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STUDY MATERIAL

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BHOPAL REGION**

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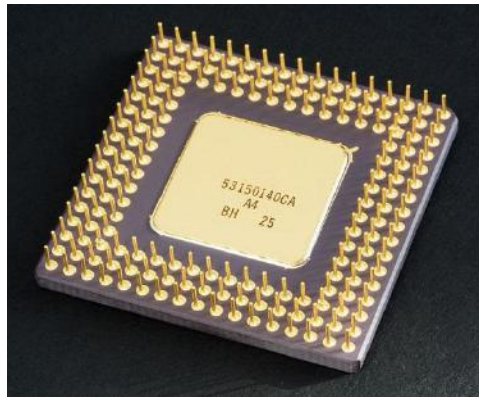
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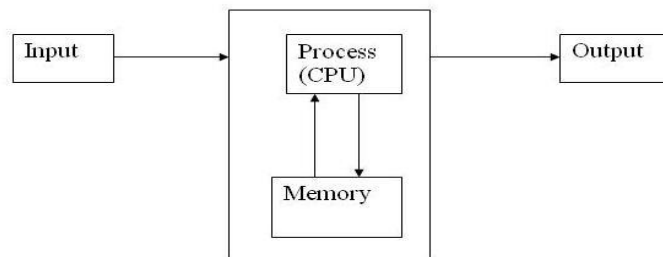
HARDWARE CONCEPTS

BASIC COMPUTER OPERATIONS

The central processing unit (CPU, occasionally central processor unit) is the hardware within a computer system which carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the system. The term has been in use in the computer industry at least since the early 1960s. The form, design, and implementation of CPUs have changed over the course of their history, but their fundamental operation remains much the same.



A computer as shown below performs basically five major operations or functions irrespective of their size and make. These are 1) it accepts data or instructions by way of input, 2) it stores data, 3) it can process data as required by the user, 4) it gives results in the form of output, and 5) it controls all operations inside a computer. We discuss below each of these operations.



1. Input: In computing, an **input device** is any peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a computer or other information appliance.

2. Storage: Storage Devices are the data storage devices that are used in the computers to store the data. The computer has many types of data storage devices. Some of them can be classified as the removable data Storage Devices and the others as the non removable data Storage Devices.

The memory is of **two types**; one is the **primary memory** and the other one is the **secondary memory**.

The primary memory is the volatile memory and the secondary memory is the non volatile memory. The volatile memory is the kind of the memory that is erasable and the non volatile memory is the one where in the contents cannot be erased. Basically when we talk about the data storage devices it is generally assumed to be the secondary memory.

The secondary memory is used to store the data permanently in the computer. The secondary storage devices are usually as follows: hard disk drives – this is the most common type of storage device that is used in almost all the computer systems. The other ones include the floppy disk drives, the CD ROM, and the DVD ROM. The flash memory, the USB data card etc.

The storage unit performs the following major functions: All data and instructions are stored here before and after processing. Intermediate results of processing are also stored here.

3. Processing: The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided. It is then sent back to the storage unit.

4. Output: This is the process of producing results from the data for getting useful information. Similarly the output produced by the computer after processing must also be kept somewhere inside the computer before being given to you in human readable form. Again the output is also stored inside the computer for further processing.

5. Control: The manner how instructions are executed and the above operations are performed. Controlling of all operations like input, processing and output are performed by control unit. It takes care of step by step processing of all operations inside the computer.

Arithmetic Logical Unit (ALU)

In computing, an **arithmetic and logic unit (ALU)** is a digital circuit that performs arithmetic and logical operations. The ALU is a fundamental building block of the central processing unit of a computer, and even the simplest microprocessors contain one for purposes such as maintaining timers

Control Unit (CU)

The control unit coordinates the components of a computer system. It fetches the code of all of the instructions in the program. It directs the operation of the other units by providing timing and control signals. All computer resources are managed by the CU. It directs the flow of data between the Central Processing Unit (CPU) and the other devices

Central Processing Unit (CPU)

The ALU and the CU of a computer system are jointly known as the central processing unit. You may call CPU as the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations.



HARDWARE



SOFTWARE

Personal Computer Configuration

Now let us identify the physical components that make the computer work. These are

1. Central Processing Unit (CPU)
2. Computer Memory (RAM and ROM)
3. Data bus
4. Ports
5. Motherboard
6. Hard disk
7. Output Devices
8. Input Devices

All these components are inter-connected for the personal computer to work.

Memory

There are two kinds of computer memory: **primary and secondary**. Primary memory is accessible directly by the processing unit. RAM is an example of primary memory. As soon as the computer is switched off the contents of the primary memory is lost. You can store and retrieve data much faster with primary memory compared to secondary memory. Secondary memory such as floppy disks, magnetic disk, etc., is located outside the computer. Primary memory is more expensive than secondary memory. Because of this the size of primary memory is less than that of secondary memory.

Random Access Memory (RAM): It is a form of computer data storage. A random-access device allows stored data to be accessed in very nearly the same amount of time for any storage location, so data can be accessed quickly in any random order. In contrast, other data storage media such as hard disks, CDs, DVDs and magnetic tape read and write data only in a predetermined order, consecutively, because of mechanical design limitations. Therefore the time to access a given data location varies significantly depending on its physical location. This memory is a volatile memory. The two main forms of modern RAM are static RAM (SRAM) and dynamic RAM (DRAM).



Read Only Memory (ROM): **Read-only memory (ROM)** is a class of storage medium used in computers and other electronic devices. Data stored in ROM cannot be modified, or can be modified only slowly or with difficulty, so it is mainly used to distribute firmware (software that is very closely tied to specific hardware, and unlikely to need frequent updates). The memories, which do not lose their content on failure of power supply.



INPUT DEVICES

Input devices are necessary to convert our information or data in to a form which can be understood by the computer. A good input device should provide timely, accurate and useful data to the main memory of the computer for processing followings are the most useful input devices.

A 'keyboard' is a human interface device which is represented as a layout of buttons. Each button, or key, can be used to either input a linguistic character to a computer, or to call upon a particular function of the computer. Traditional keyboards use spring-based buttons, though newer variations employ virtual keys, or even projected keyboards. On the basis of KEYS-LAYOUT they are of two types

- a) QWERTY Keyboard
- b) Dvorak Keyboard



Mouse: - A **pointing device** is any human interface device that allows a user to input spatial data to a computer. In the case of mice and touch screens, this is usually achieved by detecting movement across a physical surface. Analog devices, such as 3D mice, joysticks, or pointing sticks, function by reporting their angle of deflection. Movements of the pointing device are echoed on the screen by movements of the pointer, creating a simple, intuitive way to navigate a computer's GUI. There are Four types of mouse

- a) Mechanical Mouse
- b) Opto-Mechanical Mouse
- c) Optical Mouse
- d) Wireless Mouse

Light Pen: A **light pen**, also called a **selector pen**, is a computer input device in the form of a light-sensitive wand used in conjunction with a computer's CRT display. It allows the user to point to displayed objects or draw on the screen in a similar way to a touchscreen but with greater positional accuracy



Scanner: In computing, an **image scanner**—often abbreviated to just **scanner**—is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image. Common examples found in offices are variations of the desktop (or flatbed) scanner where the document is placed on a glass window for scanning. Hand-held scanners, where the device is moved by hand, have evolved from text scanning "wands" to 3D scanners used for industrial design, reverse engineering, test and measurement, orthotics, gaming and other applications. Mechanically driven scanners that move the document are typically used for large-format documents, where a flatbed design would be impractical.

- a) Hand held scanner
- b) Flat Bed Scanner



Optical Character Recognition (OCR): - **Optical character recognition**, usually abbreviated to **OCR**, is the mechanical or electronic conversion of scanned images of handwritten, typewritten or printed text into machine-encoded text. It is widely used as a form of data entry from some sort of original paper data source, whether documents, sales receipts, mail, or any number of printed records

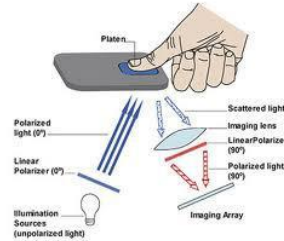
Smart Card Reader: A **smart card**, **chip card**, or **integrated circuit card (ICC)** is any pocket-sized card with embedded integrated circuits. It is a common method of digitizing printed texts so that they can be electronically searched, stored more compactly, displayed on-line, and used in machine processes such as machine translation



Barcode Reader: A **barcode reader** (or **barcode scanner**) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain *decoder* circuitry analyzing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port. There are five basic kinds of barcode readers -- pen wands, slot scanners, Charge-Couple Device (CCD) scanners, image scanners, and laser scanners.



Biometric Sensor: Biometrics (or **biometric authentication**) refers to the identification of humans by their characteristics or traits. Biometrics is used in computer science as a form of identification and access control. It is also used to identify individuals in groups that are under surveillance. Many physical characteristics may be scanned by a biometric sensor including eyes, fingerprints, or DNA. Sensors contain an analog to digital converter enabling it to digitize the image and store the digital information in memory so that it can verify the user next time he or she needs to authenticate their identity.



Web Camera:- A webcam is a video camera that feeds its images in real time to a computer or computer network, often via USB, ethernet, or Wi-Fi.

Their most popular use is the establishment of video links, permitting computers to act as videophones or videoconference stations. The common use as a video camera for the World Wide Web gave the webcam its name.



OUTPUT DEVICES

Visual Display Unit: A monitor or display (also called **screen** or **visual display unit**) is an electronic visual display for computers. The monitor comprises the display device, circuitry, and an enclosure. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT-LCD) thin panel, while older monitors use a cathode ray tube (CRT) about as deep as the screen size.



Terminals: It is a very popular interactive input-output unit. It can be divided into two types: hard copy terminals and soft copy terminals. A hard copy terminal provides a printout on paper whereas soft copy terminals provide visual copy on monitor. A terminal when connected to a CPU sends instructions directly to the computer. Terminals are also classified as dumb terminals or intelligent terminals depending upon the work situation.

Printer: In computing, a **printer** is a peripheral which produces a representation of an electronic document on physical media such as paper or transparency film. Many printers are local peripherals connected directly to a nearby personal computer. *Network printers* have built-in network interfaces can serve any user on the network. Individual printers are often designed to support both local and network connected users at the same time. Some printers can print documents stored on memory cards or from digital cameras and scanners. **Multifunction printers (MFPs)** include a scanner and can copy paper documents or send a fax; these are also called multi-function devices (MFD), or **all-in-one (AIO)** printers. Most MFPs include printing, scanning, and copying among their many features.

Depending on their speed and approach of printing, printers are classified as impact and non-impact printers.

Impact printers: use the familiar typewriter approach of hammering a typeface against the paper and inked ribbon. Dot-matrix printers are of this type.

Non-impact printers: do not hit or impact a ribbon to print. They use electro-static chemicals and ink-jet technologies. Laser printers and Ink-jet printers are of this type. This type of printers can produce color printing and elaborate graphics.

Ink-jet (bubble-jets) printers: Ink-jets(bubble-jets) printers spray ionized tiny drops of ink onto a page to create an image. This is achieved by using magnetized plates which direct the ink's path onto the paper in the desired pattern. Almost all ink-jets offer a color option as standard, in varying degrees of resolution.



Laser Printers: Laser printers operate by shining a laser beam to produce an image on a drum. The drum is then rolled through a pool, or reservoir, of toner, and the electrically charged portions of the drum pick up ink. Finally, using a combination of heat and pressure, the ink on the drum is transferred onto the page. Laser printers print very fast, and the

supply cartridges work a long time. Color laser printers use the same toner-based printing process as black and white (B/W) laser printers, except that they combine four different toner colors.



Plotters: Plotters are large-scale printers that are very accurate at reproducing line drawings. They are commonly used for technical drawings such as engineering drawings or architectural blueprints. The two basic types of plotters are called flatbed plotters and drum plotters. Flatbed plotters are horizontally aligned with a flat surface to which a piece of paper is attached. The paper remains stationary and the printer moves pens across the paper to draw the image. Drum plotters, also called upright plotters, are vertically positioned. They have a drum that the paper rolls on. Drum plotters usually make more noise and are more compact than flatbed plotters.



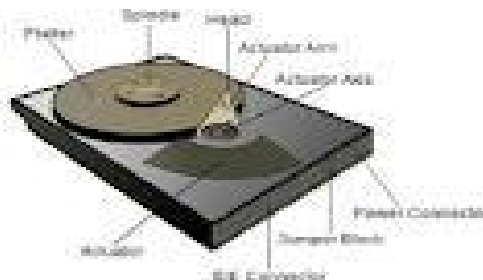
Secondary Storage Device: Alternatively referred to as external memory and auxiliary storage, secondary storage is a storage medium that holds information until it is deleted or overwritten regardless if the computer has power. For example, a floppy disk drive and hard disk drive are both good examples of secondary storage devices.

Magnetic Tapes: The Magnetic Tapes is the Type of Secondary Storage Device and this Device is used for taking back up of data and this Tape contains some magnetic fields and the Magnetic Tapes are used Accessing the data into the Sequential Form and the Tape Also Contains a Ribbon which is coated on the Single Side of the Tape and also contains a head which reads the data which is Recorded on to the Tape. And when we are reading the information from the disk then we can also read backward information means we can also back the Tape for Reading the Previous information. And For inserting the Tape into the System we also Requires Some Tape Drives Which Contains Tape and which is Responsible for Reading the contents from the Tapes. They can Store huge Amount of data into the Tape Drive , But the Main Limitation of the Tape Drive is that we cant Access the Data from the Disks directly means if we wants to 100th Record from the Tape then we must have to move all the Previous i.e. 99th Records first. And the Tapes are also easily damaged due to the Human Errors.



Magnetic Disks : - This is also called as the hard disk and this is made from the thin metal platter which is coated on the both sides of the magnetic Disks. And the there are Many Plates or Platters into a single hard disk and all the Plates are Made from the Magnetic Materials and all the Disks are Rotate from the 700 to 3600 rpm means Rotation per Minute and the hard disk also Contains a head which is used for both Reading and Writing the Data from the Hard Disks.

The Plate of Disk is Divided into the Tracks and sectors and the collection of Tracks makes a Cylinder means all the Tracks of the Disk which a Consecutive Areas makes a Cylinder.



Floppy Diskette: A **floppy disk**, or **diskette**, is a **disk storage** medium composed of a disk of thin and flexible **magnetic storage** medium, sealed in a rectangular plastic carrier lined with fabric that removes dust particles. They are read and written by a **floppy disk drive** (FDD). Floppy disks, initially as 8-inch media and later in 5.25-inch and 3.5-inch sizes.

The Floppy Disk is also called as Reusable Disk means the Floppy Disk Provides us the Facility to Read and Writes the Data into disk as and When Necessary and Also Many Times. We can Read and Write the data from the Disk.



DVD: DVD stands for Digital Versatile/Video Disc, **DVD** is an optical disc storage format, invented and developed by Philips, Sony, Toshiba, and Panasonic in 1995. DVDs offer higher storage capacity than Compact Discs while having the same dimensions.

Pre-recorded DVDs are mass-produced using molding machines that physically stamp data onto the DVD. Such discs are known as DVD-ROM, because data can only be read and not written nor erased. Blank recordable DVD discs (DVD-R and DVD+R) can be recorded once using a DVD recorder and then function as a DVD-ROM. Rewritable DVDs (DVD-RW, DVD+RW, and DVD-RAM) can be recorded and erased multiple times.



USB Drives: A **USB flash drive** is a data storage device that includes flash memory with an integrated Universal Serial Bus (USB) interface. USB flash drives are typically removable and rewritable, and physically much smaller than a floppy disk. USB drives are currently available in USB 2.0 with USB 3.0 hitting the market now. These small plug-and-play drives are removable, re-writable, and great for storing personal and professional data, as many are hardware-encrypted devices for ultimate security.



Memory Card: A **memory card** or **flash card** is an electronic flash memory data storage device used for storing digital information. They are commonly used in many electronic devices, including digital cameras, mobile phones, laptop computers, MP3 players and video game consoles. They are small, re-recordable, and able to retain data without power.

There are a number of memory cards on the market, including the SD card (secure digital card), the CF card (Compact Flash card), the Smart Media card, the Memory Stick, and the Multimedia Card.



Quantities of bytes						
Common prefix				Binary prefix		
Name	Symbol	Decimal	Binary	Name	Symbol	Binary
		SI	JEDEC			IEC
kilobyte	KB/kB	10 ³	2 ¹⁰	kibibyte	KiB	2 ¹⁰
megabyte	MB	10 ⁶	2 ²⁰	mebibyte	MiB	2 ²⁰
gigabyte	GB	10 ⁹	2 ³⁰	gibibyte	GiB	2 ³⁰
terabyte	TB	10 ¹²	2 ⁴⁰	tebibyte	TiB	2 ⁴⁰
petabyte	PB	10 ¹⁵	2 ⁵⁰	pebibyte	PiB	2 ⁵⁰
exabyte	EB	10 ¹⁸	2 ⁶⁰	exbibyte	EiB	2 ⁶⁰
zettabyte	ZB	10 ²¹	2 ⁷⁰	zebibyte	ZiB	2 ⁷⁰
yottabyte	YB	10 ²⁴	2 ⁸⁰	yobibyte	YiB	2 ⁸⁰

Flash Drives:

Also known as thumb drives because of their size or as USB drives because that's the port they connect to, flash drives are an extremely popular way to store data in a compact and portable fashion. Flash drives range in data capacity up to a whopping one terabyte (1,000GB) as of February 2012.

External Hard Drives:

External hard drives are exactly like the hard drive on any computer except they are outside of your computer. They usually connect through a USB port (similar to flash drives), are designed either for desktops or laptops and have a storage capacity of up to 2TB or more. Large companies or other individuals who need secure storage often use technologies that involve combined external hard drives set up in RAID or other hot-swappable, fault-tolerant configurations.

Smart Cards:

Smart cards are also known as memory cards. The usage and types of smart cards have evolved over the years from primary usage in laptops to cell phones and Personal Digital Assistants (PDAs). Many printers, laptops and other computers come with slots for various types of memory cards; SD cards in particular are quite popular and for the most part top out at about 2GB.

Online Storage:

Also called "remote backup," or "cloud storage," online storage sites allow you to store information on a company's servers. SugarSync, Dropbox, iDrive and numerous other sites provide these services for free; more storage space is typically available for a fee.

Re-writable CDs and DVDs:

Rewritable CDs and DVDs look exactly like CDs and DVDs you can buy in a store with music and movies on them, except in the case of rewritables you can store information on them. They are often used to store music, text files, photos, and other data. CD rewritables can hold up to about 700MB, DVD rewritables can hold up to about 4.7GB and Blu-ray rewritables, which are starting to become popular at the time of this writing, can hold about 25GB.

Questions & Answers on Hardware Concepts

1. What are Input devices for PDA's, Smart Phones and Tablet PC's ?

Ans. A Primary Input device for a PDA is a basic stylus. Some PDAs have a built in keyboard or support voice input. You can attach a full sized portable keyboard to a PDA. Smart phones include PDA capabilities, onput devices used with PDAs usually are available for smart phones. The Primary input for a Tablet PC is a digital pen, with which you can write on the device screen.

2. What are various Biometric Devices ?

Ans. A Biometric device translates a personal characteristic into digital code that is compared with a digital code stored in the computer to identify an individual. A Fingerprint scanner captures curves and indentations of a fingerprint. A face recognition system captures a live face image. A hand geometry system measures the shape and size of hand. A voice verification system compares live speech with a stored voice pattern. A signature verification system recognizes the shape of a signature.

3. Recognize the four categories of Output

Ans. Output is a data that has been processed into a useful form. Four categories of output are text, graphics, audio and video

4. How is compiler different from interpreter ?

Ans. A Compiler converts the source code(HLL) into object code (MLL) in one go and reports all the errors along with their line numbers.
An interpreter converts source code into object code line by line and executes it there and then. It does not shift to the next line if a line contains errors.

5. What are the differences between hardware, software and firmware ?

Ans. **Hawdware** are the physical tangible components of a computer system.
Software are the computer programs that govern the operation of a computer System
Firmware are the prewritten programs permanently stored in read-only memory

6. Give examples of each system software and application software. Explain the function of each type.

Ans. Examples of System software are : (i) Operating System (ii) Language processors (iii) Application software
Examples of Operating system are : *Single User, Multiuser, Batch Processing, Multiprocessing* etc
As the name suggest single user OS supports single user whereas multiuser OS can support multi users. The batchprocessing OS processes the batch of jobs(one at a time) and multiprocessing OS is capable of handling multiple CPUs at the same time
Examples of Language processors are (i) Interpreter (ii) Compiler (iii) Assembler
An **interpreter** converts source code into object code line by line and excutes it there and then. It does not shift to the next line if a line contains errors.
A **Compiler** converts the source code(HLL) into object code (MLL) in one go and reports all the errors along with their line numbers.
Examples of application software are : (i) Customised software (ii) General Software

7. What are the types of computers? How do they differ

Ans. There are three types of computers (i) Digital (ii) Analog (iii) Hybrid
Digital Computers deal with discrete quantities
Analog computers del with physical quantities
Hybrid computers combine the characteristics of analog and digital computers

8. Name the super computers developed in India.

Ans. PARAM, PACE, EKA

9. What are the major strength and weaknesses of a computer ?

Ans. **Strength** : 1. Speed 2. Accuracy 3. Reliability 4. High storage 5. Versatility
Weaknesses : 1. Lack of decision making 2. Zero IQ

10. Why is binary language often termed as machine language ? Why is machine language needed?

Ans. A Computer works on Binary numbers which are in the form of 0's and 1's. Thus it needs a language that uses unique symbols to represent these two states. Therefore a computer works on machine language. The Binary language is often termed as machine language as it fulfills the condition of using two unique symbols.

11. What is MICR? Where it is mostly used?

Ans. MICR stands for Magnetic Ink Character Reader. This device can read human readable characters that are printed using a special magnetic ink. The MICR is mostly used in banks.

12. What is the difference between OCR and OMR ?

Ans. An OCR (Optical Character Reader) is used to read characters of special type font that are printed on paper or it is a scanned document

On the other hand an OMR (Optical Mark Reader) is used to transcribe marks that are marked with a dark pencil or ink on a special preprinted form (answer sheet of multiple choice question paper where choice of the answer is reflected by shading the correct box)

13. What are the two categories of printers ? Which type of printer is more speedy

Ans. The printers can be classified in two categories

1. Impact Printers : In these type of printers, there is a physical connection between the paper and the print head. They are (i) Line Printer (ii) Dot Matrix Printer (iii) Daisy Wheel Printer
2. Non Impact Printer : In these types, there is no physical connection between the paper and the print head. The printing takes place with some electromagnetic, thermal, laser techniques.

The Non Impact printers are more speedy than Impact printers

14. What is the difference between RAM and ROM ?

Ans. RAM stand for Random Access Memory where both read and write operation can take place, but this is volatile memory; its contents are lost when power is turned off
ROM stands for Read Only Memory where only read operation can take place. This is a non volatile memory
Both RAM and ROM are the parts of primary memory

15. What does a Bus mean ?

Ans. A Bus is a group of conducting lines that carries data, address and control signals between a CPU and memory

16. What is Port? Name some port types

Ans. Port is a point on a computer having circuitry to allow connection of external devices with computer. Ports are of various types

Serial Port, Parallel Port, InfraRed Port, Phone Port, USB Port, AGP Port, Network Port

17. Can you pick the one that offers maximum read speed along with maximum capacity ?
Memory stick ProDuo, SD Card, MMC Plus, Smart Media Card

Ans. Out of these Memory stick ProDuo offers maximum read speed along with maximum capacity

18. Write the full forms of the following terms VDU, LCD, DMP, CRT, CD-RW, DVD

Ans.	VDU	– Visual Display Unit
	LCD	– Liquid Crystal Display
	DMP	– Dot Matrix Printer
	CRT	– Cathode Ray Tube
	CD-RW	– Compact Disk Read/Write
	DVD	– Digital Video Disk

SOFTWARE CONCEPTS

Types of Software

Operating System:

An **operating system (OS)** is a collection of software that manages computer hardware resources and provides common services for computer programs. The operating system is a vital component of the system software in a computer system. Application programs require an operating system to function. For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware . The most popular and latest ones include the Windows XP, Mac, UNIX, Linux, Windows Vista, etc.



Functions of an Operating System

The major functions of an OS are:

- resource management,
- data management,
- job (task) management, and
- standard means of communication between user and computer.

The resource management function of an OS allocates computer resources such as CPU time, main memory, secondary storage, and input and output devices for use.

The data management functions of an OS govern the input and output of the data and their location, storage, and retrieval



Need of an Operating System:

At the simplest level, an operating system does two things:

1. It manages the hardware and software resources of the system. In a desktop computer, these resources include such things as the processor, memory, disk space, etc. (On a cell phone, they include the keypad, the screen, the address book, the phone dialer, the battery and the network connection.)
2. It provides a stable, consistent way for applications to deal with the hardware without having to know all the details of the hardware.

The first task, managing the hardware and software resources, is very important, as various programs and input methods compete for the attention of the **central processing unit** (CPU) and demand memory, storage and input/output (I/O) bandwidth for their own purposes. In this capacity, the operating system plays the role of the good parent, making sure that each application gets the necessary resources while playing nicely with all the other applications, as well as husbanding the limited capacity of the system to the greatest good of all the users and applications.

The second task, providing a consistent application interface, is especially important if there is to be more than one of a particular type of computer using the operating system, or if the hardware making up the computer is ever open to change. A consistent **application program interface** (API) allows a software developer to write an application on one computer and have a high level of confidence that it will run on another computer of the same type, even if the amount of memory or the quantity of storage is different on the two machines.

In earlier days user had to design the application according to the internal structure of the hardware. Operating System was needed to enable the user to design the application without concerning the details of the computer's internal structure. In general the boundary between the hardware & software is transparent to the user.

1. Easy interaction between the human & computer.
2. Starting computer operation automatically when power is turned on.
3. Loading & scheduling users program.
4. Controlling input & output.
5. Controlling program execution.
6. Managing use of main memory.
7. Providing security to users program.

For hardware functions such as input and output and memory allocation, the Operating System acts as an intermediary between application programs and the computer hardware, although the application code is usually executed directly by the hardware and will frequently call the OS or be interrupted by it.

Process management:

It deals with running multiple processes. Most operating system allows a process to be assigned a priority which affects its allocation of CPU time. Interactive operating systems also employ some level of feedback in which the task with which the user is working receives higher priority. In many systems there is a background process which runs when no other process is waiting for the CPU.

Memory management:

It is the act of managing computer memory. The essential requirement of memory management is to provide ways to dynamically allocate portions of memory to programs at their request, and freeing it for reuse when no longer needed. This is critical to the computer system.

Several methods have been devised that increase the effectiveness of memory management. Virtual memory systems separate the memory addresses used by a process from actual physical addresses, allowing separation of processes and increasing the effectively available amount of RAM using paging or swapping to secondary storage. The quality of the virtual memory manager can have an extensive effect on overall system performance.

Disk and file systems:

Operating systems have a variety of native file systems that controls the creation, deletion, and access of files of data and programs.

Networking:

A **computer network**, or simply a **network**, is a collection of computers and other hardware components interconnected by communication channels that allow sharing of resources and information.^[1] Where at least one process in one device is able to send/receive data to/from at least one process residing in a remote device, then the two devices are said to be in a network. Simply, more than one computer interconnected through a communication medium for information interchange is called a computer network.

Networks may be classified according to a wide variety of characteristics, such as the medium used to transport the data, communications protocol used, scale, topology, and organizational scope.

Security:

Most operating systems include some level of security.

Language Processor

Assembler:

It is a computer program to translate between lower-level representations of computer programs; it converts basic computer instructions into a pattern of bits which can be easily understood by a computer and the processor can use it to perform its basic operations

Compiler:

A **compiler** is a computer program (or set of programs) that transforms source code written in a programming language (the *source language*) into another computer language (the *target language*, often having a binary form known as object code). The most common reason for wanting to transform source code is to create an executable program.

A compiler can translate the programs of only that language for which it is written. For example C++ compiler can translate only those programs, which are written in C++. Each machine requires a separate compiler for each high level language.

Interpreter:

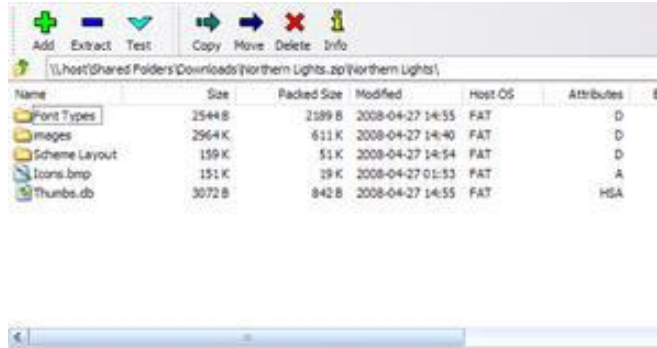
An interpreter is a program that converts one statement of a program at a time. It executes this statement before translating the next statement of the source program. If there is an error in the statement, the interpreter will stop working and displays an error message. The advantage of interpreters over compilers is that an error is found immediately. So the programmer can make corrections during program development.

Utility Software:

Utility software is system software designed to help analyze, configure, optimize or maintain a computer. A single piece of utility software is usually called a **utility** or **tool**.

Utility software usually focuses on *how* the computer infrastructure (including the computer hardware, operating system, application software and data storage) operates. Due to this focus, utilities are often rather technical and targeted at people with an advanced level of computer knowledge - in contrast to application software, which allows users to do things like creating text documents, playing games, listening to music or viewing websites.

Compression Tools: Data compression can be used for many purposes on computers and achieved in many ways. There are two types of data compression, lossy and lossless. Lossy compression makes data smaller by removing excess data so that the end result is still acceptable for its purpose. This is a one-way process and the compressed data is the result. Lossless compression makes data smaller by looking for patterns that can be written more concisely. This is a reversible process and a compressed file is the result. This file will have to be decompressed to access the original data. Advantages of data compression are that compressed data will take up less space on a computer and be quicker to transmit. Ex: 7-Zip, IZArc, WinRAR, PeaZip, The Unarchiver,

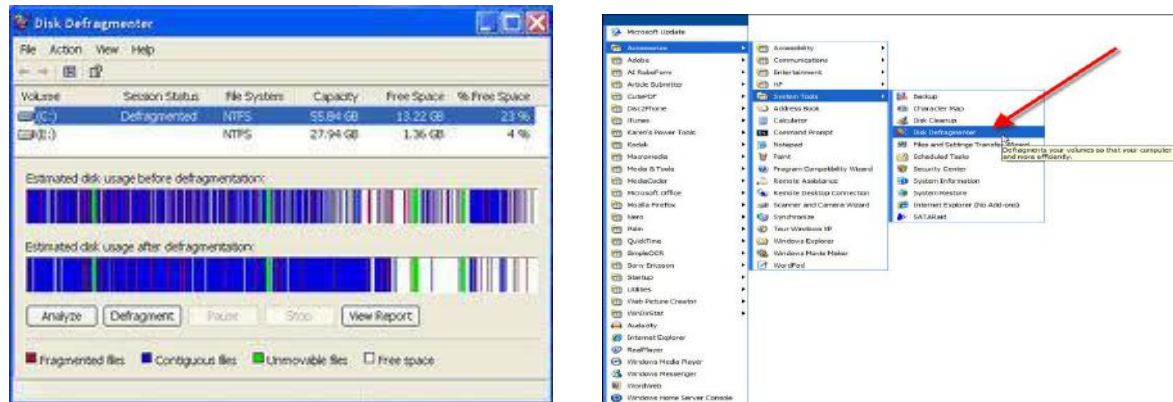


Data compression for computer files is a lossless compression
 Data compression for audio can be lossy or lossless

Data compression of images can be either lossy or lossless depending on the compression format used.

Data compression of video is primarily lossy

Disk Defragmenter:



Disk Defragmenter is a utility in Microsoft Windows designed to increase access speed by rearranging files stored on a disk to occupy contiguous storage locations, a technique called defragmentation. Defragmenting a disk minimizes head travel, which reduces the time it takes to read files from and write files to the disk.^[1] Beginning with Windows XP, Disk Defragmenter also reduces system startup times

Antivirus:

Antivirus or **anti-virus software** is software used to prevent, detect and remove malware (of all descriptions), such as: computer viruses, adware, backdoors, malicious BHOs, dialers, fraudtools, hijackers, keyloggers, malicious LSPs, rootkits, spyware, trojan horses and worms. Computer security, including protection from social engineering techniques, is commonly offered in products and services of antivirus software companies. Commonly used Antivirus are Norton, Kaspersky, Quick heal etc.

Application Software:

Application software, also known as an **application** or an **app**, is computer software designed to help the user to perform specific tasks. Examples include enterprise software, accounting software, office suites, graphics software and media players. Many application programs deal principally with documents. Apps may be bundled with the computer and its system software, or may be published separately. Some users are satisfied with the bundled apps and need never install one.

There are two types of Application software

General purpose Application Software e.g. Word, Excel, DBMS etc.

Specific Purpose Application Software e.g. Inventory Management System, Payroll System, Railway Reservation System, Hotel Management System etc.

Computer Security Threats:

Computer systems are vulnerable to many threats that can inflict various types of damage resulting in significant losses. This damage can range from errors harming database integrity to fires destroying entire computer centers. Losses can stem, for example, from the actions of supposedly trusted employees defrauding a system, from outside hackers, or from careless data entry clerks. Precision in estimating computer security-related losses is not possible because many losses are never discovered, and others are "swept under the carpet" to avoid unfavorable publicity. The effects of various threats varies considerably. Some affect the confidentiality or integrity of data while others affect the availability of a system.

Malware:

Short for "malicious software," Malware refers to software programs designed to damage or do other unwanted actions on a computer system. In Spanish, "mal" is a prefix that means "bad," making the term "badware," which is a good way to remember it (even if you're not Spanish).

Common examples of Malware include viruses, worms, Trojan horses, and Spyware. Viruses, for example, can cause havoc on a computer's hard drive by deleting files or directory information. Spyware can gather data from a user's system without the user knowing it. This can include anything from the Web pages a user visits to personal information, such as credit card numbers.

Virus :

Like a biological virus, a computer virus is something you don't want to get. Computer viruses are small programs or scripts that can negatively affect the health of your computer. These malicious little programs can create files, move files, erase files, consume your computer's memory, and cause your computer not to function correctly. Some viruses can duplicate themselves, attach themselves to programs, and travel across networks. In fact opening an infected e-mail attachment is the most common way to get a virus.

We all know it's hard enough to get a computer to work well when it is healthy, let alone when it has been attacked by a virus. Therefore, it is better to prevent an attack than to try and cure it. There are many antivirus programs available that scan incoming files for viruses before they can cause damage to your computer. Some of these programs include Norton Antivirus, McAfee Virus Scan, and Virex

Trojan Horse:

A **Trojan horse**, or **Trojan**, is a type of malware that masquerades as a legitimate file or helpful program possibly with the purpose of granting a hacker unauthorized access to a computer. Trojans do not attempt to inject themselves into other files like a computer virus. Trojan horses may steal information, or harm their host computer systems.^[1] Trojans may use drive-by downloads or install via online games or internet-driven applications in order to reach target computers. The term is derived from the Trojan Horse story in Greek mythology because Trojan horses employ a form of "social engineering," presenting themselves as

harmless, useful gifts, in order to persuade victims to install them on their computers. For example, a Trojan horse might appear to be a computer game, but once you double-click it, the program starts writing over certain parts of your hard drive, corrupting your data. While this is certainly something you want to avoid, it is good to know that these malicious programs are only dangerous if they are given a chance to run. Also, most antivirus programs can catch Trojan horses when scanning for viruses. Unlike viruses, however, Trojan horses don't replicate themselves. Though it is possible for a Trojan horse to be attached to a virus file that spreads to multiple computers.

Spyware:

Spyware is a type of malware (malicious software) installed on computers that collects information about users without their knowledge. The presence of spyware is typically hidden from the user and can be difficult to detect. Some spyware, such as keyloggers, may be installed by the owner of a shared, corporate, or public computer intentionally in order to monitor users.

As the name implies, this is software that "spies" on your computer. Nobody likes to be spied on, and your computer doesn't like it either. Spyware can capture information like Web browsing habits, e-mail messages, usernames and passwords, and credit card information. If left unchecked, the software can transmit this data to another person's computer over the Internet.

Worm:

A **computer worm** is a standalone malware computer program that replicates itself in order to spread to other computers. Often, it uses a computer network to spread itself. This is due to security shortcomings on the target computer. Unlike a computer virus, it does not need to attach itself to an existing program. Worms almost always cause at least some harm to the network, even if only by consuming bandwidth, whereas viruses almost always corrupt or modify files on a targeted computer.

Worms are hard to detect because they are typically invisible files. They often go unnoticed until your computer begins to slow down or starts having other problems. Unlike viruses and Trojan horses, worms can replicate themselves and travel between systems without any action from the user. For these reasons, it is good to have an antivirus program installed on your system that can detect and remove worms before they have a chance to replicate or spread to other computers. Security updates such as Windows Update also patch security holes that allow worms to infect your computer. So keep your security updates and virus definitions up-to-date and you should be able to keep your computer worm-free.

Virus detection and its removal:

Virus detection and its removal are made through an antivirus program which finds out viruses in a computer and then possibly removes or repairs the virus problem. Some of commonly used Virus detection and its removable tools are Norton Antivirus, McAfee, Virus Scan, Kaspersky and Quick Heal etc.

Digital Certificate:

A digital certificate is a pair of files on your computer that you can use to create the digital equivalent of handwritten signatures and sealed envelopes. Each pair of files is divided into two parts: the public key and the private key. The public key is the portion that is shared; the private key is the portion that you, and only you, should have access to. Your computer and programs understand how to share only the public portion of your keys so that others can see them, while still keeping your private keys secure.

For example, when sending an e-mail message, you can digitally sign the message by attaching your digital certificate. Once they receive the message, recipients can verify that it came from you by viewing the small attachment on the e-mail, which contains your public key information. This protects you from people who might try to "spoof" an e-mail that looks like it came from you but is really sent from a different e-mail account.

Digital Signature:

A digital signature authenticates electronic documents in a similar manner a handwritten signature authenticates printed documents. This signature cannot be forged and it asserts that a named person wrote or otherwise agreed to the document to which the signature is attached. The recipient of a digitally signed message can verify that the message originated from the person whose signature is attached to the document and that the message has not been altered either intentionally or accidentally since it was signed. Also, the signer of a document cannot later disown it by claiming that the signature was forged. In other words, digital signatures enable the “authentication” and “non-repudiation” of digital messages, assuring the recipient of a digital message of both the identity of the sender and the integrity of the message.

A digital signature is issued by a Certification Authority (CA) and is signed with the CA's private key. A digital signature typically contains the: Owner's public key, the Owner's name, Expiration date of the public key, the Name of the issuer (the CA that issued the Digital ID), Serial number of the digital signature, and the digital signature of the issuer. Digital signatures deploy the Public Key Infrastructure (PKI) technology.

Cookies:

A **cookie**, also known as an **HTTP cookie**, **web cookie**, or **browser cookie**, is usually a small piece of data sent from a website and stored in a user's web browser while a user is browsing a website. When the user browses the same website in the future, the data stored in the cookie can be retrieved by the website to notify the website of the user's previous activity.^[1] Cookies were designed to be a reliable mechanism for websites to remember the state of the website or activity the user had taken in the past. This can include clicking particular buttons, logging in, or a record of which pages were visited by the user even months or years ago.

How Do They Work

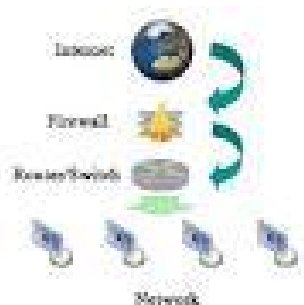
A command line in the HTML of a document tell the browser to set a cookie of a certain name or value? Here is an example of some script used to set a cookie. Set-Cookie: NAME=VALUE; expires=DATE; path=PATH; domain=DOMAIN_NAME; secure Cookies are usually run from CGI scripts, but they can also be set or read by JavaScript.

Firewall:

A **firewall** can either be software-based or hardware-based and is used to help keep a network secure. Its primary objective is to control the incoming and outgoing network traffic by analyzing the data packets and determining whether it should be allowed through or not, based on a predetermined rule set. A network's firewall builds a bridge between an internal network that is assumed to be secure and trusted, and another network, usually an external (inter)network, such as the Internet, that is not assumed to be secure and trusted

Hardware Firewall

Hardware firewall providing protection to a Local Network.



Software Firewall:

Computer running firewall software to provide protection



A firewall examines all traffic routed between the two networks to see if it meets certain criteria. If it does, it is routed between the networks, otherwise it is stopped. A firewall filters both inbound and outbound traffic. It can also manage public access to private networked resources such as host applications. It can be used to log all attempts to enter the private network and trigger alarms when hostile or unauthorized entry is attempted. Firewalls can filter packets based on their source and destination addresses and port numbers. This is known as address filtering. Firewalls can also filter specific types of network traffic. This is also known as protocol filtering because the decision to forward or reject traffic is dependant upon the protocol used, for example HTTP, ftp or telnet. Firewalls can also filter traffic by packet attribute or state.

Password:

A **password** is a secret word or string of characters that is used for authentication, to prove identity or gain access to a resource (example: an access code is a type of password). The password should be kept secret from those not allowed access. The use of passwords is known to be ancient. Sentries would challenge those wishing to enter an area or approaching it to supply a password or *watchword*. Sentries would only allow a person or group to pass if they knew the password. In modern times, user names and passwords are commonly used by people during a log in process that controls access to protected computer operating systems, mobile phones, cable TV decoders, automated teller machines (ATMs), etc. A typical computer user may require passwords for many purposes: logging in to computer accounts, retrieving e-mail from servers, accessing programs, databases, networks, web sites, and even reading the morning newspaper online.

Questions & Answers on Software Concepts

Q.1. What are various categories of software ?

Ans. They are broadly classified into two categories

- (i) **System Software** : This type of software controls internal computer operations. The system software can be further classified in two categories
 - a) **Operating System** : An Operating system is a set of programs which act as a interface between a user and hardware
 - b) **Language Processors** : This program is responsible for converting a HLL code into machine understandable code.
- (ii) **Application Software** : An Application software is a set of programs

Q.2. What are various types of Operating System ?

Ans. The Operating system are mainly following types :

- (i) **Single Program OS** : As the name suggest this OS is single user operating system, so only one user program can be supported and executed by it
- (ii) **Multiprogram OS** : Unlike single program OS, this is multiuser OS. It supports multiprogramming i.e., more than one user can be supported by it, therefore more than one user programs are loaded and active in main memory at a time
- (iii) **Time sharing OS** : This OS uses time sharing techniques. Each active use is given a fair share of CPUY time. If the time elapses or an I/O operation is requested, CPU shifts over to the next job waiting and the previous program is put to wait
- (iv) **Real time OS**: In this OS the jobs have fixed deadlines and the jobs have to be completed within fixed deadlines. The System performance is measured by its ability to complete its jobs within the specified deadlines.
- (v) **Multiprocessing OS** : This OS is capable of handling more than one processors as the jobs have to be executed on more than one processor.

Q.3. What is fragmentation? How does it affect computers performance?

Ans. Fragmentation means files stored in fragmented storage blocks. That is when files are not stored in contiguous storage areas rather their contents are scattered over the disk it is known as fragmentation.

High fragmentation slows down a computer as the computer has to perform more read/ write operations.

Q.4. What is application software ? Why are its types?

Ans. **Application Software**: An application software is the set of programs necessary to carry out operations for a specified application. These are the programs written by programmers to enable computer to perform a specific tasks such as processing word, inventory controls, handling calculation and figures, medical accounting, financial accounting, result preparation, railway reservation, billing etc.

Application Software Types:

Packages: General application software's are known as Packages.

Utilities: They are those applications programs that assist the computer by performing housekeeping functions like baking up disk or scanning / cleaning viruses or arranging information etc.

Customised Software: This type of software istailor-made software to a user's requirements. The type of software is developed to meet all the requirements specified by the user.

Q.5. Define the following.

- a. Spam b. Malware c. Phishing d. Firewall e. Digital Signature f. Digital Certificate

Ans. **Spam** : Email spam, also known as junk email or unsolicited bulk email (UBE), is a subset of electronic spam involving nearly identical messages sent to numerous recipients by email. Clicking on links in spam email may send users to phishing web sites or sites that are hosting malware. Spam email may also include malware as scripts or other executable file attachments. Definitions of spam usually include the aspects that email is unsolicited and sent in bulk.

Malware : Malware, short for malicious software, is software used or created to disrupt computer operation, gather sensitive information, or gain access to private computer systems. It can appear in the form of code, scripts, active content, and other software

Phishing : Phishing is attempting to acquire information (and sometimes, indirectly, money) such as usernames, passwords, and credit card details by masquerading as a trustworthy entity in an electronic communication

Firewall : A firewall can either be software-based or hardware-based and is used to help keep a network secure. Its primary objective is to control the incoming and outgoing network traffic by analyzing the data packets and determining whether it should be allowed through or not, based on a predetermined rule set.

Digital Signature : A digital signature or digital signature scheme is a mathematical scheme for demonstrating the authenticity of a digital message or document. A valid digital signature gives a recipient reason to believe that the message was created by a known sender, and that it was not altered in transit. Digital signatures are commonly used for software distribution, financial transactions, and in other cases where it is important to detect forgery or tampering.

Digital Certificate : A digital certificate is an electronic "credit card" that establishes your credentials when doing business or other transactions on the Web. It is issued by a certification authority (CA). It contains your name, a serial number, expiration dates, a copy of the certificate holder's public key (used for encrypting messages and digital signatures), and the digital signature of the certificate-issuing authority so that a recipient can verify that the certificate is real

Q.6. What do you understand by IDE ?

Ans. IDE stands for Integrated Development Environment. It is an application program consisting of different development tools needed for developing and application

Q.7. What is DBMS ? How it is useful

Ans. DBMS stands for Data Base Management System. It is a software that can handle and manage bulk of stored data in the form of tables and records.

Q.8. What is DTP Software ? Give an example of DSTP Software.

Ans. DTP stands for Desk Top Publishing. It is a software that handles page layouts by combining the functions of traditional typesetter and a layout artist. Example is Corel Draw, Page Maker etc.

UNIT – II

INTRODUCTION TO PROGRAMMING

Getting started with IDE

- **RAD:** Rapid Application Development is software programming technique that allows quick development of software application.
- **Integrated Development Environment (IDE):** It is a software tool to help programmer to edit, compile, interpret and debug the program in the same environment. i.e Eclipse, NetBeans, VB etc.
- **Byte code:** A byte code is machine instruction that the Java compiler generates and Java interpreter executes. When the compiler compiles a .java file, it produces a series of byte codes and stores them in a .class file. The Java interpreter (JVM) can execute the byte codes stored in the .class file.
- **JVM:** Java Virtual Machine (JVM) is a program which behaves as interpreter and translates the byte code into machine language as they go called just in time compilation.
- **Source Code:** The core program or text which is written in a language like C, C++ or Java is called source code.
- **Object Code:** The program which only is understood by the computer in the form of machine instructions or binary instructions called object code. In Java JVM is used to generate object code in the form of byte code.
- **GUI:** A graphical user interface (GUI) presents a pictorial interface to a program. GUI allows the user to spend less time trying to remember which keystroke sequences do what and spend more time using the program in a productive manner.

Programming Fundamentals

Token

The smallest individual unit in a program is known as Token. Java has the following types of tokens: *keyword, Identifier, literal, punctuators and operators.*

Keywords

Keywords are words that have a specific predefined meaning in Java. They cannot be used as variable names. They are also known as reserve words. Eg. void, private, if, while etc.

Literals:

Items having fixed data values are referred to as Literals. They are also known as Constants. Various types of literals available in Java are :

- *Integer literals*
- *Floating literals*
- *Boolean literals*
- *Character literals*
- *String literals*
- *Null literals*

Variable :

Variable is a named storage location in computer memory whose contents can change during a program run.

The characteristics of a variable are:

- (i) It has a name.
- (ii) It is capable of storing values.
- (iii) It provides temporary storage.
- (iv) It is capable of changing its value during program execution.

Punctuators:

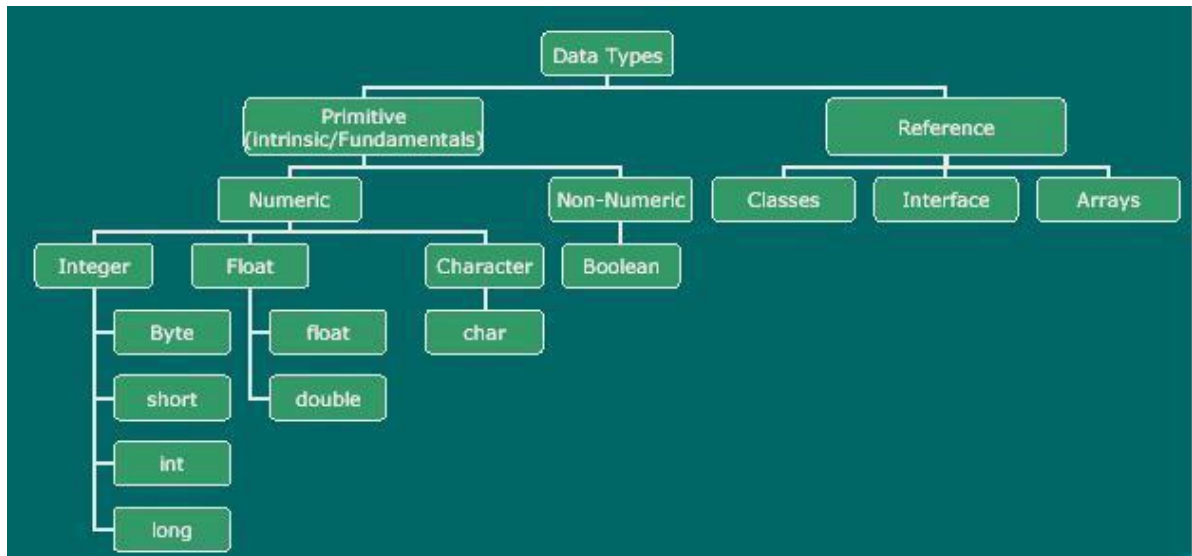
The following nine ASCII charaters are the separators:

() { } [] ; , .

Operators: Operators are special symbols that perform specific operations on one, two, or three operands, and then return a result.

Operators	Precedence
postfix	expr++ expr
unary	++expr expr+expr expr~ !
multiplicative	* / %
additive	+ -
shift	<<>>>>
relational	<><= >= instanceof
equality	== !=
bitwise AND	&
bitwise exclusive	OR ^
bitwise inclusive	OR
logical	AND &&
logical	OR
ternary	? :
assignment	= += *= /= %= &= ^= = <<= >>= >>>=

Data type states the way the values of that type are stored, and the range for that type.



Primitive Data Types:

The Java programming language is statically typed, which means that all variables must first be declared before they can be used.

A primitive type is predefined by the language and is named by a reserved keyword. The eight primitive data types supported by the Java programming language are:

- **byte:** The byte data type is an 8bit signed two's complement integer. It has a minimum value of 128 and a maximum value of 127 (inclusive).
- **short:** The short data type is a 16bit signed two's complement integer. It has a minimum value of 32,768 and a maximum value of 32,767 (inclusive).
- **int:** The int data type is a 32bit signed two's complement integer. It has a minimum value of 2,147,483,648 and a maximum value of 2,147,483,647 (inclusive).
- **long:** The long data type is a 64bit signed two's complement integer. It has a minimum value of 9,223,372,036,854,775,808 and a maximum value of 9,223,372,036,854,775,807 (inclusive).
- **float:** The float data type is a single precision 32bit IEEE 754 floating point.
- **double:** The double data type is a double precision 64bit IEEE 754 floating point.
- **boolean:** The boolean data type has only two possible values: true and false. Use this data type for simple flags that track true/false conditions.
- **char:** The char data type is a single 16bit Unicode character. It has a minimum value of '\u0000' (or 0) and a maximum value of '\uffff' (or 65,535 inclusive).

Reference Data Types : These are constructed by using primitive data types, as per user need. Reference data types, as per user need. Reference data types store the memory address of an object. Class, store the memory address of an object.

Class, Interface and Array are the example of Interface Reference Data types.

parse methods: parse() methods helps to parse string into different numeric types. These are :

Method	Syntax	Usage
parseByte()	Byte.parseByte(string)	To convert a string value to byte type
parseShort()	Short.parseShort(string)	To convert a string value to type short
parseInt()	Integer.parseInt(string)	To convert a string value to Integer type
parseLong()	Long.parseLong()	To convert a string value to Long type
parseFloat()	Float.parseFloat()	To convert a string value to Float type
parseDouble()	Double.parseDouble()	To convert a string value to Double type

Type Conversion:

The process of converting one predefined type into another is called Type Conversion.

These are of two types:

- a) Implicit type conversion
- b) Explicit type conversion

➤ **Implicit Type Conversion:**

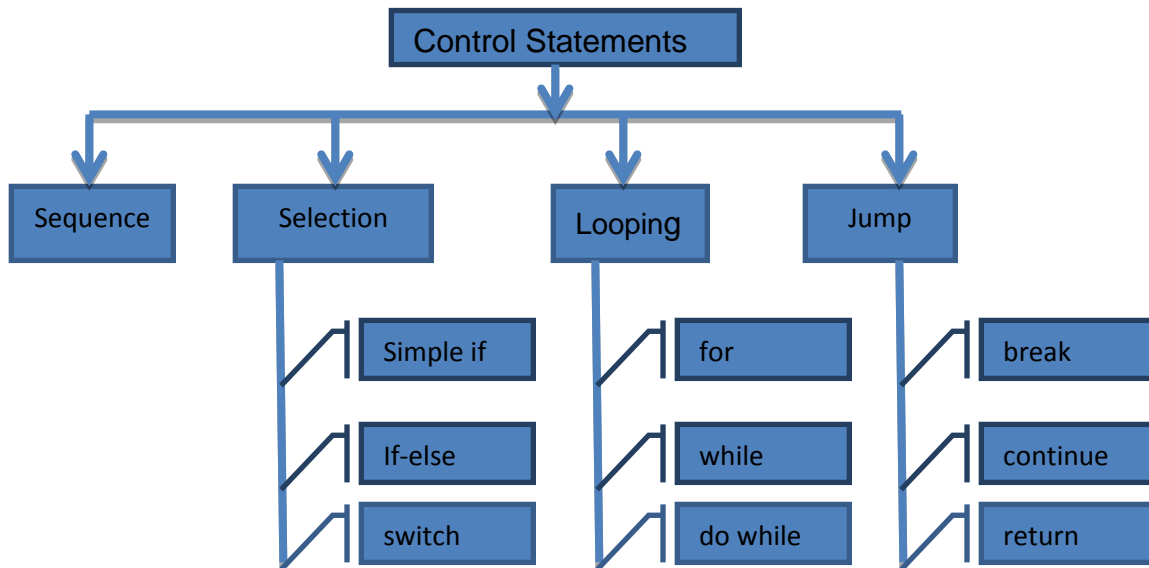
In this conversion java compiler converts all operands up to the type of largest datatype.

➤ **Explicit Type Conversion:**

An explicit type conversion is user defined that forces an expression to be of specific type.

Flow of Control

- **Control Flow Statements:** The statements inside your source files are generally executed from top to bottom, in the order that they appear. Control flow statements, however, breakup the flow of execution by employing decision making, looping, and branching, enabling your program to conditionally execute particular blocks of code.



1. Selection: A selection statement selects among a set of statements depending on the value of a controlling expression.

(a) if statements: The if statement allows selection (decision making) depending upon the outcome of a condition. If the condition evaluates to true then the statement immediately following if will be executed and otherwise if the condition evaluates to false then the statements following the else clause will be executed.

(i) Simple if:

The syntax of if statement is as shown below:

```
Syntax:  
if (conditional expression)  
{  
Statement Block;  
}
```

(ii) if-else

The syntax of if-else statement is as shown below:

```
Syntax:  
if (conditional expression)  
{  
Statement Block;  
}  
else  
{  
Statement Block;  
}
```


(iii) Nested if else

These control structures are used to test for multiple conditions as against the simple if statement which can be used to test a single condition. The syntax of nested if else is as follows:

Syntax:

```
if (conditional expression1)
{
statements1;
}
else if (conditional expression2)
{
statements2;
}
else if (conditional expression3)
{
statements3;
}
else
{
statements4;
}
```

(b) **switch**: This selection statement allows us to test the value of an expression with a series of character or integer values. On finding a matching value the control jumps to the statement pertaining to that value and the statement is executed, till the break statement is encountered or the end of switch is reached.

The syntax of the switch statement is as follows:

```
switch (Variable/Expression)
{
    case Value1 : statements1 ;
                break ;
    case Value2 : statements2 ;
                break ;
    default:    statements3 ;
}
}
```

2. Looping: These statements are used to perform a set of instructions repeatedly while the condition is true.

(i) The syntax of the for loop is:

Syntax
for(initialization; test expression; increment/decrement expression)
{
statements;
}

(ii) **While loop** : The while loop is an entry-controlled loop. It means that the loop condition is tested before executing the loop body. If the loop condition is initially false, for the first iteration, then loop may not execute even once.

The syntax of the while loop is as follows:

Syntax
while(test expression)
{
loop body
}

(iii) **do while** : Do..While loop is an exit-controlled loop. In the do..while loop, the test occurs at the end of the loop. This ensures that the do..while loop executes the statements included in the loop body at least once.

The syntax of the loop is as follows:

```
Syntax :  
do  
{  
loop body  
}while (test expression);
```

3. Jump:

(i) **break** : The break is used to break from an enclosing do, while ,for or switch statement.

```
Syntax:  
break;
```

(ii) **continue**: The continue statement stops the execution of the current iteration and causes control to begin with next iteration.

```
Syntax:  
continue;
```

(iii) **return** : Return is used to return value from the method

```
Syntax:  
Return <value>;
```

Java IDE Programming – I , II & III

- **Commonly available Swing Controls in Java**

JFrame: A Frame is a container control, in which all the controls can be placed.

JLabel: JLabel allows placing un-editable text on the Frame/Panel

JTextField: JTextField allows placing editable text on the Frame/Panel. User can enter text in a text field during runtime.

JButton: is used to initiate an action when it is clicked.

JList: is a group of values or items from which one or more selections can be made.

JComboBox: JComboBox is similar to JList but also allow to enter editable text during run time. It is a combination of JTextField and JList.

JRadioButton: Allow us to choose a single item from a group of JRadioButton options.

JCheckBox: Allow us to choose one or more items from a group of JCheckBox options.

JPasswordField: Allow us to enter a text during the run time but shows an encrypted text instead of the original text

JTextArea: JTextArea is a multi-line text component to enter or edit text.

Focus: The control under execution is said to have the focus. The control having the focus obtains input from the user.

getText(): getText() method is used to obtain the text from a JTextField during the run time.

setText(): setText() method is used to set or change the text of a JTextField during run time.

Swing Controls Methods and Properties: These are the Swing Controls available with NetBeans IDE and their concern methods and properties are given below.

Swing Controls	Methods	Properties
jButton	<ul style="list-style-type: none"> • getText() • setText() 	Background <ul style="list-style-type: none"> • Enabled • Font • Foreground • Text • Label
jLabel	<ul style="list-style-type: none"> • getText() 	Background Enabled Font Foreground Text
javax.swing.JTextField	<ul style="list-style-type: none"> • getText() • isEditable() • isEnabled() • setText() 	<ul style="list-style-type: none"> • Background • Editable • Enabled • Font • Foreground • Text
javax.swing.JRadioButton	<ul style="list-style-type: none"> • getText() • setText() • isSelected() • setSelected() 	<ul style="list-style-type: none"> • Background • Button Group • Enabled • Font • Foreground • Label • Selected
javax.swing.JCheckBox	<ul style="list-style-type: none"> • getText() • setText() • isSelected() • setSelected() 	<ul style="list-style-type: none"> • Button Group • Font • Foreground • Label • Selected • Text
javax.swing.JButtonGroup		<ul style="list-style-type: none"> • Add
javax.swing.JComboBox	<ul style="list-style-type: none"> • getSelectedItem() • getSelectedIndex() • setModel() 	<ul style="list-style-type: none"> • Background • ButtonGroup • Editable • Enabled • Font • Foreground • Model • SelectedIndex • SelectedItem • Text
javax.swing.JList	<ul style="list-style-type: none"> • getSelectedValue() 	<ul style="list-style-type: none"> • Background • Enabled • Font • Foreground • Model • SelectedIndex • SelectedItem • SelectionMode • Text
javax.swing.JTable	<ul style="list-style-type: none"> • addRow() • getModel() 	<ul style="list-style-type: none"> • model
javax.swing.JOptionPane	<ul style="list-style-type: none"> • showMessageDialog() 	<ul style="list-style-type: none"> • getRowCount() • removeRow() • addRow()

Some Important Questions with Answers

1. Which window is used to design the form.

Ans: Design window

2. Which window contains the Swing Controls components.

Ans: Palette window

3. What is the most suitable component to accept multiline text.

Ans : Text Area

4. What will be the output of the following command?

Learning.concat("Java")

Ans : Error

5. What will be the output of the following command?

"Learning".concat("Java")

Ans: LearningJava

6. Name the different list type controls offered by Java Swing.

Ans: (i) `JList`

(ii) `JComboBox`

7. Name any two commonly used methods of `List`.

Ans: `getSelectedIndex()` and `getSelectedValue()`

8. Write code to add an element ("New Course") to a list (`SubList`) at the beginning of the list.

Ans: `SubList.add(0,"New Course");`

9. Describe the three common controls. Also give some of their properties.

Ans:

(i) `JButton` text,icon

(ii) `JLabel` text,border

(iii) `JTextField` text,font

10. By default a combo box does not offer editing feature. How would you make a combo box editable.

Ans: By setting its `editable` property to `false`.

11. Write Name the component classes of Swing API for the following components-

(a) frame (b) button

Ans:(a)`JFrame`(b)`JButton`

12. What is the name of event listener interface for action events ?

Ans: `ActionListener`

13. What does `getPassword()` on a password field return ?

Ans: a character array

14. What is event driven programming?

Ans: This programming style responds to the user events and is driven by the occurrence of user events.

15. What are containers? Give examples.

Ans: Containers are those controls inside them e.g., frame (`JFrame`), Panel (`JPanel`), label (`JLabel`) etc. are containers.

16. Which method of list is used to determine the value of selected item, if only one itm is selected.

Ans: `getSelectedValue()`

17. Which type of storage is provided by variables.

Ans: temporary

18. What will be the output of the following code segment:

```
String firstName = "Johua ";
String lastName = "Yacomo";
String fullName = firstName + lastName;
jTextField1.setText("Full Name: ");
jTextField2.setText (fullName);
```

Ans: Full Name:

JohuaYacomo

19. Which expression is used to print the value of a variable "x" of type int.

Ans: `jTextField1.setText("x = " + x);`

20. The statement `i++`; is equivalent to

Ans: `i=i+1`

21. Name the primitives datatypes in java.

Ans: Numeric type , Fractional type, Character type and Boolean type.

22. Which events gets fired when a user click a JButton and JRadioButton.

Ans: ActionPerformed

23. Which of the following is a selection construct ?

a. do while Loop b. for Loop c. while Loop d. None of these

Ans: none of these

24. What will be used if there are two or more possible options.

Ans: is else if and switch

25. Name the loop that never ends.

Ans: infinite loop

26. Which braces is used to enclose statements in a block statement.

Ans: { } Curly braces

27. Which of the following is an exit controlled loop?

a. for loop b. do while Loop
c. while loop d. none of these

Ans: do while loop

28. Which process is used to translate a task into a series of commands that a computer will use to perform that task.

Ans: Project design

29. Which of the following component is the best suited to accept the country of the user?

A. List
B. Combo box
C. Radio button
D. Check box

Ans: List and combo box

30. Which construct will be used to find the sum of the first 10 natural numbers?

Ans: for loop

31. Which of the following is not a good programming guideline?

Ans : Using text fields to accept input of marital status

Short answers type questions:

1. Explain the following terms:

- a) IDE
- b) Form

Ans:

a) IDE : IDE is an acronym for Integrated Development Environment which is a work environment that integrates all tools necessary for Application Development and makes them available as part of one environment.

b) Forms: Forms are used to accept data (input) and submit data to an external agent for processing.

2. Explain the usage of the following methods :

- a) setText()
- b) toString()
- c) concat()

Ans:

a) setText() : It is used to change the display text of a component (label, text field or button) during run time.

b) toString() : It is used to convert an Integer value to String type.

c) concat() : The concat() method or the string concatenation symbol(+) may be used to add two strings together.

3. Differentiate between:

Ans:

- a) Text field and Text area components :

The Text Field allows the user to enter a single line of text only. But Text Area component allows to accept multiline input from the user or display multiple lines of information.

- b) Text field and Password field components:

The Text Field displays the obtained text in unencrypted form whereas password field displays the obtained text in encrypted form. This component allows confidential input like passwords which are single line.

- c) parseInt() and parseDouble() methods:

parseInt() is used to convert a string value to Integer type whereas parseDouble() is used to convert a string value to type Double.

4. What is a Variable?

Ans: Variables are named temporary storage locations.

5. Why are data types important?

Ans: Data Types define the way the values are stored, the range of the values and the operations that can be performed on that type.

6. How are keywords different from variable names?

Ans: Keywords have special meaning in java, should not be used as the variable names. Variables are named temporary storage locations.

7. What is an identifier?

Ans: Identifiers are fundamental building block of a program and are used as the general terminology for the names given to different parts of the program viz. variables, objects, classes, functions, arrays etc.

8. What is casting? When do we need it?

Ans: Casting is a conversion, which uses the cast operator to specify the type name in parenthesis and is placed in front of the value to be converted.

For example: Result = (float) total / count ;

They are helpful in situations where we temporarily need to treat a value as another type.

9. What is the purpose of break statement in a loop?

Ans: In a loop, the break statement terminates the loop when it gets executed.

10. Is Java case sensitive? What is meant by case sensitive?

Ans: Yes java is case sensitive. Case sensitive means upper case letters and lower case letters are treated differently.

11. Is a string containing a single character same as a char?

Ans: No

12. What is the main difference between a combo box and a list box?

Ans: The List Box does not have a text field the user can use to edit the selected item, whereas a Combo Box is cross between a text field and a list.

13. Explain the use of for statement along with its syntax.

Ans: The for loop repeats a set of statements till a test condition is satisfied.

The syntax of the for loop is:

Syntax

```
for( initialization; test exp; increment/decrement exp)
{
statements;
}
```

14. What is the difference between selection and repetition?

Ans: Selection statements test conditions and selectively execute code depending on the outcome of the test condition, whereas repetition statements repeat a set of statements till a test condition is satisfied.

15. What is the purpose of if statement? Name the different forms of if statement.

Ans: The if statement allows selection (decision making) depending upon the outcome of a condition.

- a) simple if
- b) if else
- c) if - else if – else

16. What is the purpose of default clause in a switch statement?

Ans: The default statement gets executed when no match is found in switch.

17. What is the main difference between a while loop and a do while loop?

Ans: In while loop test expression is evaluated at the beginning of the loop whereas in do while loop the test expression is evaluated at the bottom of the loop. This means that do-while loop is executed at least once.

18. How is the if...else if combination more general than a switch statement?

Ans: The switch statement must be by a single integer control variable, and each case section must correspond to a single constant value for the variable. The if...else if combination allows any kind of condition after each if.

19. Excessive comments add time to the execution of your program. (True/False).

Ans: False because comments are non-executable.

20. Differentiate between compile time and run time errors.

Ans: Compile time errors refer to the errors that violate the grammatical rules and regulations of programming language.

21. Which error is harder to locate and why?

Ans: Logical errors because in presence of logical error, the program executes without any problems but the output produced is not correct. Therefore every statement of the program needs to be scanned.

22. Explain the following terms:

- a) **Exception handling** : Run time errors are also called exceptions, and handling such errors in the application is called exception handling.
- b) **Syntax** : Formal set of rules defined for writing any statement in a language is known as syntax.
- c) **Portability** : The application should be portable. It should be able to run on different platforms.
- d) **Prettyprinting** : Prettyprinting is the formatting of a program to make it more readable. These formatting conventions usually consist of changes in positioning, spacing, color, contrast, size and similar modifications intended to make the content easier to view, read and understand.
- e) **Syntax error**: Syntax errors occur when syntax rules of any programming language are violated. These errors occur during compilation of the application

OutPut Finding Questions:

1 Write the output :

- (i) System.out.println("Hello".charAt(3));
- (ii) System.out.println("Good morning".substring(4));

Ans:

- (i) l
- (ii) morning

2. Write the output of the following code :

```
int x, y = 0;
for(x=1; x<=5; ++x)
y = x++;
--y;
```

Ans: 7 4

3. Find the output of the code:

```
int f=1, i=2;
do
{ f*=i;
}while(++i<5);
System.out.println(f);
```

Ans: 24

4. What would the following code do :

```
Connection , statement created
String str="select * from emp";
ResultSet rs= stmt.executeQuery(str);
rs.last();
int r= rs.getRow();
JOptionPane.showMessageDialog(null, ""+r);
Ans : if emp table has 5 records it will display 5
```

5. What will be the output of the following code segment:

```
String firstName = "Johua ";
String lastName = "Yacomo";
String fullName = firstName + lastName;
jTextField1.setText("Full Name: ");
jTextField2.setText (fullName);
```

Ans: Full Name :
JohuaYacomo

6. What will be the value of j and k after execution of the following code:

```
int j=10, k=12;
if(k>=j)
{k=j;
J=k;
}
```

Ans: 10 10

7. How many times, the following loop gets executed?

```
i=0;
while (i> 20)
{
//Statements
}
```

Ans: 0 times

8. How many times, the following loop gets executed?

```
i=0;
do
{
//Statements
}while (i> 20);
```

Ans: 1 time

9. What will be the contents of jTextField1 and jTextField2 after executing the following statement:

```
StringBuffer s= new StringBuffer("Common Wealth");
int c=s.capacity();
s.insert(0,'E');
s.reverse();
jTextField1.setText(""+c);
jTextField2.setText(s.toString());
```

Ans:

29

htlaeWnommoCE

10. What will be the contents of jTextField after executing the following statement:

```
int num=4;
num=num+1;
if(num>5)
    jTextField1.setText(Integer.toString(num));
else
    jTextField1.setText(Integer.toString(num*4));
```

Ans : 7

11. Find the output of the following code:

```
int First = 7;
int Second = 73;
First++;
if (First+Second> 90)
jlabel1.setText("value is 90 ");
else
jlabel1.setText("value is not 90 ");
```

Ans :value is not 90

12. Find the output

```
int Number1 = 7, Number2=8;
int Second = 73;
if (Number1>0 || Number2>5)
if (Number1>7)
jTextField1.setText("Code Worked");
else
jTextField1.setText("Code MightWork");
else
jTextField1.setText("Code will not Work");
Ans :Code MightWork
```

13. How many times will the following loop get executed?

```
x = 5;
y = 36;
while ( x <= y)
{
x+=6;
}
```

Ans: 6

14. What will be the content of the JTextArea1 after executing the following code?

```
Int Num = 1;
do
{
jTextArea1.setText(Integer.toString(++Num) + "\n");
Num = Num + 1;
}while(Num<=10)
Ans: 10
```

15. What will be the contents of jTextField1 and jTextField2 after executing the following code:

```
String s="KENDRIYA VIDYALAYA GUNA"
jtextfield1.setText(s.length()+" ");
jtextfield2.setText(Math.round(2.34)+"");
```

Ans : 23 2

16. What will be the value of s after executing the following code?

```
double i,sum=2
for(i=3;i<8;++i)
{ if(i%4==0)
{ break;
sum=Math.pow(sum,i);
}
else
sum+=i/2;
}
```

Ans: 150.0625

17. What will be the content of jTextField1 and jTextField2 after executing the following code:

```
String st="New to Information Technology";
jTextField1.setText(st.replace("Technology","Practices"));
jTextField2.setText(st.substring(7));
Ans: New to Information Practices
```

18. Predict the output for tan & tan1 if sac equals 7?

```
int tan = 0, tan1 = 4 ;
if ( sac == 2 )
{ tan = 4 ; tan1 = 0; }
else if (sac == 8)
{ tan = 0 ; tan1 = 4; }
JOptionPane.showMessageDialog( null , " tan = " + tan + " , tan1 = " + tan1 ) ;
```

Ans: tan = 0 tan1=4

19. Give the output for the following code fragment:

```
v = 20 ;
do
{
JOptionPane.showMessageDialog( null , v + " " ) ;
} while ( v < 50 ) ;
JOptionPane.showMessageDialog( null , " Bye " ) ;
```

Ans: Infinite loop

20. Give the value of x after executing following Java code. Also find how many times the following loop will execute? :

```
int a=10;
int b=12;
int x=5;
int y=6;
while (a<=b)
{ if (a%2==0)
x=x + y;
else
x=x-y;
a=a+1;
}
```

Ans:11

21. What will be the output produced by following code fragment? (1)

```
float x=9;
float y=5;
int z=(int)(x/y);
switch(z)
{
case1:x=x+2;
case2: x=x+3;
default:x =x+1;
}
System.out.println("value of x:"+x);
```

Ans: 15

22. Predict the output of the following code fragments:

```
inti,j,n;
n=0;i=1;
do
{ n++; i++;
}
```

```
while(i<=5);  
Ans: 5
```

23. What will be the output of the following program code when the user will press JButton:

```
Public class svm  
{  
    int a;  
    svm(int p)  
    {  
        a=p;    }  
    void assign(int no)  
    {  
        a=no;    }  
    intdisp()  
    {  
        return a;    }  
}  
private void jButton1ActionPerformed(java.awt.event.ActionEventevt)  
{  
    svm os=new svm(15);  
    System.out.println("    " + os.disp());  
    os.assign(35);  
    System.out.println("    " + os.disp());  
}  
Ans: 15    35
```

24. What will be the contents of jTextField1 and jTextField2 after executing the following code:

```
String s = "Sun Micro Systems";  
jTextField1.setText(s.length()+"");  
jTextField2.setText(s.toLowerCase());  
Ans:  
jTextField1 : 17  
jTextField2 : abc micro systems
```

25. What values will be assigned to the variable ua ,ub, uc and fail after execution of the following program segment:

```
int i=0,ua=0,ub=0,uc=0,fail=0;  
while(i<=5) {  
    switch ( i++ )  
    {  
        case 1 :++ua;  
        case 2 : ++ub; uc++;break;  
        case 3 :  
        case 4 : ++uc; ua++;ub++;break;  
        default : ++fail;  
    }  
}  
Ans: ua=1 ub=1 uc=0
```

26. Predict an output of the following code fragments:

```
int i = 1, j = 0, n = 0;  
while(i<4) {  
    for(j=1;j<= i ; j++)  
    {  
        n+= 1;  
        i = i+1;  
    }  
    System.out.println(n);  
}
```

Ans : 6

27. Give the output of the following code:

```
int m=100;
while(m>0)
{
if (m<10)
break;
m=m-10;
}
System.out.println("m is "+m);
```

Ans: 0

Errors finding questions:

1. The following code has some errors. Rewrite the corrected code .

```
int i=2,j=5;
while j>i
{ jTextField1.getText("j is greater");
j--; ++i;
}JOptionPane.showMessageDialog("Hello");
```

Ans:

```
int i=2,j=5;
while( j>i)
{ jTextField1.getText("j is greater");
j--; ++i;
}JOptionPane.showMessageDialog("Hello");
```

2. Identify the errors :

```
switch(ch)
{
    case 'a' :
    case 'A' :
    case 'e' :
    case 'E' :
    case 'i' :
    case 'I' :
    case 'u' :
    case 'U' : ++vowels;
                break;
    default : ++others;
```

Ans: two case constants doesn't have the same value

3.

```
inti,j=5;
i==j+5;
if(i=j)
{
jTextField1.setText("i and j are unequal");
jTextField2.setText("they are not equal"); break;
}
else jTextField1.setText("i and j are equal");
```

Ans:

```
int i,j=5;
i=j+5;
if(i==j)
{
jTextField1.setText("i and j are unequal");
jTextField2.setText("they are not equal"); break;
}
else jTextField1.setText("i and j are equal");
```

4. Rewrite the code after making correction . Underline the corrections

```
int sum,value,inct;  
  
int i  
for(i==0;i<=10;i++)  
sum=sum+i;  
inct++;
```

Ans :

```
int sum,value,inct;  
int i;  
for(i=0;i<=10;i++)  
sum=sum+i;  
inct++;
```

5. The following code has some error(s). Rewrite the correct code underlining all the corrections made.

```
int y=3;  
switch(y);  
{ case 1: System.out.print("Yes its One");  
case>2: System.out.println("Yes its more than Two");  
break;  
case else: System.out.print("Invalid Number):
```

ans:

```
int y=3;  
switch(y)  
{ case 1: System.out.print("Yes its One");  
break;  
case 2: System.out.println("Yes its more than Two");  
break;  
default: System.out.print("Invalid Number):  
}
```

6. The following has some error(s). Rewrite the correct code underlining all the corrections made:

```
Inti,j=5;  
i==j+5;  
if(i=j)  
{  
jtextfield1.setText("I and j are unequal");  
jtextfield1.setText("I and j are not equal");breaks;  
}  
else  
jtextfield1.setText("I and j are equal")
```

Ans:

```
inti,j=5;  
i=j+5;  
if(i==j)  
{  
jTextField1.setText("I and j are unequal");  
}  
else  
jTextField1.setText("I and j are equal")
```


7. Rewrite the following Java code after underling the corrections made.

```
int x = = 0;
```

```
int n= Integer parseInt(JLabel1.getText);
```

Ans:

```
int n= Integer parseInt(JLabel1.getText());
```

```
int x = 0;
```

8. Find out errors if any:

```
M=1;  
N=0;  
For(;m+n<19;++n)  
System.out.println("hello");  
M=m+10;
```

Ans:

```
m=1;  
n=0;  
for(;m+n<19;++n)  
System.out.println("hello");  
m=m+10;
```

9. The following code has some error(s). Rewrite the correct code underlining all the corrections made.

```
int y=6,p;  
do  
{ y=3.14*y;  
  p=y%10;  
if p=2  
System.out.print("Two");  
while(y>1)
```

Ans:

```
int y=6,p;  
do  
{ y=3.14*y;  
  p=y%10;  
if (p==2)  
System.out.print("Two");  
}while(y>1);
```

Rewrite questions:

1. Rewrite the following program code using a for loop:

```
inti,sum=0;  
  
while(i<10)  
  
{ sum +=i;  
  
  i+=2;  
  
}
```

Ans: `int i,sum=0;`

```
for(i=0;i<10;i+=2)
```

```
{ sum +=i;
```

```
}
```

2. Rewrite the following code using while loop :

```
inti,j;
```

```
for(i=1;i<=4;i++)
```

```
{ for(j=1;j<=i;++j)
```

```
{ System.out.print(j);
```

```
}
```

```
System.out.println();
```

```
}
```

Ans:

```
int i=1,j;
```

```
while(i<=4)
```

```
{ j=1;
```

```
while(j<=i)
```

```
{ System.out.print(j);
```

```
++j;
```

```
} i++;
```

```
System.out.println();
```

```
}
```

3. Write a equivalent while loop for the following code:

```
intsz=25;
```

```
for(int i=0,sum=0;i<sz;i++)
```

```
sum+=i;
```

```
System.out.println(sum);
```

Ans: `int sz=25;`

```
int i=0,sum=0;
```

```
while(i<sz)
```

```
{
```

```
sum+=i;
```

```
i++;
```

```
}
```

```
System.out.println(sum);
```

4. Rewrite the following if-else segment using switch-case statement

```
char ch='A';
```

```
if(ch=='A')
```

```
System.out.println("Account");
```

```
if((ch=='C') || (ch=='G'))
System.out.println("Admin");
if(ch=='F')
System.out.println("Advisor");
```

Ans: char ch='A';

```
switch(ch)
{
    case 'A':
        System.out.println("Account");
        break;
    case 'C':
    case 'G':
        System.out.println("Admin");
        break;
    case 'F':
        System.out.println("Advisor");
}
```

5. Rewrite the following code using while loop:

```
inti,j;
for(i=1,j=2;i<=6;i++,j+=2)
System.out.println(i++);
System.out.println("Finished!!!");
```

Ans: inti=1,j=2;
while(i<=6)
{System.out.println(i++);
i++;
j+=2;}
System.out.println("Finished!!!");

6. Rewrite the following code using for loop.

```
int i=0;
while(++i<20)
{ if( i==8)
    break;
  System.out.println(i++);
}
```

Ans:

```
int i;
for(i=1;i<20;++i)
{ if( i==8)
    break;
  System.out.println(i++);
}
```

7. Rewrite the code using switch statement:

```
if(k==1)
    Day="Monday";
elseif(k==2)
    Day="Tuesday";
elseif(k==3)
    Day="Wednesday";
else
```

```
Day="-"
```

```
Ans:  
switch(k)  
{  
case 1: Day="Monday";  
break;  
case 2: Day="Tuesday";  
break;  
case 3: Day="Wednesday";  
break;  
default: Day="";  
}
```

8. Write the equivalent switch case for the following code :

```
If (num1 == 1 )  
jTextField1.setText("Number is one");  
else If (num1 == 2 )  
jTextField1.setText("Number is two");  
else If (num1 == 3 )  
jTextField1.setText("Number is three");  
else  
jTextField1.setText("Number is more than three");  
Ans:
```

```
Switch(num1)  
{  
Case 1 :  
jTextField1.setText("Number is one");  
break;  
case 2 :  
jTextField1.setText("Number is two");  
break;  
case 3 :  
jTextField1.setText("Number is three");  
break;  
default:  
jTextField1.setText("Number is more than three");  
}
```

9. Given the following code fragment :

```
If(a==0)  
System.out.println("zero");  
If(a==1)  
System.out.println("one");  
If(a==2)  
System.out.println("two");  
If(a==3)  
System.out.println("three");
```

Write an alternative code (Using if) that saves on number of comparisons

Ans:

```
if(a==0)  
System.out.println("zero");
```

```
else if(a==1)
    System.out.println("one");
else if(a==2)
    System.out.println("two");

else if(a==3)
    System.out.println("three");
```

10. Rewrite the following code fragment using switch :

```
if(ch == 'E')
    east++;
if(ch == 'W')
    west++;
if(ch == 'N')
    north++;
if(ch == 'S')
    south++;
else
    JOptionPane.showMessageDialog(null, "unknown");
```

Ans:

```
Switch(ch)
{
```

```
Case 'E':
    east++;
    break;
case 'W':
    west++;
    break;
case 'N':
    north++;
    break;
case 'S':
    south++;
    break;
default :
    JOptionPane.showMessageDialog(null, "unknown");
}
```

11 Rewrite the following code using for loop:

```
int i = 0;
while(++i <20)
{
    if(i == 8)
        break;
    System.out.println(++i);
}
```

Ans:

```
for(int i = 0; ++i <20;)
{
    if(i == 8)
        break;
    System.out.println(++i);
}
```

Design Questions:

1. Design an application for Theatre Booking system. And answers the following questions :

The screenshot shows a Java Swing application window titled "Theatre Booking System". It features two main sections: "Seat Types" and "Payment Method".

- Seat Types:** Contains four radio buttons: "Stalls" (selected), "Circle", "Upper Class", and "Box". Below them is a text field labeled "Price per sea..." with the value "625".
- Payment Method:** Contains four radio buttons: "Cash" (selected), "Visa", "American Express", and "Master Card".
- Number of seats required:** A label followed by a text field containing the value "1".
- Book Seats:** A button located at the bottom left.
- Cash Payment:** The text "Cash Payment of Rs. 625" is displayed at the bottom right.

- (a) When the user select different seat type, then its price should be displayed in the Label.
(b) If the user enters an invalid no of seats i.e. less than 1, then an error message should be displayed in the dialog box.
(c) When the user click at the Book Seats button , then total amount (calculated as no. of seats x price per seat) should be displayed along with payment method, next to the push button.
(c) Price per seat depend upon the seat type :
- | | |
|--------------|--------|
| Stall | 625/- |
| Circle | 750/- |
| Upper Circle | 850/- |
| Box | 1000/- |

Ans:

- ```
(a) if(jRadioButton1.isSelected()==true)
 jLabel2.setText("625");
 if(jRadioButton2.isSelected()==true)
 jLabel2.setText("750");
 if(jRadioButton3.isSelected()==true)
 jLabel2.setText("850");
 if(jRadioButton4.isSelected()==true)
 jLabel2.setText("1000");
(b) int s=Integer.parseInt(jTextField1.getText());
 if(s<1)
 JOptionPane.showMessageDialog(null,"Error");
(c) int s=Integer.parseInt(jTextField1.getText());
 int p=Integer.parseInt(jLabel2.getText());
 int tp=s*p;
 if(jRadioButton5.isSelected()==true)
 jLabel5.setText("Cash Payment of " +tp);
 if(jRadioButton6.isSelected()==true)
 jLabel5.setText("Visa Payment of " +tp);
 if(jRadioButton7.isSelected()==true)
 jLabel5.setText("American Express Payment of " +tp);
 if(jRadioButton8.isSelected()==true)
 jLabel5.setText("Master Card Payment of " +tp);
```

2. Write a java program that lets you create an address book in a table. The details to be added in Address Book are : SNo,Name, Email Id, Phone.

| Sno. | Name   | EmailID          | Phone      |
|------|--------|------------------|------------|
| 1    | Amit   | amit@abc.com     | 9876543212 |
| 2    | Albert | albert@gmail.com | 9865743217 |
| 3    | Pooja  | pooja@yahoo.com  |            |

SNo

Name

EmailID

Phone

Ans:

```
DefaultTableModel tm= (DefaultTableModel) jTable1.getModel();
```

```
int sno= Integer.parseInt(jTextField1.getText());
```

```
String name = jTextField2.getText();
```

```
String email = jTextField3.getText();
```

```
long ph= Integer.parseInt(jTextField4.getText());
```

```
Object nr[]={sno,name,email,ph};
```

```
tm.addRow(nr);
```

3. Design the following application and answer the questions that follow :

**ICICI Bank**

Principal  Time

Rate

Senior Citizen

Account Type

Fixed Deposit

Recurring Deposit

Interest  Amount

- (a) Write the code for the Clear button to clear all the textfields and checkbox. Set the default choice in the radio button as Fixed Deposit.
- (b) Write the code for the calculate button to calculate compound interest and amount and display the values in the txtInterest and txtAmount depending on principal, rate and time. Rate is calculated based on the time according to the following table:

| Account           | Time       | Rate |
|-------------------|------------|------|
| Fixed Deposit     | <= 1       | 10%  |
|                   | >1 and <=5 | 12%  |
|                   | >5         | 15%  |
| Recurring Deposit | <= 2       | 11%  |
|                   | >2 and <=7 | 12%  |
|                   | >7         | 15%  |

An additional rate of 2% is given to the senior citizens i.e. if the chkSR checkbox is checked.

Ans:

```
(a) jTextField1.setText("");
 jTextField2.setText("");

 jTextField3.setText("");

 jRadioButton1.setSelected(true);

 jCheckBox1.setSelected(false);

(b) int p= Integer.parseInt(jTextField1.getText());
 int t= Integer.parseInt(jTextField2.getText());
 if(jRadioButton1.isSelected()==true)
 {
 if(t<=2)
 r=11;
 else if(t>2 && t<=7)
 r=12;
 else
 r=15;
 }

 else
 {
 if(t<=1)
 r=10;
 else if(t>1 && t<=5)
 r=12;
```



```

else
 r=15;
}

float ci= p*Math.pow((1+(r/100)),t);
float amt= p+ci;
txtInterest.setText(""+ci);
txtAmount.setText(""+amt);

```

4. Answers the following questions:

The grading criteria for the two streams is given below :

| Stream      | Percentage | Grade |
|-------------|------------|-------|
| Medical     | $\geq 80$  | A     |
|             | 60-80      | B     |
|             | $< 60$     | C     |
| Non-Medical | $\geq 75$  | A     |
|             | 50-75      | B     |
|             | $< 50$     | C     |

- (a) Write code for Calculate Percentage button to calculate the Percentage after finding the total marks of I term and II term . Also ensure that NCC cadet gets an increment of 3% in their percentages.  
 (b) Write code for Calculate grade button to calculate the grade depending upon on the stream selected according to the given criteria.

Ans:

```

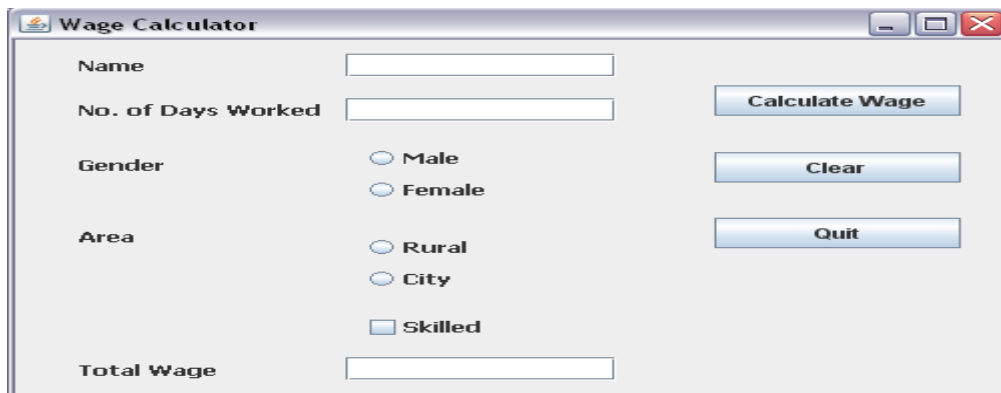
(a) float f= Integer.parseInt(jTextField1.getText());
float s= Integer.parseInt(jTextField2.getText());
float tot = f+s;
float p= tot/2;
if(jCheckBox1.isSelected()==true)
 p=p+3;
jLabelp.setText(""+p);

```

( b) String g;

```
if(jRadioButton1.isSelected()==true)
{
 if(p>=80)
 g="A";
 else if(p>=60 &p<80)
 g="B";
 else
 g="C";
}
else
{
 if(p>=75)
 g="A";
 else if(p>=50 &p<75)
 g="B";
 else
 g="C";
}
jLabelp.setText(""+p);
jLabelg.setText(""+g);
```

5. Mr. Madhav works in a construction company. To calculate total wages he has developed the following GUI in NetBeans.



Male and female labours are respectively paid Rs. 150/- per day and Rs. 170/- per day. Skilled labourers are paid extra at the rate of Rs. 100/- day. Male and female labourers from rural areas are paid 10% less per day.

- (a) When Calculate Wage button is clicked, the total wages is calculated as per the given criteria and displayed in total wage text box.
- (b) When Clear button is clicked, all the text boxes should be cleared and radio button, check box should be deselected.
- (c) Close the application when Quit button is pressed.

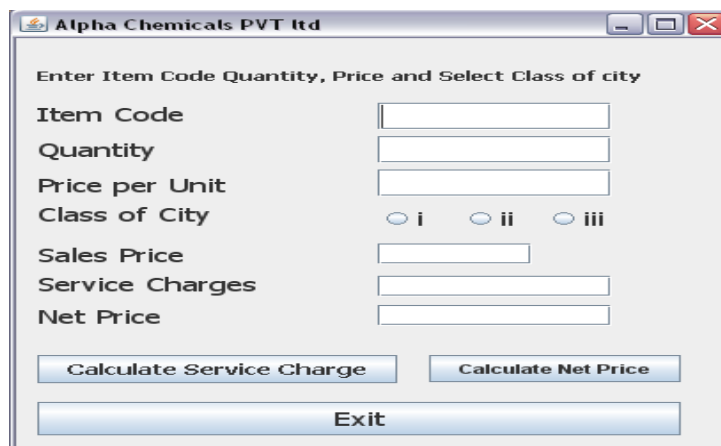
Ans:

```
(a) int d = Integer.parseInt(jTextField2.setText());
 int w;
 if(jRadioButton1.isSelected()==true)
 w=150;
 else
 w=170;
 if(jCheckBox1.isSelected()==true)
 w=w+100;
 if(jRadioButton3.isSelected()==true)
 w=w-(w*10)/100;
 int cw=d*w;
 jLabel6.setText(""+cw);
```

```
(b) jTextField1.setText("");
 jTextField2.setText("");
 jRadioButton1.setSelected(false);
 jRadioButton2.setSelected(false);
 jRadioButton3.setSelected(false);
 jRadioButton4.setSelected(false);
 jCheckBox.setSelected(flase);
```

```
(c) System.exit(0);
```

6. Mr. JigneshDesai an owner of Alpha Chemicals PVT ltd has asked his programmer Sweta to develop the following GUI application in Netbeans:



**Service Charges Rates are as follows :**

| Class of City | Rate of Service Charges |
|---------------|-------------------------|
| i             | 10% of sales price      |
| ii            | 15% of sales price      |
| iii           | 20% of sales price      |

Write java code for the following:

(a) To calculate service charges depending on the selection of radio button. This code will execute after click on the calculate service charges?

(b) To calculate net price when Calculate Net price button will be clicked.

(c) When exit button will be clicked application should be automatically closed.

Ans:

```
(a) float q=Float.parseFloat(jTextField2.getText());
 float p=Float.parseFloat(jTextField3.getText());
 float sp=q*p;
 jLabelsp.setText(""+sp);
 float sc;
 if(jRadioButton1.isSelected()==true)
 sc=(10*sp)/100;
 else if(jRadioButton2.isSelected()==true)
 sc=(15*sp)/100;
 else
 sc=(20*sp)/100;
 jLabelsc.setText(""+sc);
```

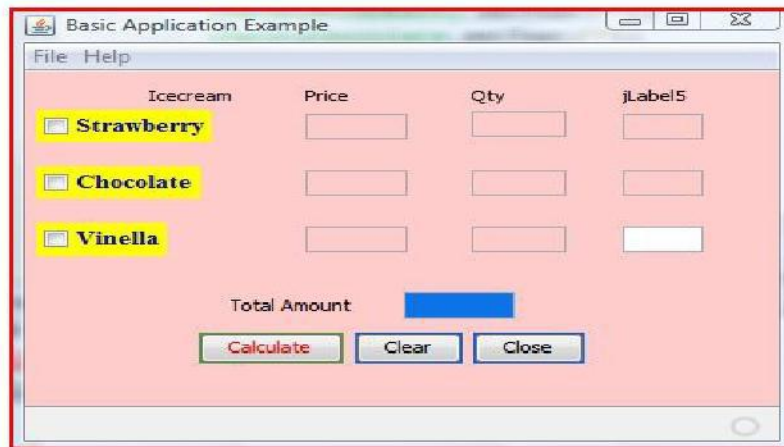
```
float sp=Float.parseFloat(jLabelsp.getText());

float sc=Float.parseFloat(jLabelsc.getText());
float np=sp+sc;
jLabelnp.setText(""+np);
(c) System.exit(0);
```

7. Assume the following interface built using Netbeans used for bill calculation of a ice-cream parlor. The parlor offers three varieties of ice-cream - vanilla, strawberry, chocolate. Vanilla ice-cream costs Rs. 30, Strawberry Rs. 35 and Chocolate Rs. 50. A customer can choose one or more ice-creams, with quantities more than one for each of the variety chosen. To calculate the bill parlor manager selects the appropriate check boxes according to the varieties of ice-cream chosen by the customer and enter their respective quantities.

Write Java code for the following:

- a. On the click event of the button 'Bill', the application finds and displays the total bill of the customer. It first displays the rate of various ice-creams in the respective text fields. If a user doesn't select a check box, the respective ice-cream rate must become zero. The bill is calculated by multiplying the various quantities with their respective rate and later adding them all.
- b. On the Click event of the clear button all the text fields and the check boxes get cleared.
- c. On the click event of the close button the application gets closed.



Ans:

(a) `private void jBtnCalculateMouseClicked(java.awt.event.MouseEvent evt)`

```
{
 if(jchkStrawberry.isSelected()==true)
 jTxtPriceStrawberry.setText("35");
 else
 {
 jTxtPriceStrawberry.setText("0");
 jTxtQtyStrawberry.setText("0");
 }
 if(jChkChocolate.isSelected()==true)
 jTxtPriceChocolate.setText("50");
 else
 {
 jTxtPriceChocolate.setText("0");
 jTxtQtyChocolate.setText("0");
 }
 if(jChkVinella.isSelected()==true)
 jtxtPriceVinella.setText("30");
}
```

```

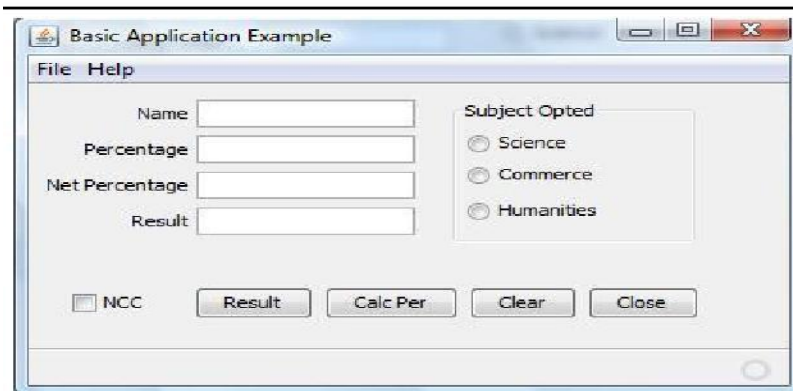
else
{
 jtxtPriceVinella.setText("0");
 jTxtQtyVinella.setText("0");
}
int r1,r2,r3,q1,q2,q3,a1,a2,a3,gt;
r1=Integer.parseInt(jTxtPriceStrawberry.getText());
r2=Integer.parseInt(jTxtPriceChocolate.getText());
r3=Integer.parseInt(jtxtPriceVinella.getText());
q1=Integer.parseInt(jTxtQtyStrawberry.getText());
q2=Integer.parseInt(jTxtQtyChocolate.getText());
q3=Integer.parseInt(jTxtQtyVinella.getText());
a1=r1*q1;
jTxtAmtStrawberry.setText(""+a1);
a2=r2*q2;
jTxtAmtChocolate.setText(""+a2);
a3=r3*q3;
jTxtAmtVinella.setText(""+a3);
gt=a1+a2+a3;
jTxtTotalAmt.setText(""+gt);
}
(b) private void jBtnClearActionPerformed(java.awt.event.ActionEvent evt)
{
 jTxtPriceStrawberry.setText("");
 jTxtPriceChocolate.setText("");
 jtxtPriceVinella.setText("");
 jTxtQtyStrawberry.setText("");
 jTxtQtyChocolate.setText("");
 jTxtQtyVinella.setText("");
 jTxtAmtStrawberry.setText("");
 jTxtAmtChocolate.setText("");
 jTxtAmtVinella.setText("");
 jchkStrawberry.setSelected(false);
 jChkChocolate.setSelected(false);
 jChkVinella.setSelected(false);
}
(c) private void jBtnCloseActionPerformed(java.awt.event.ActionEvent evt)
{
 System.exit(0);
}

```

8. ABC School uses the following interface built in java to check the eligibility of a student for a particular stream from science, commerce and humanities. The user first enters the total percentage and selects the desired stream by selecting the appropriate option button. An additional 5% is marks is given to students of NCC.

Write Java Code for the following

- On Action event of the button 'Calc Percentage' Net percentage of the student is calculated and displayed in the appropriate text filed. Net percentage is same as that of the actual percentage if the student doesn't opts for NCC otherwise 5% is added to actual percentage.
- On Action event of the button 'Result', the application checks the eligibility of the students. And display result in the appropriate text field. Minimum percentage for science is 70, 60 for commerce and 40 for humanities.
- On the Click event of the clear button all the text fields and the check boxes get cleared. d. On the click event of the close button the application gets closed.



Ans: private void jBtnClearActionPerformed(java.awt.event.ActionEvent evt)

```

{
jTextField1.setText(" ") OR jTextField1.setText(null)
jTextField1.setText(" ") OR jTextField1.setText(null)
jTextField1.setText(" ") OR jTextField1.setText(null)
jTextField1.setText(" ") OR jTextField1.setText(null)
jCheckBox1.setSelected(false);
}
private void jBtnCalcPerActionPerformed(java.awt.event.ActionEvent evt)
{
int p;
p=Integer.parseInt(jTextField2.getText());
if (jCheckBox1.isSelected())
p=p+5;
jTextField3.setText(Integer.toString(p));
}
private void jBtnResultActionPerformed(java.awt.event.ActionEvent evt)
{
int p;
p=Integer.parseInt(jTextField3.getText());
if (jRadioButton1.isSelected())
{
if (p>=70)
jTextField4.setText("Eligible for all subject");
}
}

```

```
else
jtextfield4.setText("Not Eligible for science");
}

else if(jRadioButton2.isSelected())
{
if (p>=60)
jTextField4.setText("Eligible for Commerce and Humanities");
else
jtextfield4.setText("Not Eligible for Science and Commerce");
}
else
{
if (p>=40)
jTextField4.setText("Eligible for Humanities");
else
jtextfield4.setText("Not Eligible for any subject ");
}
}

private void jBtnCloseActionPerformed(java.awt.event.ActionEvent evt)
{
System.exit(0);
}
```



# PROGRAMMING GUIDELINES

## Stylistic Guidelines

- Use meaningful names for identifiers
- Ensure clarity of expressions.
- Use comment and indentation.
- Insert blank lines and blank spaces.

## Characteristic for a Good Program

- Effective and efficient
- User friendly
- Self documenting code
- Reliable
- Portable

## Stages of Program Development Process

A program development process is a step by step process where each stag contributes to building of an effective and efficient program.

Stages are as follows

- ✓ Crack the problem
- ✓ Code the algorithm
- ✓ Compile the program
- ✓ Execute the program

## Types of Errors

- **Compile Time Error**- Occurs during compile time. When a program compiles it sources code is checked for rules of programming language.  
**Its types are:-**
  1. Syntax error : it occurs when a grammatical rule of Java is violated
  2. Semantic error: it occurs when statement are not meaningful.
- **Run Time Error**: Occurs during the execution of the program.
- **Logical Error**: Occurs due to wrong logic of a program.

## PROBLEM SOLVING METHODOLOGY AND TECHNIQUES

**Steps to creating a working program are:-**

1. Understand the problem well
2. Analyze the problem to
  - a) Identify minimum number of inputs required for output
  - b) Identify processing components.
3. design the program by
  - a) Deciding step by step solution.
  - b) Breaking down solution into simple steps.
4. Code the program by
  - a) Identifying arithmetic and logical operation required for solution.
  - b) Using appropriate control structure such as conditional or looping control structure.
5. Test and Debug your program by
  - a) Finding error in it.
  - b) Rectifying the error.
6. Complete your documentation.
7. Maintain your program.

## Questions & Answers on Programming Guidelines

1. Excessive comments add time to the execution of your program. (True/False). Justify your answer.

Ans: No, Comments don't add time to program execution. As comments are only for documentation purpose. They are non executable statements.

2. Differentiate between compile time and run time errors.

Ans: **a.** Compile time errors occur due violation of grammatical rules of a programming language. Run time errors occur during execution of program.

**b.** Compile time errors are easy to correct as we get error message corresponding to that which give an idea to correct it. Run time errors causes abnormal termination of program.

**c.** Example of compile time error: Missing semicolon(;). Example of run time error: Divide by zero error, Logarithm of a negative number.

3. Which error is harder to locate and why?

Ans: Logical errors are harder to locate. Logical errors occur due to error in the logic of a program. When a program is syntactically correct, even running properly but not giving a desired output, it means that it has a logical error.

One common example of logical error is when we write a statement  $Eng+Math+Gk/3$  instead of  $(Eng+math+Gk)/3$  to calculate average of marks of 3 subjects.

4. Explain the following terms:

- a) Exception handling

A run time error is called an exception , which causes abnormal termination of program. To handle such type of errors/exception is called Exception handling. In java exception handling is done by try{ } and catch { } block. Statements that can raise exception are put in try{ } block and its handling code is written in catch { } block.

- b) Syntax :

Formal set of rules defined for writing any statement in a language is known as syntax. Example- Every line in JAVA should be terminated by semicolon(;).

- c) Portability -Portability means an application should run on different platform without doing any changes.

- d) Prettyprinting

Prettyprinting is the formatting of a program to make it more readable. These formatting conventions usually consist of changes in positioning, spacing, color, contrast, size and similar modifications intended to make the content easier to view, read and understand. Prettyprinters for programming language source code are sometimes called code beautifiers or syntax highlighters. Netbeans supports prettyprinting and the shortcut key to format any source code in Netbeans is Alt+Shift+F.

- e) Syntax error:

Formal set of rules defined for writing any statement in a language is known as syntax. Syntax errors occur when syntax rules of any programming language are violated. These errors occur during compilation of the application but in Netbeans these errors are highlighted in design stage itself using the error indicator. Some of the common examples of syntax errors are missing semicolon, missing parenthesis and using incompatible data types.

5. The code given below will give an error on execution if the value entered in t2 is 0. Identify the type of the error and modify the code to handle such an error.

```
int a,b,c;
```

```
a= Integer.parseInt(t1.getText());
```

```
b= Integer.parseInt(t2.getText());
```

```
c= a / b;
```

Ans: The error is logical error.

```
int a,b,c;
```

```
a= Integer.parseInt(t1.getText());
```

```
b= Integer.parseInt(t2.getText());
```

```
if(b!=0)
```

```
c= a / b;
```

```
else{
```

```
JOptionPane.showMessageDialog(null,"Denominator can't be zero");
```

```
t2. setText("");
```

```
t2.requestFocus();
```

```
}
```

6. What are the characteristics of a good program?

Ans: The characteristics of a good program are-

- A. The program should be efficient in terms of execution speed and effective memory utilization.
- B. The should be accurate. It should produce correct result.
- C. The program should user friendly. It means meaningful names should be given to variable, proper messages should be given,use of comments and indentation.
- D. The program must be reliable that is it should be able to handle the situation when the wrong inputs are given.
- E. The program should be portable so that it can run on different platforms without doing any changes.

7. What is the use of comments and indentation?

Ans Comments are non executable statements and are used for internal documentation purpose. In Java comments are given either by // or /\* ....\*/ brackets.

Example-

```
/* This method calculates sum of two numbers.*/
```

```
int Sum(int x, int y)// x,y are formal parameters
```

```
{ return (x+y); }
```

Indentation makes a program readable and understandable. When you are writing a program you must remember that

- (i) The opening braces should properly match with a closing braces.
- (ii) Spaces should be inserted between operator and operands in an expression.

# UNIT-3

## RELATIONAL DATABASE MANAGEMENT SYSTEM

### Data:

Basic/raw facts about something which is not organized, for example details of some students which is not organized.

### Data Item:

Each piece of information about an entity, such as name of a person or address, age or name of a product or the price is a Data Item.

### Database:

A well organised collection of data that ensures safety, security and integrity of data.

### DataBase Management System(DBMS)

Comprehensive software that provides the essential services to create, manage and maintain the databases. In short a DBMS provides the means to store the data in the database, to edit or delete the data stored, to search and analyze the data in the database. They also provide various safety and security mechanisms that ensures that in any case stored data will be safe and accessible.

### Relational DataBase Management System(RDBMS) :

A Database Management System that conforms at-least half of the 12 rules defined by Dr. E.F. Codd (1970) in his research document. In a relational data model, the data is organized into tables (i.e. Rows and Columns). These tables are called Relations. A row in a table represents a relationship among a set of values. Since table is a collection of relationships it is generally referred to using the mathematical term Relation.

### Database Systems:

Systems comprising of Databases and Database Management Systems are simply referred as database systems.

### Advantages of Data Base System:

- 1) Reduce data redundancy (duplication of data)
- 2) Control data inconsistency to a large extent
- 3) Database facilitate sharing of data
- 4) Enforce standards
- 5) Centralized databases can ensure data security

### Examples of Common Database Management Systems:

MySQL ,INGRES, POSTGRES, ORACLE, DB2.

### Levels of Database Implementation:

#### 1. Internal Level ( Physical Level) :

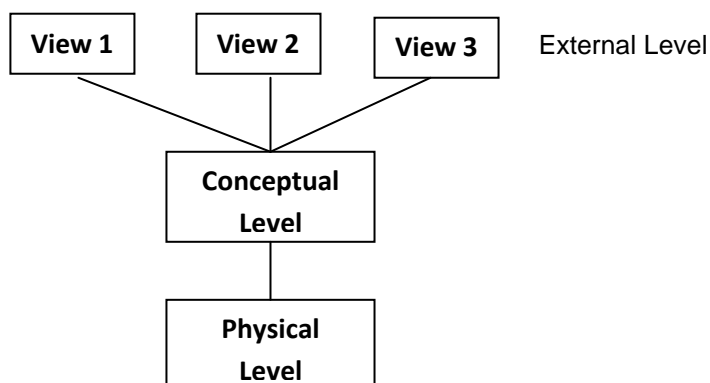
It describes how the data are actually stored on the storage media.

#### 2. Conceptual Level :

It describes what data are actually stored in the database. It also describes the relationships existing among data.

#### 3. External Level (View Level) :

It is closest to the users and is concerned with the way in which the data are viewed by individual users



**Data Independence:** The ability to modify a scheme definition in one level without affecting a scheme definition in the next higher level.

## Two Level of Data Independence:

1. **Physical Data Independence:** It refers to the ability to modify the scheme followed at the physical level without affecting the scheme followed at the conceptual level.
2. **Logical data Independence** It refers to the ability to modify the scheme followed at the conceptual level without affecting the scheme followed at the External level.

## Data Model:

A way by which data structures and their relationships are analyzed.

## Different Data Models :

1. Relational data model
2. Network data model
3. Hierarchical data model

## Relational data model:

In this model data is organized into tabular structures called relations. A database may contain many relations providing a better classification of data based on its nature and use. Multiple relations are then linked/ associated together on some common key data values (foreign key).

## Network Data Model :

In this model data is represented by collections of records and relationships among data are represented by links. A record is collection of fields i.e. attributes, each of which contents only one data value.

## Hierarchical data model :

In this model records are organized as trees, data is represented by collection of records connected to one another through links.

## Basics of Relational Model

### Relation :

- A tabular structure containing data. To be a relation is must satisfy following four conditions:
- Atomicity : At every row-column intersection (Cell) there must be an atomic value i.e. a value that can not be further subdivided.
  - No duplicity: No two rows of relation will be identical i.e. in any two rows value in at least one column must be different.
  - Ordering of rows is immaterial.
  - Ordering of columns is immaterial.

### Tuple :

A row in a relation is called a tuple

### Attribute :

A column in a relation is called an attribute

### Domain :

Domain of an attribute refers to the set of all the possible values for that attribute.

### Degree :

Number of attributes in a relation is the degree of that relation

### Cardinality :

Number of tuples in a relation is the cardinality of that relation.

### Candidate Key:

A set of one or more minimal attributes used to uniquely identify a tuple in the relation

and which can act as Primary Key. A relation can have multiple candidate keys

### Primary Key:

A candidate key that is primarily chosen for unique identification of tuples in a Relation.

Any subset of Primary key should not be Primary key.

### Alternate Key:

Candidate keys that not chosen as primary key are the alternate keys.

### Example:

In A LIBRARY Table

**Candidate keys** can be Accession no, Book no,

**Primary key:** If we select Book no as **primary key** for our purpose then

**Alternate Key** will be Accession No.

**Views :** A view is a virtual table whose contents are taking from other tables depending upon a condition.

Table: Student

| Roll No. | Name  | Marks |
|----------|-------|-------|
| 101      | Anu   | 85    |
| 102      | Riya  | 70    |
| 103      | Ankit | 78    |

**Definition of the VIEW :**

**CREATE VIEW toppers AS**

**SELECT \* FROM Student**

**WHERE Marks > 75 ;**

Here name of the view is toppers

Base table is students

toppers( A virtual table based on Student table)

| Roll No. | Name  | Marks |
|----------|-------|-------|
| 101      | Anu   | 85    |
| 103      | Ankit | 78    |

## Questions & Answers on DataBase Concepts

Q1. What do you mean by a Database Management System?

Ans:- DBMS is a collection of programs and files that allows a user to define structure of database, store data into it, modify the structure and manipulate data. Apart from this it also provide security, transaction management and concurrency control.

Q2. What are the advantages of using a DBMS?

Ans: Advantages of DBMS are:

- 1) Reduce data redundancy (duplication of data)
- 2) Control data inconsistency to a large extent
- 3) Database facilitate sharing of data
- 4) Enforce standards
- 5) Centralized databases can ensure data security.

Q.3. What do you mean by Relational Data Model?

Ans In this model data is organized into tabular structures called relations. A database may contain many relations providing a better classification of data based on its nature and use. Multiple relations are then linked/ associated together on some common key data values (foreign key).

Q.4. What is a relation in Relational Model?

Ans A tabular structure containing data. To be a relation is must satisfy following four conditions:

- ✓ Atomicity : At every row-column intersection (Cell) there must be an atomic value i.e. a value that can not be further subdivided.
- ✓ No duplicity: No two rows of relation will be identical i.e. in any two rows value in at least one column must be different.
- ✓ Ordering of rows is immaterial.
- ✓ Ordering of columns is immaterial.

Q.5. What is the foreign key?

Ans: A column or a combination of columns whose values are derived from primary key of some other table is called the foreign key of the table in which it is contained.

Q.6. What do you mean by referential integrity? How is it enforced in databases?

Ans The property of a relational database which ensures that no entry in a foreign key column of a table can be made unless it matches a primary key value in the corresponding column of the related table. It is enforced in the database with the help of foreign key constraint.

## INTRODUCTION TO MYSQL

**MySQL :** It is an Open Source RDBMS Software that uses Structured Query Language . It is available free of cost.  
**Key Features of MySQL :**

1. High Speed.
2. Ease of Use.
3. Available Free of Cost.
4. Supports standards based SQL.
5. Provides portability.
6. High Security.
7. Provides many data types.
8. Handles large database.

### MySQL Data Types:

Every column (or data item) should belong to a unique domain (known as data type). These data types help to describe the kind of information a particular column holds. MySQL supports the ANSI SQL data types. Some of the commonly used data types along with their characteristics are as follows:

| Class   | Data Type     | Description                                                                                                                                                                                                                                               | Example                  |
|---------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Text    | CHAR(size)    | A fixed-length string between 1 and 255 characters in length right-padded with spaces to the specified length when stored. Values must be enclosed in single quotes or double quotes.                                                                     | 'Maths'<br>'Text'        |
|         | VARCHAR(size) | A variable-length string between 1 and 255 characters in length; for example VARCHAR(25). Values must be enclosed in single quotes or double quotes                                                                                                       | 'Computer'<br>'Me and u' |
| NUMERIC | DECIMAL(p,s)  | It can represent number with or 17.3 without the fractional part. The size argument has two parts: precision and scale. Precision (p) indicates the number of significant digits and scale (s) maximum number of digits to the right of the decimal point |                          |
|         | INT           | It is used for storing integer values                                                                                                                                                                                                                     | 345                      |
| Date    | DATE          | It represents the date including day, month and year between 1000-01-01 and 9999-12-31                                                                                                                                                                    | 2009-07-02               |

### The Structured Query Language(SQL)

SQL (pronounced SEQUEL for Simple English Query Language) is Non-procedural universal data access language used to access and manipulate data stored in nearly all the data bases available currently. SQL standards are defined by ANSI (American National Standards Institute). SQL statements are used to retrieve and update data in a database. SQL works with database programs like MySQL, MS Access, DB2, Informix, MS SQL Server, Oracle, Sybase, etc. Most of the SQL database programs also have their own proprietary extensions in addition to the SQL standard.



## SQL Commands

SQL commands can be classified into the following:

**Data Definition Language (DDL):** A database scheme is defined by set of definitions, which are expressed, by a special set of commands called Data Definition Language (DDL). They are used to create tables, databases, identify data items, provide unique names to the data items and to define the length and provide the range of values that each data item can assume. They are CREATE TABLE, ALTER TABLE and DROP TABLE commands.

### Data Manipulation Language (DML):

The data manipulation language (DML) handles operations such as entering rows into a table, changing data, deleting rows, and extracting data from rows and tables. With DML, one does not change the table's structure, but rather its contents. It contains commands like INSERT, UPDATE and DELETE.

**Transaction Control Language (TCL):** A transaction is a one complete unit of work. A transaction is successfully completed in and only if all its constituent steps are successfully completed. To manage and control the transactions, the transaction control commands are used. e.g. COMMIT, ROLLBACK, SAVEPOINT.

## WORKING WITH SQL

To work on MySQL, you need to open or create the database first:

### To Create/Open Database:

```
mysql> CREATE DATABASE <name of database>;
```

Now the database with the given name will be created. One must be connected to the database before using it, as below:

```
mysql> use <name of database>;
```

### Creating Tables

Tables are defined with the CREATE TABLE command. When tables are created its columns are named, data types and sizes supplied for each column. At least one column must be specified.

Syntax:

```
CREATE TABLE <TableName>(<ColumnName1> <Data Type1>,
<ColumnName2> <Data Type2>,... ..,<ColumnNameN> <Data Type N>);
```

Example:

```
mysql> CREATE TABLE Students
(
 RollNo DECIMAL(3),
 Name VARCHAR(25)
);
```

Once the table is created we can insert the record in it, edit or delete existing records, and also we can search for desired record in a very comprehensive way using the SQL Select statement.

### Creating tables with SQL Constraints :

- ✓ A Constraint is a condition or check applicable on a field or set of fields.
- ✓ Data constraints are the rules that are defined when a table is created.
- ✓ They can also be defined or modified after creating the tables.
- ✓ When constraints are defined any data entering in the table is first checked to satisfy the condition specified in particular constraint if it is, only then table data can be updated. If data updation/insertion is violating the defined constraints, database rejects the data (entire record is rejected).
- ✓ When a constraint is applied to a single column, it is called a column level constraint but if a constraint is applied on a combination of columns it is called a table constraint.

### Following constraints can be defined on a table in SQL:

| Constraints name        | Description                                         |
|-------------------------|-----------------------------------------------------|
| PRIMARY KEY             | Used to create a primary key                        |
| NIQUE                   | to create a unique key                              |
| NOT NULL                | to define that column will not accept null values.  |
| FOREIGN KEY/ REFERENCES | to define referential integrity with another table. |
| DEFAULT                 | to define the columns default value.                |
| CHECK                   | to define the custom rule.                          |

Not Null and Default constraints can be applied only at column level rest all constraints can be applied on both column level and table levels.

### Use of constraints

```
CREATE TABLE student (Srollno integer NOT NULL, ...);
CREATE TABLE student (Srollno integer UNIQUE, ...);
CREATE TABLE student (Srollno integer NOT NULL, Sclass integer, Sname varchar(30), Sclass
DEFAULT 12);
CREATE TABLE student (Srollno integer CHECK (Srollno>0), Sclass integer, Sname varchar(30));
CREATE TABLE student (Srollno integer NOT NULL PRIMARY KEY, Sclass integer, Sname
varchar(30));
CREATE TABLE teacher (Tid integer NOT NULL, FOREIGN KEY (Studentid) REFERENCES student
(Sid));
```

### Inserting the record in existing table

The INSERT INTO command append a new record to an existing table and initializes it to desired values.

#### Syntax:

```
INSERT INTO table_name (column_name [,column_name])
VALUES (value [,value]);
INSERT INTO Student (RollNo,Name)
VALUES (12333,'Anu');
```

#### Inserting NULL Values:

```
INSERT INTO Student (RollNo,Name, Class, Grade)
VALUES (12333,'Anu',11, NULL);
```

#### Inserting Dates:

```
INSERT INTO Student (RollNo,Name, Class, DOB)
VALUES (12333,'Anu',11, '1998-02-24')
```

#### Inserting Data from another Table:

```
INSERT INTO Marks
SELECT * FROM Student
WHERE Class>10;
```

NOTE: Column names can be omitted if the values are entered in the same order in which they appear in the table. Insert into will give you an error if you omit to enter a mandatory value (non-null).

## Deleting Existing records from the table :

The DELETE command deletes one, many, or even all records in a table, depending on the conditions that you specify.

Syntax:

```
DELETE FROM tablename
WHERE search_conditions;
```

for example

```
DELETE FROM Students
WHERE RollNo>11255;
```

Note: The delete command is VERY dangerous. If run without conditions, it will delete ALL records in a table. In addition, SQL has no undo function. For instance,

```
DELETE FROM Students;
```

Will delete all records from Students table. This is not likely to be what you want.

## Modifying the contents of records :

The UPDATE command changes one, many, or even all records in a table, depending on the conditions that you specify

Syntax:

```
UPDATE tablename
SET column_name = expression [,column_name = expression..]
[WHERE search_conditions];
```

for example(assuming a customer table)

```
UPDATE customer
SET f_name = 'Thomas'
WHERE l_name = 'Smith' and
 date_of_birth = '3/2/1985';
```

An expression can be either a constant value (e.g., 'Thomas') or an operation done on another column or columns (see the example below, assuming a loan table with column rate.).

```
UPDATE TABLE loan
SET rate = rate + 1.5;
```

Because there is no condition (i.e., no WHERE ) all records will be updated. All rates will be increased by 1.5.

## Selecting data from existing table :

SQL SELECT statement is a comprehensive statement used to search/select records from one or more tables. All the analysis done on a database usually involves some form of select statement.

- **Choosing all fields (columns) :** Use a asterisk (\*) to indicate all fields with the select statement:

```
SELECT *
FROM table_name;
```

```
SELECT *
FROM customer;
```

➤ **Choosing a selected list of fields (columns)**

```
SELECT column_name [,column_name]
FROM table_name;
```

```
SELECT f_name, l_name, date_of_birth
FROM customer;
```

NOTE: The order in which you list the columns affects their order in the resulting output. Items within [ ] are optional.

➤ **Temporarily renaming columns in query results**

```
SELECT column_heading AS column_name
[,column_heading AS column_name]
FROM table_name;
```

Example:

```
SELECT f_name as "Name"
FROM customer;
```

➤ **Including calculated columns in the results**

```
SELECT date_due, rate, principal, rate * principal FROM loan;
```

NOTE: If necessary, use parentheses to clarify order of precedence.

➤ **Eliminating duplicate query results with distinct**

If you use the keyword distinct after the keyword SELECT, you will only get unique rows. Example:

```
SELECT rate,
FROM loan;
(above will display all rate values might be repeated)
```

```
SELECT distinct rate
FROM loan;
(above will display only unique rate values, no repetition)
```

➤ **Selecting from all the rows:**

```
SELECT ALL rate,
FROM loan;
(above query will display all rate values)
```

➤ **Selecting rows:** WHERE clause is used to specify the condition for searching. Only those records will be retrieved that satisfy condition given with where clause.

```
SELECT SELECT_list
FROM table_list
WHERE search_conditions;
```

Example:

```
SELECT * FROM customer
WHERE f_name = 'Carl';
```

➤ **Possible Search Conditions**

- ✓ Comparison operators (=,<,> !=,<>,<=,>=)

```
SELECT * FROM loan
WHERE principal > 100000000;
```

- ✓ Ranges (between and not between; inclusive)

```
SELECT * FROM loan
WHERE rate BETWEEN 7.5 AND 8.5;
```

OR

```
SELECT * FROM loan
WHERE rate NOT BETWEEN 7.5 AND 8.5;
```

- ✓ Lists (in and not in)

```
SELECT *
from Customer
where city IN ('Ahmedabad', 'Baroda', 'Delhi', 'Mumbai', 'Chennai');
```

OR

```
SELECT *
from Customer
where city NOT IN ('Ahmedabad', 'Baroda', 'Delhi', 'Mumbai', 'Chennai');
```

- ✓ Null values

```
SELECT *
from Customer
where city is Null;
```

OR

```
SELECT *
from Customer
where city is Not Null;
```

- ✓ Character matches (like and not like)

```
SELECT f_name, l_name
FROM customer
WHERE l_name LIKE 'Fos%';
```

```
SELECT f_name, l_name
FROM customer
WHERE l_name LIKE '_oster';
```

Note: "%" (matches any string of zero or more characters) and "\_" (matches any one character). In addition to those, brackets can be used to include either ranges or sets of characters.

Combinations of previous options using logical operators and, or, and not etc.:

```
SELECT f_name, l_name
FROM customer
WHERE l_name LIKE 'San%' AND City NOT
IN ('Baroda', 'Delhi')
```

➤ **Some more examples:**

- ✓ 'Am%' matches any string starting with Am.
- ✓ '%Singh%' matches any string containing 'Singh'
- ✓ '%a' matches any string ending with 'a'
- ✓ '\_\_\_' matches any string that is exactly 3 characters long.
- ✓ '\_\_\_%' matches any string that has at least 2 characters long.
- ✓ '\_\_\_g' matches any string that is 4 characters long with 3 characters in the beginning but 'g' as the 4<sup>th</sup> character.
- ✓

➤ **Viewing a tables structures**

Describe/ Desc statement is used to see the structure of a table:

```
Desc <tablename> ;
Describe <tablename>;
```

➤ **Sorting records**

The output of a SELECT query can be sorted in ascending or descending order on one or more columns, the default is ascending. This is important to note that the data in table is not sorted, only the results that appear on the screen are sorted.

Syntax:

```
SELECT <column name> [, <column name>, ...]
FROM <table name>
[WHERE <condition>]
[ORDER BY <column name> [, <column name>...]];
```

Example: (Sorting on single column)

```
SELECT * FROM EMPL
ORDER BY ENAME;
```

Example : (Sorting on Multiple columns)

```
SELECT * FROM EMPL
ORDER BY ENAME, JOB;
```

➤ **Adding a column:**

The ALTER TABLE command is used to change definitions of existing tables . It can add columns, delete columns or change their size.

Syntax:

```
ALTER TABLE <table name>
ADD (<column name> <data type with size> <constraints>);
```

Example:

```
ALTER TABLE Students
ADD (age NUMBER (2) CHECK (age > 5));
```

➤ **Modify a column :**

Syntax :

```
ALTER TABLE <table name>
MODIFY (column name newdatatype (newsized));
```

Example:

```
ALTER TABLE Students
MODIFY (age NUMBER (1));
```

➤ **Changing a column name:**

```
ALTER TABLE <table name>
CHANGE <old_column_name> <new_column_name> <column definition> ;
```

Example:

```
ALTER TABLE Students
CHANGE age s_age NUMBER (2)
```

➤ **Removing table components**

- ✓ To remove primary key constraints  
ALTER TABLE Students  
DROP primary key;
- ✓ To remove column from the table  
ALTER TABLE Students  
DROP COLUMN age ;

➤ **Drop a table from database:**

```
DROP TABLE <table name> ;
```

Example:

```
DROP TABLE Students;
```

**Operator Precedence :**

All the operators have precedence. Precedence is the order in which different operators are evaluated.

Various operators in descending order of precedence ( top to bottom) are listed below:

|    |                                |
|----|--------------------------------|
| 1  | !                              |
| 2  | ( unary minus)                 |
| 3  | ^                              |
| 4  | *,/,DIV,%, MOD                 |
| 5  | -,+                            |
| 6  | =, <=, >, >=, !=, IS, LIKE, IN |
| 7  | BETWEEN                        |
| 8  | NOT                            |
| 9  | &&, AND                        |
| 10 | , OR                           |

## MySQL Functions

### Functions

A function is a predefined command set that performs some operation and returns the single value.

### Numeric Functions

- **POWER()** : Returns the argument raised to the specified power. POW () works the same way.  
Example:(i)POW(2,4):Result:16    (ii)POW(2,-2):Result:0.25    (iii)POW(-2,3):Result: -8
- **ROUND()** : ROUND(X) Rounds the argument to the zero decimal place, Where as ROUND(X,d) rounds the argument to d decimal places.  
Example : (i) ROUND(-1.23); Result: -1                      (ii) ROUND(-1.58); Result: -2  
(iii) ROUND(1.58); Result: 2                              (iv) ROUND(3.798, 1); Result: 3.8  
(v) ROUND(1.298, 0); Result: 1                            (vi) ROUND(23.298, -1); Result: 20  
(vii) ROUND( 25.298,-1); result: 30
- **TRUNCATE()** : Truncates the argument to specified number of decimal places.  
Example: (i) TRUNCATE (7.29,1) Result: 7.2 (ii) TRUNCATE(27.29,-1)            Result: 20
- **SIGN()** : Returns sign of a given number.  
Example : (i) SIGN (15) Result : 1 : (ii) SIGN (-15) Result : -1 : (iii) SIGN (0) Result : 0.
- **SQRT** : Returns the square root of given number.  
Example : (i) SQRT (25) Result : 5

### Character/String Functions

- **LENGTH()** : Returns the length of a string in bytes/no.of characters in string.  
Example: LENGTH('INFORMATICS'); Result:11
- **CHAR()** : Returns the corresponding ASCII character for each integer passed.  
Example : CHAR(65) ; Result : A
- **CONCAT()**: Returns concatenated string i.e. it adds strings.  
Example : CONCAT('Informatics', '','Practices'); Result : Informatics Practices'
- **INSTR()**: Returns the index of the first occurrence of substring.  
Example : INSTR('Informatics','mat'); Result : 6(since 'm' of 'mat' is at 6th place)
- **LOWER()/LCASE()**: Returns the argument after converting it in lowercase.  
Example: LOWER('INFORMATICS'); Result : informatics
- **UPPER()/UCASE()**: Returns the argument after converting it in uppercase.  
Example: UCASE('informatics'); Result : INFORMATICS
- **LEFT()** : Returns the given number of characters by extracting them from the left side of the given string  
Example : LEFT('INFORMATICS PRACTICES', 3); Result : INF
- **RIGHT()**: Returns the given number of characters by extracting them from the right side of the given string



Example : RIGHT('INFORMATICS PRACTICES',3);      Result : CES

- MID(): Returns a substring starting from the specified position in a given string.

Example: MID('INFORMATICS PRACTICES',3,4);      Result : FORM

- SUBSTR() : Returns a substring from a given string.

Example: SUBSTR('INFORMATICS' , 3 , 4 ) ;      Result : FORM

- LTRIM() : Removes leading spaces.

Example : LTRIM(' INFORMATICS');      Result: 'INFORMATICS'

- RTRIM(): Removes trailing spaces.

Example : RTRIM('INFORMATICS ');      Result: 'INFORMATICS'

- TRIM() : Removes leading and trailing spaces.

Example: TRIM(' INFORMATICS ');      Result: 'INFORMATICS'

### **Date/Time Functions**

- CURDATE() : Returns the current date

Example: CURDATE();      Result: '2012-09-18'

- NOW() : Returns the current date and time

Example: NOW();      Result : '2010-07-21 13:58:11'

- SYSDATE() : Return the time at which the function executes

Example: SYSDATE();      Result: '2010-07-21 13:59:23'

- DATE() : Extracts the date part of a date or datetime expression

Example: DATE('2003-12-31 01:02:03');      Result:: '2003-12-31'

- MONTH() Returns the month from the date passed

Example: MONTH('2010-07-21');      Result : 7

- YEAR() : Returns the year.

Example: YEAR('2010-07-21');      Result : 2010

- DAYNAME() : Returns the name of the weekday

Example: DAYNAME('2010-07-21');      Result : WEDNESDAY

- DAYOFMONTH() : Returns the day of the month (0-31)

Example: DAYOFMONTH('2010-07-21');      Result: 21

- DAYOFWEEK() : Returns the weekday index of the argument

Example: DAYOFWEEK('2010-07-21');      Result: 4 (Sunday is counted as 1)

- DAYOFYEAR() : Return the day of the year(1-366)

Example: DAYOFYEAR('2010-07-21');      Result: 202

## QUESTIONS & ANSWERS on MySQL

Q.1. What is MySQL?

Ans:- It is an Open Source RDBMS Software. It is available free of cost.

Q.2. What is SQL?

Ans . SQL is Non-procedural universal data access language used to access and manipulate data stored in nearly all the data bases available currently. SQL standards are defined by ANSI (American National Standards Institute). SQL statements are used to retrieve and update data in a database. SQL works with database programs like MySQL, MS Access, DB2, Informix, MS SQL Server, Oracle, Sybase, etc.

Q.3. Differentiate between DDL and DML?

Ans Data Definition Language (DDL): This is a category of SQL commands. All the commands which are used to create, destroy, or restructure databases and tables come under this category. Examples of DDL commands are - CREATE, DROP, ALTER. Data Manipulation Language (DML): This is a category of SQL commands. All the commands which are used to manipulate data within tables come under this category. Examples of DML commands are - INSERT, UPDATE, DELETE.

Q.4 What is a constraint?

Ans : A constraints is a condition or check application on a field or set of fields.

Example: NOT NULL (ensure that column can not have null value), CHECK (make sure that all value satisfy certain criteria), UNIQUE (ensure that all values in a column are different) etc.

Q5 What are single row functions ?

Ans: Single Row Function work with a single row at a time. A single row function returns a result for every row of a queried table.

Examples of Single row functions are Sqrt(), Concat(), Lcase(), Upper(), Day(), etc.

Q. 6 Compare CHAR and VARCHAR data types.

Ans. The CHAR data-type stores fixed length strings such that strings having length smaller than the field size are padded on the right with spaces before being stored.

The VARCHAR on the other hand supports variable length strings and therefore stores strings smaller than the field size without modification.

Q.7 What are the differences between DELETE and DROP commands of SQL?

Ans: DELETE is DML command while DROP is a DDL command. Delete is used to delete rows from a table while DROP is used to remove the entire table from the database.

Q8 What do you understand by MySQL Server?

Ans:MySQL server listens for clients requests coming in over the network and accesses database contents according to those requests and provides that to the client.

Q9 What do you understand by MySQL Client?

Ans: MySQL Clients are programs that connect to MySQL Server and issue queries in predefined format.

Q.10 Explain with the help of an example that why should a transaction be executed as a whole or it should be not executed at all.

Ans: Suppose Raunak's account number is 3246 and his aunt's account number is 5135. In order to process the cheque presented by Raunak, the following two SQL commands need to be executed on the database maintained by the bank:

```
UPDATE Savings SET balance = balance - 2000
```

```
WHERE account_no = 5135;
```

```
UPDATE Savings SET balance = balance + 2000
```

```
WHERE account_no = 3246;
```

The above two Updates should both take place. If the first Update takes place and there is a system failure, the first updation should be undone. Either both the updations should be done and if it is not possible for both the updations to be done, then no updation should be done.

## Query Based question & answers

1. The Pincode column of table 'Post' is given below-

| .Pincode |
|----------|
| 10001    |
| 120012   |
| 300048   |
| 281001   |

i. SELECT Pincode from Post where Pincode LIKE " %1" ;

ii. SELECT Pincode from Post where Pincode LIKE " 0%" ;

Ans:

i) 110001

ii) No Output

2. A table "Animals" in a database has 3 columns and 10 records. What is the degree and cardinality of this table?

Ans: Degree 3 and Cardinality=10

3. Answer the question based on the table VOTER given below:

**Table : VOTER**

| Column Name | Data type | Size | Constraints | Description                          |
|-------------|-----------|------|-------------|--------------------------------------|
| V_id        | BIGINT    | 8    | Primary key | Voter identification                 |
| Vname       | VARCHAR   | 25   | Not null    | Name of the voter                    |
| Age         | INT       | 3    | Check>17    | Age should not less than equal to 17 |
| Address     | VARCHAR2  | 30   |             | Address of voter                     |
| Phone       | VARCHAR   | 10   |             | Phone number of the voter            |

(i) Write the command to delete all the rows of particular voter from the table voter where voter ID between 10 and 20.

Ans: Delete from VOTER where V\_id between 10 and 20;

(ii) Delete the table physically.

Ans: Drop table VOTER;

4. Write MySql command to create a furniture table including all constraint.

Table: Furniture

| ITEMNO      | ITEMNAME | TYPE    | DATEOFSTOCK             | PRICE | DISCOUNT |
|-------------|----------|---------|-------------------------|-------|----------|
| INT         | VARCHAR  | VARCHAR | DATE                    | INT   | INT      |
| 5           | 20       | 20      |                         | 6     | 2        |
| PRIMARY KEY | NOT NULL |         | DEFAULT<br>'19/03/2010' |       |          |

CREATE TABLE FURNITURE

( ITEMNO INT(5) PRIMARY KEY, ITEMNAME VARCHAR(20) NOT NULL,

TYPE VARCHAR(20),DATE\_STOCK DATE DEFAULT '2012/03/19', PRICE INT(6), DISCOUNT INT(2) );

5. Consider a database LOANS with the following table:

**Table: Loan\_Accounts**

| AccNo | Cust_Name   | Loan_Amount | Instalments | Int_Rate | Start_Date | Interest |
|-------|-------------|-------------|-------------|----------|------------|----------|
| 1     | R.K. Gupta  | 300000      | 36          | 12.00    | 19-07-2009 |          |
| 2     | S.P. Sharma | 500000      | 48          | 10.00    | 22-03-2008 |          |
| 3     | K.P. Jain   | 300000      | 36          | NULL     | 08-03-2007 |          |
| 4     | M.P. Yadav  | 800000      | 60          | 10.00    | 06-12-2008 |          |
| 5     | S.P. Sinha  | 200000      | 36          | 12.50    | 03-01-2010 |          |
| 6     | P. Sharma   | 700000      | 60          | 12.50    | 05-06-2008 |          |
| 7     | K.S. Dhall  | 500000      | 48          | NULL     | 05-03-2008 |          |
|       |             |             |             |          |            |          |

**Answer the following questions.**

**Create Database and use it**

1. Create the database LOANS.

```
Mysql> Create Database LOANS;
```

2. Use the database LOANS.

```
Mysql> Use LOANS;
```

**Create Table / Insert Into**

3. Create the table Loan\_Accounts and insert tuples in it.

```
Mysql>Create table Loan_Acc (AccNo int primary key,
Cust_Name varchar(30), Loan_Amount int, Installment int, Int_Rate number(5,3),
Start_Date date, Interest number(7,2));
Mysql> Insert into Loan_Acc values(1,'R.K. GUPTA',300000,36,12.0,'2009-07-19');
```

**Simple Select**

4. Display the details of all the loans.

```
Mysql> Select * from Loan_Acc;
```

5. Display the AccNo, Cust\_Name, and Loan\_Amount of all the loans.

```
Mysql> Select Acc_No,Cust_Name,Loan_Amount from Loan_Acc;
```

**Conditional Select using Where Clause**

- 6 Display the details of all the loans with less than 40 instalments.

```
Mysql> Select * from Loan_Acc where Instalment <40;
```

7. Display the AccNo and Loan\_Amount of all the loans started before 01-04-2009.

```
Mysql> Select AccNo, Loan_Amount from Loan_Acc where Start_Date <'2009-04-01';
```

8. Display the Int\_Rate of all the loans started after 01-04-2009.

```
Mysql> Select Int_Rate from Loan_Acc where Start_date >'2009-04-01';
```

**Using NULL**

8. Display the details of all the loans whose rate of interest is NULL.

```
Mysql> Select * from Loan_Acc where Int_rate is NULL;
```

9. Display the details of all the loans whose rate of interest is not NULL.

```
Mysql> Select * from Loan_Acc where Int_rate is not NULL;
```

### Using DISTINCT Clause

10. Display the amounts of various loans from the table Loan\_Accounts. A loan amount should appear only once.

```
Mysql> Select DISTINCT Loan_Amount from Loan_Acc;
```

11. Display the number of instalments of various loans from the table Loan\_Accounts. An instalment should appear only once..

```
Mysql> Select DISTINCT Instalment from Loan_Acc;
```

### Using Logical Operators (NOT, AND, OR)

12. Display the details of all the loans started after 31-12-2008 for which the number of instalments are more than 36.

```
Mysql> Select * from Loan_Acc where Start_Date>'2008-12-31' and Instalment>36;
```

13. Display the Cust\_Name and Loan\_Amount for all the loans which do not have number of instalments 36.

```
Mysql> Select Cust_Name, Loan_Amount from Loan_Acc where Instalment <>36;
```

14. Display the Cust\_Name and Loan\_Amount for all the loans for which the loan amount is less than 500000 or int\_rate is more than 12.

```
Mysql> Select Cust_Name, Loan_Amount from Loan_Acc where Loan_Amount <500000 or Int_rate>12;
```

15. Display the details of all the loans which started in the year 2009.

```
Mysql> Select * from Loan_Acc where Year(Start_Date)=2009;
```

16. Display the details of all the loans whose Loan\_Amount is in the range 400000 to 500000.

```
Mysql> Select * from Loan_Acc where Loan_Amount between 400000 and 500000;
```

17. Display the details of all the loans whose rate of interest is in the range 11% to 12%.

```
Mysql> Select * from Loan_Acc where Int_Rate between 11 and 12;
```

### Using IN Operator

19. Display the Cust\_Name and Loan\_Amount for all the loans for which the number of instalments are 24, 36, or 48. (Using IN operator)

```
Mysql> Select Cust_Name, Loan_Amount from Loan_Acc where Instalment IN(24,36,48);
```

### Using LIKE Operator

20. Display the AccNo, Cust\_Name, and Loan\_Amount for all the loans for which the Cust\_Name ends with 'Sharma'.

```
Mysql> Select AccNo, Cust_name from Loan_Acc where Cust_Name like '%Sharma';
```

21. Display the AccNo, Cust\_Name, and Loan\_Amount for all the loans for which the Cust\_Name ends with 'a'.

```
Mysql> Select AccNo, Cust_name,Loan_Amount from Loan_Acc where Cust_Name like '%a';
```

22. Display the AccNo, Cust\_Name, and Loan\_Amount for all the loans for which the Cust\_Name contains 'a'

```
Mysql> Select AccNo, Cust_name,Loan_Amount from Loan_Acc where
```

Cust\_Name like '%a%';

23. Display the AccNo, Cust\_Name, and Loan\_Amount for all the loans for which the Cust\_Name does not contain 'P'.

```
Mysql> Select AccNo, Cust_name, Loan_Amount from Loan_Acc where
NOT (Cust_Name like '%P%');
```

24. Display the AccNo, Cust\_Name, and Loan\_Amount for all the loans for which the Cust\_Name contains 'a' as the second last character.

```
Mysql> Select AccNo, Cust_name, Loan_Amount from Loan_Acc where
Cust_Name like '%a_';
```

### Using ORDER BY clause

25. Display the details of all the loans in the ascending order of their Loan\_Amount.

```
Mysql> Select * from Loan_Acc ORDER BY Loan_Amount;
```

28. Display the details of all the loans in the descending order of their Start\_Date.

```
Mysql> Select * from Loan_Acc ORDER BY Start_date DESC;
```

29. Display the details of all the loans in the ascending order of their Loan\_Amount and within Loan\_Amount in the descending order of their Start\_Date.

```
Mysql> Select * from Loan_Acc ORDER BY Loan_Amount, Start_Date DESC;
```

### Using UPDATE, DELETE, ALTER TABLE

30. Put the interest rate 11.50% for all the loans for which interest rate is NULL.

```
Mysql> Update Loan_Acc SET Int_Rate =11.50 Where Int_Rate IS NULL;
```

31. Increase the interest rate by 0.5% for all the loans for which the loan amount is more than 400000.

```
Mysql> Update Loan_Acc SET Int_Rate= Int_Rate+0.5
Where Loan_Amount >400000;
```

32. For each loan replace Interest with (Loan\_Amount\*Int\_Rate\*Instalments) /12\*100.

```
Mysql> Update Loan_Acc
SET Interest=(Loan_Amount*Int_Rate*Instalments) /12*100;
```

33. Delete the records of all the loans whose start date is before 2007.

```
Mysql> Delete From Loan_Acc Where Year(Start_Date)<2007;
```

34. Delete the records of all the loans of 'K.P. Jain'

```
Mysql> Delete From Loan_Acc Where Cust_Name='K.P.Jain';
```

35. Add another column Category of type CHAR(1) in the Loan table.

```
Mysql> Alter Table Loan_Acc ADD (Category CHAR(1));
```

### Find the Output of the following queries

36.

```
SELECT cust_name, LENGTH(Cust_Name), LCASE(Cust_Name), UCASE(Cust_Name) FROM
Loan_Accounts WHERE Int_Rate < 11.00;
```

| Cust_Name   | Length(Cust_Name) | LCASE(Cust_Name) | UCASE(Cust_Name) |
|-------------|-------------------|------------------|------------------|
| S.P. Sharma | 11                | s.p. sharma      | S.P. SHARMA      |
| M.P. Yadav  | 10                | m.p. yadav       | M.P. YADAV       |

37.

SELECT LEFT(Cust\_Name, 3), Right(Cust\_Name, 3), SUBSTR(Cust\_Name, 1, 3) FROM  
Loan\_Accounts WHERE Int\_Rate > 10.00;

| LEFT(Cust_Name,<br>3) | Right(Cust_Name, 3) | SUBSTR(Cust_Name, 1, 3) |
|-----------------------|---------------------|-------------------------|
| R.K                   | pta                 | R.K                     |
| S.P                   | nha                 | S.P                     |
| P.                    | Rma                 | P.                      |

38. SELECT RIGHT(Cust\_Name, 3), SUBSTR(Cust\_Name, 5) FROM Loan\_Accounts;

RIGHT(Cust\_Name, 3) SUBSTR(Cust\_Name, 5)

|     |        |
|-----|--------|
| pta | Gupta  |
| rma | Sharma |
| ain | Jain   |
| dav | Yadav  |
| nha | Sinha  |
| rma | harma  |
| all | Dhall  |

39. SELECT DAYOFMONTH(Start\_Date) FROM Loan\_Accounts;

| DAYOFMONTH(Start_Date) |
|------------------------|
| 19                     |
| 22                     |
| 08                     |
| 06                     |
| 03                     |
| 05                     |
| 05                     |



## Unit 4

### IT Applications

➤ **E-GOVERNANCE:**

It refers to application of electronic means in governance with an aim of fulfilling the requirements of common man at affordable costs and in fastest possible time.

➤ **Social impacts of E-Governance:**

- ✓ Improved the efficiency of administration and service delivery
- ✓ Reduced waiting time
- ✓ Reduced Cost
- ✓ Increased public participation
- ✓ Increased transparency

➤ **Some E-Governance websites are:**

| Name of Website                                                          | Purpose                                                                                                                                                         |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="http://www.incometaxindia.gov.in">www.incometaxindia.gov.in</a> | It Provides all the services of Income Tax department                                                                                                           |
| <a href="http://www.indiancourts.nic.in">www.indiancourts.nic.in</a>     | It provides information related to Supreme Court and High Courts of India.                                                                                      |
| <a href="http://www.rti.gov.in">www.rti.gov.in</a>                       | Right to information Act 2005 mandates timely response to citizen requests for government information                                                           |
| <a href="http://india.gov.in">india.gov.in</a>                           | This portal not only gives the information about Government of India, but also allows the users to apply online for various services provided by the government |
| <a href="http://www.drdo.nic.in">www.drdo.nic.in</a>                     | Defense Research and Development organization.                                                                                                                  |

➤ **E-BUSINESS:**

It refers to any form of transaction (exchange) that uses an electronic medium to facilitate the transaction.

➤ **Social impacts of E- Business:**

- ✓ Reductions in transactions and other costs.
- ✓ Increase in the internet users.
- ✓ Un-shortened supply chain.
- ✓ Improved customer service.
- ✓ Increased productivity/efficiency.
- ✓ Access to international markets.

➤ **Some E-Business websites are:**

| Name of Website  | Purpose                                                                   |
|------------------|---------------------------------------------------------------------------|
| www.irctc.co.in  | It provides online railway ticket reservation in India.                   |
| www.licindia.com | Insurance company of India.                                               |
| www.ebay.in      | India's most popular online shopping mall providing free online auctions. |
| www.amazon.com   | Online store for Books, CD's, DVD's, MP3's etc.                           |
| www.yatra.com    | Online flight ticket booking service.                                     |

➤ **E-LEARNING:**

It is a flexible term used to describe a means of teaching through technology such as a network, browser, CDROM or DVD multimedia platform.

➤ **Social impacts of E- Learning:**

- ✓ Availability of same course to millions.
- ✓ Boon for working class.
- ✓ Apprehensive Employers.
- ✓ Cultural differences obstruct the true aim of e- learning.
- ✓ High Dropout rate.

➤ **Some E-learning websites are:**

| Name of Website      | Purpose                                                                                                                                                                                           |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| www.moodle.org       | It is Open source Course Management System (CMS), also called as Learning Management System(LMS).                                                                                                 |
| www.w3schools.com    | Online web tutorial.                                                                                                                                                                              |
| www.exelearning.org  | Freely available open source application useful in publishing of web content.                                                                                                                     |
| www.ncert.nic.in     | Interactive module for students to learn various topics.                                                                                                                                          |
| www.gcflearnfree.org | It is an educational part of the GCF mission. GCF creates and provides quality, innovative online learning opportunities to anyone who wants to improve the technology, literacy, and math skills |

## QUESTION & ANSWERS

Q.1. What is e-Governance?

Ans: E-Governance is the use of a range of modern information and communication technologies such as internet, local area network, mobiles etc. by government to improve effectiveness of their services.

Q2. What is e-Learning?

Ans: E-Learning is a delivery of learning, training or education program by electronic means.

Q3. What do you mean by E-Business?

Ans: E-business is a term used to describe business run on the computer.

Q4. What are objectives of E- Governance?

Ans: Objectives of E- Governance are:-

- a. Improves Government processes.
- b. Increases the efficiency and speed in a transparent manner.
- c. Simplify administrative transactions.
- d. Citizen can participate in decision making process.

Q5. List the advantages of E Governance.

Ans: Advantages are :-

- a. Improved quality of information and information supply.
- b. Reduction of process time.
- c. Cost reduction.
- d. Improved service level.
- e. Increased efficiency.

Q6. How E-learning is useful to learner.

Ans: a. It enables students to complete training conveniently at off-hours or from home.  
b. Self pacing for slow and quick learners reduces stress and increased satisfaction.  
c. Interactivity engage users, pushing them rather than pulling them through training etc.

Q7. Why E-learning is preferred?

Ans: E-learning is preferred because it provides faster learning at reduced cost, increased access to learning and clear accountability for all participants in the learning process.

Q8. What are the importances of E-business?

Ans: 1) Reductions in transactions and other cost.

2) Un-shortened supply chain.

3) Improved customer service.

4) Increased productivity/efficiency.

5) Access to international markets.

Q9. What do you think e-learning courses have high dropout rate?

Ans: the possible reasons for this are

1) Lack of interaction.

2) Lack of proper follow-up.

---

**KENDRIYA VIDYALAYA SANGTHAN**

**SESSION ENDING EXAMINATION**

**Informatics Practice ( CLASS XI)**

**SAMPLE PAPER**

**MM: 70**

**TIME:3:00 HRS**

- Q.1 What is a Bluetooth? 1
- Q.2 What is the function of an OCR? 1
- Q.3 What are non-impact printers? 1
- Q.5 Write two characteristics of Random Access Memory. 2
- Q.6 How Multi Processing Operating Systems is different from Multi Programming Operating Systems? 2
- Q.7 Write a short note on Firewall. 2
- Q.8 What is an Assembler? 1
- Q.9 Paradise Park uses the following interface to generate bill for its customers. 4

The screenshot shows a Java Swing window titled "Paradise Park Billing". The window contains a form with the following elements:

- PARADISE PARK** (Main Title)
- Billing Entry** (Section Header)
- Name**: A text field containing "Rahul".
- Age**: A text field containing "15".
- Joy Ride 1**
- Joy Ride 2**
- Bill** (Button)
- Summary** (Text area):  
Name: Rahul  
Age: 15  
Bill: 300

The controls used in the above interface are as follows:

| <b>Control Type</b> | <b>Control Name</b> | <b>Functionality</b> |
|---------------------|---------------------|----------------------|
| jTextField          | txtName             | Customer Name        |
| jTextField          | txtAge              | Customer Age         |
| jCheckBox           | chkJr1              | Joy Ride 1           |
| jcheckbox           | chjJr2              | Joy Ride 2           |

|           |         |                  |
|-----------|---------|------------------|
| jTextArea | txtRes  | Bill Area        |
| jButon    | btnbill | To generate Bill |

When the bill button is clicked the bill is displayed as shown in the interface above. The functionality is as follows:

Rate for joy ride 1 is 100 and that for Joy ride 2 is 200. A customer can select one or both the joy rides. The total is calculated as the sum of one or both joy rides cost. A discount of Rs 50 is given on total if the child is below 12 years.

Write code under the action event of the jButton to achieve the above functionality.

Q.10 Explain how java codes are compiled and run. 2

Q.11 What will be the output of the following code segments: 2

```
int a=5, b=10, c=9, d=8;
```

```
System.out.println("" + ((a++)+(++c)--b)+(d--));
```

```
System.out.println("" + ((a>b)?(c>d)?(++d):35:(--b)));
```

Q.12 Convert the following code segment using switch-case construct: 2

```
int num = Integer.parseInt(txtNum.getText());
```

```
if(num>=2 && num<=5)
```

```
txtRes.setText("Prime");
```

```
else if(num==6 || num==8 || num==10)
```

```
txtRes.setText("Even");
```

```
else
```

```
txtRes.setText("Not Valid");
```

Q.13 Predict the output of the following java construct: 2

```
int m=5;
```

```
int prod=1;
```

```
int i=1;
```

```
while(i<=5)
```

```
{
```

```
 prod=prod+prod*(m%2);
```

```
 --m;
```

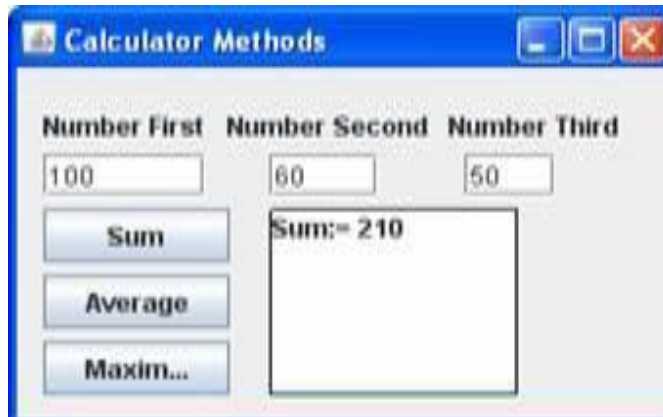
```
 ++i;
```

```
}
```

```
System.out.println(""+prod);
```

Q.14 What is the difference between an ordinary method and a Constructor? 2

Q.15 Design an application having an interface like: 4



Implement functionality by writing methods with passing the argument of three textboxes in calcSum(), calcAvg() & calcMax().

Q.16 What are the actual and formal parameters? Give example to support your answer. 2

Q.17 Explain the use of Comments in Java with example. 2

Q.18 Explain two circumstances where run time errors may occur in a java program. 2

Q.19 Write two characteristics of a good program. 1

Q.20 Write short Notes on: 6

- a) MySQL Features.
- b) Referential Integrity
- c) Database Constraints

Q.21 What is NULL? What happens when you perform arithmetic calculations on NULL value. 2

Q.22 Enlist the various types queries available with DDL and DML 2

2

Q.23 Explain the difference between ROUND and TRUNCATE functions in MySQL with examples.

Q.24 Given the following table Structure and sample data:

14

Table Name: **Saragam**

| Field Name | Data Type | Data Limit | Constraint     |
|------------|-----------|------------|----------------|
| Albumid    | Numeric   | 4          | PRIMARY KEY    |
| Album      | Text      | 20         | NOT NULL       |
| Cost       | Numeric   | 3          | DEFAULT 0      |
| Quantity   | Numeric   | 3          | Greater than 0 |
| Singer     | Text      | 10         |                |

Sample Data:

| Albumid | Album      | Cost | Quantity | Singer  |
|---------|------------|------|----------|---------|
| 1001    | SAHER      | 150  | 4        | JAGIT   |
| 1002    | MADHUSHALA | 250  | 6        | MANNA   |
| 1003    | IBADAT     | 180  | 8        | RAFI    |
| 1004    | KISMAT     | 180  | 6        | RAFI    |
| 1005    | HALCHAL    | 200  | 4        | KISHORE |
| 1006    | BLACK      | 210  | 10       | MICHEL  |
| 1007    | PASSION    | 200  | 5        | SHAKIRA |
| 1008    | NAMESAKE   | 190  | 3        | MADONA  |
| 1009    | PLASURE    | 220  | 2        | ASHA    |
| 1010    | CATWALK    | 155  | 7        | MADONA  |

Write the following queries:

- Write SQL syntax to create the table. The table does not support Foreign Keys.
- Add a column RATING in the above table containing numeric data and should accept NULL values.
- Insert one Row in the table.
- Increase the cost of all the albums sung by RAFI by 50.
- Display cost of all those albums whose singer name ends with 'A'.
- Display the album details for either RAFI, KISHORE or ASHA
- Display the Album details in the ascending order of their quantity.



- Q.25 What will be the output of the following SQL statements: 4
- a) `SELECT RIGHT(MID('MAHARAJA MAHAYOGI', 2, 5), 4);`
  - b) `SELECT LEFT(SUBSTR('AARAHANAPAHARAN',-10,5),2);`
- Q.26 How e-Governance has has benefited the Common man? 2
- Q.27 What benefits does e-business offer to a customer? 2
- Q.28 Enlist 2 websites that provides e-learning platforms. 1
-

**KENDRIYA VIDYALAYA SANGTHAN**

**SESSION ENDING EXAMINATION**

**MARKING SCHEME**

**Informatics Practice (CLASS XI )**

MM: 70

TIME:3:00 HRS

- Q.1 Bluetooth is telecommunication industry specification that describes how mobile phones , computers and PDA's can be easily interconnected using a short range wireless connection. 1
- Q.2 OCR is used to read character of special type font printed on a conventional paper with conventional ink.It is a input device. 1
- Q.3 In these printers there as no mechanical contact between the print head and paper. 1
- Q.5 The two characteristics of Random Access Memory are - 2
1. It is a volatile memory. Its contents are lost when power is turned off.
2. We can read as well as write in this memory.
- Q.6 **Multiprogramming OS-** It supports multiprogramming i.e. more than one user can be supported by it therefore more than one programs are loaded and active in main store at the same time. 2
- Multiprocessing OS-** It is capable of handling more than one processor as the jobs have to be executed on more than on CPU. It is capable of loadsharing.
- Q.7 Firewall- A firewall is a technique used in a secured computer system or network to block unauthorized access and allow only the authorized users.. Firewall can be implemented as a hardware as well as software , or combination of both. 2
- Q.8 Assembler- Assembler is a language processor which translates a program written in assembly language to machine language. 1
- Q.9 String str= txtName.getText(); 4
- int age= Integer.parseInt(txtage.gettext());
- int bill=0;
- if( chkJr1.isSelected())
- bill+=100;
- if(chkJr2.isSelected())
- bill+=200;
- if(age<12)

```
bill-=50;
txtRes.append("\n Name: "+str);
txtRes.append("\n Age: "+age);
txtRes.append("\n Bill: "+bill);
```

1 mark for correct input statements.

2 marks for correct if=else.

1 mark for correct output.

- Q.10 Java compiler produces bytecode, which is a machine instruction code for a java processor chip called Java Virtual machine. This bytecode is platform independent. 2
- Q.11 System.out.println(""+ ((a++)+(++c)--b)+(d--)); 2
- Output: 14
- System.out.println(""+ ((a>b)?35:(--b)));
- Output: 9
- Q.12 Convert the following code segment using switch-case construct: 2

```
int num = Integer.parseInt(txtNum.getText());

switch(num)
{ case 2:
 case 3:
 case 4:
 case 5:
 txtRes.setText("Prime");
 break;
 case 6:
 case 8:
 case 10:
 txtRes.setText("Even");
 break;
 default:
 txtRes.setText("Not Valid");
```

}

Q.13 Predict the output of the following java construct: 2

Output:- 4

Q.14 2

| Ordinary method                                  | Constructor                        |
|--------------------------------------------------|------------------------------------|
| It is a collection of java statement.            | It creates an object of a class    |
| Can have any valid return type , even void also. | has no return typr , not even void |
| Any name except class name                       | Same name as the class name        |

Q.15 `int calcSum( int N1, int N2, Int N3)` 4

```
{ return (N1+N2+N3);}
```

```
float calcAvg(int N1, int N2, Int N3)
```

```
{ return (float)(N1+N2+N3)/3;}// Type casting
```

```
int calcMax(int N1, int N2, Int N3)
```

```
{ return ((N1>N2?(N1>N3? N1:N3):(N2>N3?N2:N3));}
```

1 mark each for writing correct method.

1 mark for finding greatest between N1,N2 & N3.

Q.16 Actual parameters are those parameters which appear in method call statement. 2

Formal parameters are that parameter which appear in method definition.

```
int M1(int x, int y) // x & y are formal parameters
```

```
{ return (x+y);}
```

```
int a=12,b=13;
```

```
int C=M1(a,b); // a,b are actual parameters
```

1 mark for correct definition

1 mark for correct example.

Q.17 Comments provide internal documentation of a program. In Java comments are given either by // or /\* ....\*/ brackts. 2

Example-

```
/* This method calculates sum of two numbers.*/
```

```
int Sum(int x, int y)// x,y are formal parameters
```

```
{
```

```
return (x+y);
```

```
}
```

- Q.18 1. Divide by zero error- When we try to divide a number by 0. 2  
 2. When we try to calculate square root of a negative number.
- Q.19 Characteristics of a good program. 1  
 1. The program should be user friendly.. The user should not concern about what is happening inside a program.  
 2. The program should be portable i.e. it should run on different platforms.
- Q.20 Write short Notes on: 6  
 a.MySql features- Any 4 Features like cost, Query Language support, Portability, Speed, Ease of use,Security etc.  
 b. Correct definition of Referential Integrity.  
 c. Definition of constraint and types of constraints  
 Each topic will be of 2 marks.
- Q.21 1 mark for Correct definition of NULL 2  
 If any column value involved in an arithmetic expression is NULL, the result of the arithmetic expression is also NULL.
- Q.22 DDL: Create, Alter, Drop commands. 2  
 DML: Select, insert, Update, Delete commands.
- Q.23 Round( X,D):-> returns X rounded to D decimal places. 2  
 Truncate(X,D):-> The number is truncated to D digits after decimal point.  
 Select round( 1.298,1); will return 1.3  
 Select truncate( 1.298,1); will return 1.2
- Q.24 Write the following queries:  
 a. Write SQL syntax to create the table. The table does not support Foreign Keys.  
 Create table Sargam (Albumid int(4) primary key,  
 Album varchar(20) not null,cost int(3) default 0,  
 Quantity int(3) check ( Quantity>0), Singer varchar(10));  
 b. Add a column RATING in the above table containing numeric data and should accept NULL values.  
 Alter table Sargam ADD COLUMN (rating int);  
 c. Insert one Row in the table.  
 Insert into Sargam values(111,'Miraz', 200,2,'Jagjit');  
 d. Increase the cost of all the albums sung by RAFI by 50.  
 Update Sargam SET cost=cost+50 where singer='RAFI';  
 e. Display cost of all those albums whose singer name ends with 'A'.  
 Select cost from Sargam where singer like '%A';  
 f. Display the album details for either RAFI, KISHORE or ASHA  
 Select \* from Sargam where singer IN( 'RAFI','KISHORE','ASHA');

g. Display the Album details in the ascending order of their quantity.

Select \* from Sargam ORDER BY Quantity;

- Q.25 What will be the output of the following SQL statements: 4  
a) HARA b) AN
- Q.26 1. Keeping a tab on corruption. 2  
2. Resulted in increased public participation.  
Or any two benefits to common men.
- Q.27 Access to International markets, increased productivity, reduction in transaction and 2  
other cost or any other benefits to customer.
- Q.28 [www.moddle.org](http://www.moddle.org), [www.w3schools.com](http://www.w3schools.com), [www.exelearning.org](http://www.exelearning.org), or any other valid 1  
answer.

## SESSION ENDING EXAMINATION

### INFORMATICS PRACTICES

CLASS XI

Time allowed: 3 hours

Maximum Marks: 70

- Note:**
- (i) This question paper is divided into 3 sections
  - (ii) **Section A** consists of 30 Marks.
  - (iii) **Section B** consists of 20 marks.
  - (iv) **Section C** consists of 20 Marks.
  - (iv) Answer the questions after carefully reading the text.

#### SECTION-A

1. Answer the following questions :
- a. Define each of the following:  
(a) Nibble (b) Byte (c) Kilo Byte (d) Giga Byte 2
  - b. State the basic units of the computer. Name the subunits that make up the CPU, and give the function of each of the units. 2
  - c. Differentiate between the compiler and interpreter. 2.
  - d. What is a computer virus? How can it affect your computer? 2.
  - e. Expand the following terms : 2  
a) PDAs b) MICR c) DVD d) TFT
2. a. Which Graphical controls of JAVA can used to display multiple choices out of which more than one can be selected? 1
- b. Suppose you want to scan your storage devices attached with your computer for virus infection . Suggest the type and name of the software. 1
  - c. What is Write Once Run Anywhere characteristics of Java? 2
  - d. How can you declare the variable in JAVA for the following:- 2
    - (i) If you want to store the employee no. of an employee.
    - (ii) If you want to store the name of an employee.
  - e. What is meant by E-learning. Suggest any two websites which can be used for E-learning. 2
  - f. What benefits (mention at least 2) does an e-business offer to an organization? 2
3. a. Define the following terms in respect of Relational database management System: 2
  - (i) Primary Key.
  - (ii) Foreign Key.
- b. Differentiate between DEFAULT and CHECK constraint of table with example. 2
  - c. What will be the output of following code? 2
    - (i) `SELECT LOWER(CONCAT('Informatics', 'Practices'));`
    - (ii) `SELECT INSTR('INFORMATICS PRACTICES','OR');`
  - d. Difference between DDL and DML commands of SQL with example. 2
  - e. Rahul wants to create a table STUDENT which can store Roll number, name, address and percentage in SQL. Write the 2

command to create the table STUDENT (Decide the type and size of column on your own).

**SECTION-B**

4. a. Give the value of x after executing following Java code. 2

```
int a=10;
int b=12;
int x=5; int y=6;
while (a<=b)
{ if (a%2= =0)
 x=x+y;
 else
 x=x-y;
 a=a+1;
}
```

b. Find the errors from the following code segment and rewrite the corrected code underlining the correction made. 2

```
int a ,b;
c = a + b;
for(i<=5;i++)
{
 Display c;
 c=c+1
}
```

c. Rewrite the following code using **do-while** loop. 2

```
For(int x=0;x<10;x++)
{
 System.out.Println(x);
}
```

d. Write a JAVA Program to print the following Pattern: 2+2

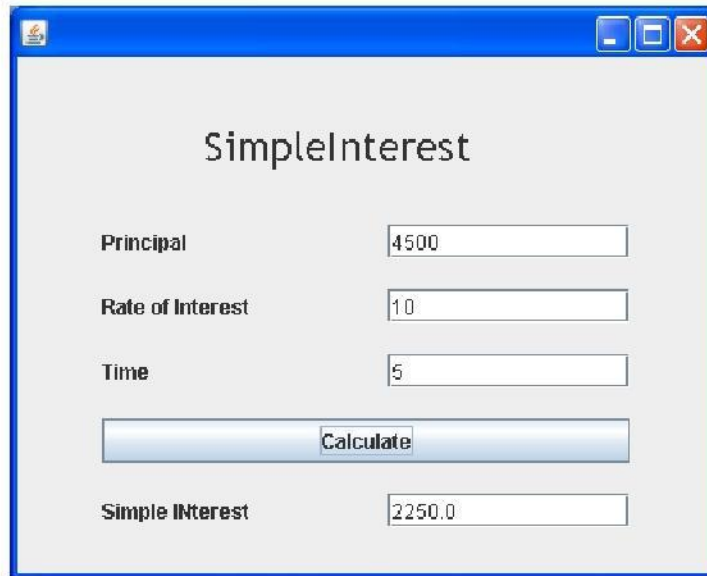
|                                                  |                                                   |
|--------------------------------------------------|---------------------------------------------------|
| (i)<br>6<br>55<br>444<br>3333<br>22222<br>111111 | (ii)<br>A<br>AAA<br>AAAAA<br>AAAAAAA<br>AAAAAAAAA |
|--------------------------------------------------|---------------------------------------------------|

5. a. Design an application that obtains three values in three text fields from user: Principal, Rate of Interest, Time. It should then compute and display Simple Interest when Calculate button is clicked. Controls names and Interface are given below 4

| Control  | Purpose                    | Name        |
|----------|----------------------------|-------------|
| Text box | To accept Principal        | jTextField1 |
|          | To accept Rate of Interest | jTextField2 |
|          | To accept Time             | jTextField3 |
|          | To display Simple Interest | jTextField4 |



|                |                                                       |          |
|----------------|-------------------------------------------------------|----------|
| Command Button | To Click for computation & display of Simple Interest | jButton1 |
|----------------|-------------------------------------------------------|----------|



- b. Write a java code to calculate and print the factorial of an integer stored in variable **num**. 4
- c. Rajni Raghav works for a Computer Institute. He wishes to create controls on application form for the following functions. Choose appropriate controls from Text Box, Label, Option Button, Check Box, List Box, Combo Box, command Button and write in the third column : 2

| S.No. | Function / Purpose of Control       | Control |
|-------|-------------------------------------|---------|
| 1     | Enter Applicant Name                |         |
| 2     | Enter Gender                        |         |
| 3     | Enter Course from a List of choices |         |
| 4     | Submit Form                         |         |

**SECTION-C**

6. Answer the question based on the table given below:

**TABLE : Student**

| Column Name | Data Type | Siz | Constraint                |
|-------------|-----------|-----|---------------------------|
| Roll_No     | NUMBER    | e   | PRIMARY KEY               |
| Name        | VARCHAR   | 4   | Not Null                  |
| Stipend     | NUMBER    | 20  | Stipend is greater than 0 |
| Stream      | VARCHAR   | 7   | Not Null                  |
| Grade       | VARCHAR   | 15  |                           |

1

- (i) Write the SQL command to create the above table with constraints. 2
- (ii) Insert 2 records with relevant information, in the table student 1
- (iii) Display all the records of the table Student. 1
- (iv) Delete the Student Whose Roll no is 100. 1
- (v) Change the Stream of Student to 'Computer' Whose Roll no. is 536. 1
- (vi) Add one column email of data type VARCHAR and size 30 to the table Student. 1
- (vii) View structure of the table created by you. 1
- (viii) Drop the table Student. 1
- (ix) Make the all changes permanently. 1

7. Answer the question based on the table given below:

**TABLE : HOSPITAL**

| No. | Name    | Age | Department       | DatoFadm | Charges | Sex |
|-----|---------|-----|------------------|----------|---------|-----|
| 1   | Arpit   | 62  | Surgery          | 21/01/98 | 300     | M   |
| 2   | Zareena | 22  | ENT              | 12/12/97 | 250     | F   |
| 3   | Kareem  | 32  | Orthopedic       | 19/02/98 | 200     | M   |
| 4   | Arun    | 12  | Surgery          | 11/01/98 | 300     | M   |
| 5   | Zubin   | 30  | ENT              | 12/01/98 | 250     | M   |
| 6   | Ketaki  | 16  | ENT              | 24/02/98 | 250     | F   |
| 7   | Ankita  | 29  | Cardiology       | 20/02/98 | 800     | F   |
| 8   | Zareen  | 45  | Gynecology       | 22/02/98 | 300     | F   |
| 9   | Kush    | 19  | Cardiology       | 13/01/98 | 800     | M   |
| 10  | Shilpa  | 23  | Nuclear Medicine | 21/02/98 | 400     | F   |

- (a) To list the names all the patients admitted after 15/01/98. 2
- (b) To list the names of female patients who are in ENT department. 2
- (c) To list names of all patients with their date of admission in ascending order. 2
- (d) To display Patient's Name, Charges, Age for only female patients. 2

Find Out the Output of Following SQL Command:-

- (i) `Select COUNT(DISTINCT charges) from HOSPITAL;` 1
- (ii) `Select MIN(Age) from HOSPITAL where Sex="F";` 1

SESSION ENDING EXAMINATION

INFORMATICS PRACTICES

CLASS XI

MARKING SCHEME

Time allowed: 3 hours

Maximum Marks: 70

(ALL the answers are suggestive, similar and correct answers may also be considered)

**Note:** (i) This question paper is divided into 3 sections

(ii) **Section A** consists of 30 Marks. (iii)

**Section B** consists of 20 marks. (iv) **Section**

**C** consists of 20 Marks.

(iv) Answer the questions after carefully reading the text.

SECTION-A

1. Answer the following questions :

a. Define each of the following:

(a) Nibble (b) Byte (c) Kilo Byte (d) Giga Byte

2

Ans:- Nibble- Collection of 4 bits

Byte- Collection of 8 bits

Kilobyte- Collection of 1024 bytes

Gigabyte- Collection of 1024 Mega Bytes

(1/2 marks each for each correct ans)

b. State the basic units of the computer. Name the subunits that make up the CPU, and give the function of each of the units. 2

Basic Units: 1. Input unit 2. Central Processing unit(CPU) 3. Output Unit 4. Memory.

Ans. The CPU has two subunits : The control Unit(CU) and Arithmetic logic unit(ALU).

The control unit controls the entire operation being carried out. The

ALU performs the arithmetic and logical operations.

**2 marks for the correct answer.**

c. Differentiate between the compiler and interpreter. 2

Ans. An interpreter converts and executes HLL program code into Machine language code line by line where as Compiler converts an HLL program into object program(Machine Lang.) in one go and once the program is error free, it can be executed later.

**2 Marks for the correct answer.**

d. What is a computer virus? How can it affect your computer? 2

Ans. Computer viruses are malicious codes/programs that cause damage to data and files on a system. Viruses can attack any part of a computer. It can effects as (a) Worms : A worm is a self-replicating program which eats up the entire disk space or memory. (b) Trojan Horses: A Trojan horse is a program that appears harmless but actually performs malicious functions such as deleting files.

**2 Marks for the correct answer.**

e. Expand the following terms : 2

a) PDAs b) MICR c) DVD d) TFT

Ans. PDA :Personal Digital Assistants .

MICR : Magnetic Ink Character Reader / Recognition

DVD : Digital Video Disk

TFT : Thin Film Transistor

**½ Mark each for each correct expansion**

2. a. Which Graphical controls of JAVA can used to display multiple choices out of which more than one can be selected? 1  
jCheckbox .

Ans. **1 Mark for correct answer**

- b. Suppose you want to scan your storage devices attached with your computer for virus infection. Suggest the type and name of the software. 1

Ans. Antivirus - MCaffe , Avast, AVG etc.

**1 Mark for correct answer**

- c. What is Write Once Run Anywhere characteristics of Java? 2

Ans. The Java programs need to be written just once, which can be run on different platforms without making changes in the Java program. Only the Java interpreter is changed depending upon the platform. This characteristic is known as Write Once Run Anywhere.

(2 marks for complete answer )

- d. How can you declare the variable in JAVA for the following:- 2

(iii) If you want to store the Employee no. of an employee.

(iv) If you want to store the name of an employee.

Ans. (i) Int employeeno;

(ii) String name;

**1 mark each for each correct declaration.**

- e. What is meant by E-learning. Suggest any two websites which can be used for E-learning. 2

Ans. E-learning is a flexible term used to describe a means of teaching and learning through technology such as a network, browser, CDROM or DVD multimedia platforms.

Two websites : [www.moodle.org](http://www.moodle.org), [www.w3schools.com](http://www.w3schools.com)

**1 Mark for defining e-learning**

**½ Mark each for each correct website.**

- f. What benefits (mention at least 2) does an e-business offer to an organization?. 2

Ans. The benefits an e-business offer to an organization are:

1. Provides convenience and comfort for customers.
2. Offers opportunity to access new markets across the globe.

**1 Mark each for each correct benefit.**

3. a. Define the following terms in respect of Relational database management System: 2

(iii) Primary Key. (iv)

Foreign Key.

Ans. (i) A Primary Key is a set of one or more attributes that can uniquely identify tuples within the relation.

(ii) A column in the current table that is a primary key in another table (Master Table) is known as foreign key.

**1 Mark each for defining each of the key correctly**

- b. Differentiate between DEFAULT and CHECK constraint of table with example. 2

| DEFAULT Constraint                                                                                                                     | CHECK Constraint                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Default constraint is used to set a default value for a column that may be used when no value is inserted by the user for that column. | Check constraint is used to check the valid values for a column.                     |
| Ex -<br>Create table student (<br>Gender char(1) Default 'M');                                                                         | Ex -<br>Create table student (<br>Sal decimal(6,2) check (sal>=2000 and sal<=5000)); |

**1 mark for correct difference**

**½ mark each for correct example of each.**

- c. What will be the output of following code? 2  
 (iii) `SELECT LOWER(CONCAT('Informatics', 'Practices'));` (iv)  
`SELECT INSTR('INFORMATICS PRACTICES','OR');`  
 Ans. (i) informaticspractices  
 (ii) 4

**1 Mark each for each correct output.**

- d. Difference between DDL and DML commands of SQL with example. 2  
 Ans. Data Definition(Description) Language Subset of SQL commands that are used to describe various objects of database.(Example: CREATE/ALTER)  
 Data Manipulation Language Subset of SQL commands that are used to manipulate data in tables.(Example: SELECT/INSERT/DELETE/UPDATE)

**1 mark for correct difference**

**½ mark each for correct example of each.**

- e. Rahul wants to create a table STUDENT which can store Roll number, name, address and percentage in SQL. Write the command to create the table STUDENT (Decide the type and size of column on your own). 2  
 Create table STUDENT(Rollnumber integer, name varchar(15), address varchar(30), percentage decimal(3,2));  
 Ans. **2 Marks for correct answer.**

### SECTION-B

4. A Give the value of x after executing following Java code. 2  
`int a=10;`  
`int b=12;`  
`int x=5; int y=6;`  
`while (a<=b)`  
`{ if (a%2==0)`  
`x=x + y;`  
`else`  
`x=x-y;`  
`a=a+1;`  
`}`  
 Ans. **11**  
**(2 marks for correct output.)**

- b. Find the errors from the following code segment and rewrite the corrected code underlining the correction made. 2  
`int a ,b;`  
`c = a + b;`  
`for(;i<=5;i++)`  
`{`  
`Display c;`  
`c=c+1`  
`}`  
 Corrected Code:  
 Ans. `int a , b, c;`  
`c = a + b;`  
`for(i<=5;i++)`  
`{`  
`System.out.println(" "+c);`  


---

```
c=c+1;
```

```
}
```

½ mark each for finding any 4 errors.

c. Rewrite the following code using *do-while* loop.

2

```
For(int x=0;x<10;x++)
{
System.out.println(x);
}
```

Ans. int x=0;

do

{

System.out.println(x);

x=x+1;

} while(x<10)

**2 marks for correct answer.**

d. Write a JAVA Program to print the following Pattern:

2+2

(i)

6

55

444

3333

22222

111111

(ii)

A

AAA

AAAAA

AAAAAAA

AAAAAAAAA

Ans.

(i)

```
for(int i=6; i>=1;i--)
```

```
{
```

```
for(int j=6; j>=i; j--)
```

```
System.out.print(""+i);
```

```
System.out.println();
```

```
}
```

**2 marks for correct code.**

(ii)

```
for(int i=1; i<=5;i++)
```

```
{
```

```
for(int j=4; j>=i; j--)
```

```
System.out.print(" ");
```

```
for(int k=1; k<=(2*i-1); k++)
```

```
System.out.print("A");
```

```
System.out.println();
```

```
}
```

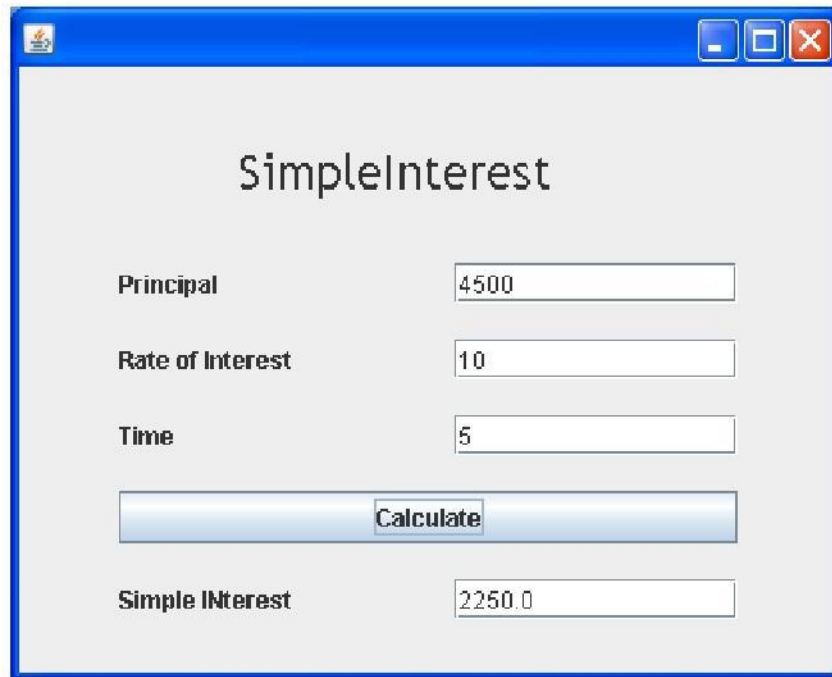
**2 marks for correct code.**

5. a. Design an application that obtains three values in three text fields from user: Principal, Rate of Interest, Time. It should then compute and display Simple Interest when Calculate button is clicked. Controls names and Interface are given below -

4

| Control  | Purpose                    | Name        |
|----------|----------------------------|-------------|
| Text Box | To accept Principal        | jTextField1 |
|          | To accept Rate of Interest | jTextField2 |
|          | To accept Time             | jTextField3 |
|          | To display Simple Interest | jTextField4 |

|                |                                                       |          |
|----------------|-------------------------------------------------------|----------|
| Command Button | To Click for computation & display of Simple Interest | jButton1 |
|----------------|-------------------------------------------------------|----------|



Ans.

```
private void jButton1ActionPerformed
(java.awt.event.ActionEvent evt)
{
jTextField4.setText
(Double.toString(
(Double.parseDouble(jTextField1.getText())
*Double.parseDouble(jTextField2.getText())
*Double.parseDouble(jTextField3.getText())
/100));
}

```

**OR**

```
private void jButton1ActionPerformed
(java.awt.event.ActionEvent evt)
{
double P,R,T,SI;
P= Double.parseDouble (jTextField1.getText()); R=
Double.parseDouble (jTextField2.getText()); T=
Double.parseDouble (jTextField3.getText());
SI = P*R*T/100;
jTextField4.setText(Double.toString(SI));
}

```

**4 Mark for correct code.**

b. Write a java code to calculate and print the factorial of an integer stored in variable **num**.

4

```
Ans. long i=0, fact=1, num=2;
i=num;
while(num!=0)
{
Fact=fact*num;
--num;
}
System.out.println("the Factorial of " + I + "is" + fact);

```

**4 marks for correct answer.**

c. Rajni Raghav works for a Computer Institute. He wishes to create controls on application form for the following functions. Choose appropriate controls from Text Box, Label, Option Button, Check Box, List Box, Combo Box,

2

command Button and write in the third column :

| S.No. | Function / Purpose of Control       | Control |
|-------|-------------------------------------|---------|
| 1     | Enter Applicant Name                |         |
| 2     | Enter Gender                        |         |
| 3     | Enter Course from a List of choices |         |
| 4     | Submit Form                         |         |

Ans.

- 1 Text Box
- 2 Option Button
- 3 Combo Box
- 4 Command Button

½ mark each for each correct control name.

### SECTION-C

6. Answer the question based on the table given below:

**TABLE : Student**

| Column Name | Data Type | Size | Constraint                |
|-------------|-----------|------|---------------------------|
| Roll_No     | NUMBER    | 4    | PRIMARY KEY               |
| Name        | VARCHAR   | 20   | Not Null                  |
| Stipend     | NUMBER    | 7    | Stipend is greater than 0 |
| Stream      | VARCHAR   | 15   | Not Null                  |
| Grade       | VARCHAR   | 1    |                           |

- |                                                                                  |   |
|----------------------------------------------------------------------------------|---|
| (x) Write the SQL command to create the above table with constraints.            | 2 |
| (xi) Insert 2 records with relevant information, in the table student            | 1 |
| (xii) Display all the records of the table Student.                              | 1 |
| (xiii) Delete the Student Whose Roll no is 100.                                  | 1 |
| (xiv) Change the Stream of Student to 'Computer' Whose Roll no. is 536.          | 1 |
| (xv) Add one column email of data type VARCHAR and size 30 to the table Student. | 1 |
| (xvi) View structure of the table created by you.                                | 1 |
| (xvii) Drop the column Grade from the table Student.                             | 1 |
| (xviii) Make the all changes permanently.                                        | 1 |

Ans. (i) create table student(Roll\_No integer(4) primary key, Name varchar(20) NOT NULL, Stipend integer(7) Check Stipend>0, Stream varchar(15) NOT NULL, Grade varchar(1));

**2 marks for correct answer.**

- (ii) (a) insert into Student values(100,'Vishal Mishra',1000, 'Science','A');
- (b) insert into Student values(101,'Arvind Verma',2000, 'Science','A');
- (iii) select \* from student;
- (iv) delete from Student where Roll\_No=100;
- (v) update Student set Stream='Computer' where Roll\_No=536;
- (vi) alter table Student add(email varchar(30));
- (vii) desc[ribe] Student; Drop
- (viii) table Student;
- (ix) commit;

**1 mark each for each correct answer from part (ii) to (ix)**



7.

Answer the question based on the table given below:

**TABLE : HOSPITAL**

| No. | Name    | Age | Department       | DatoFadm | Charges | Sex |
|-----|---------|-----|------------------|----------|---------|-----|
| 1   | Arpit   | 62  | Surgery          | 21/01/98 | 300     | M   |
| 2   | Zareena | 22  | ENT              | 12/12/97 | 250     | F   |
| 3   | Kareem  | 32  | Orthopedic       | 19/02/98 | 200     | M   |
| 4   | Arun    | 12  | Surgery          | 11/01/98 | 300     | M   |
| 5   | Zubin   | 30  | ENT              | 12/01/98 | 250     | M   |
| 6   | Ketaki  | 16  | ENT              | 24/02/98 | 250     | F   |
| 7   | Ankita  | 29  | Cardiology       | 20/02/98 | 800     | F   |
| 8   | Zareen  | 45  | Gynecology       | 22/02/98 | 300     | F   |
| 9   | Kush    | 19  | Cardiology       | 13/01/98 | 800     | M   |
| 10  | Shilpa  | 23  | Nuclear Medicine | 21/02/98 | 400     | F   |

**Ans.**

a) `SELECT name FROM hospital WHERE DatoFadm > '15-jan-1998';`

(b) `SELECT name FROM hospital WHERE sex='F' and department='ENT';`

(c) `SELECT name FROM hospital ORDER BY DatoFadm asc;`

(d) `SELECT name, charges,age FROM hospital WHERE sex='F';`

[ 2 mark each for each correct query]

i)5

ii)16

[ 1 mark each for each correct output]

**KENDRIYA VIDYALAYA SANGATHAN**

**Sample Paper**

**Class – XI**

**Subject : Informatics Practices**

**MM:70**

**Time : 3 hours**

---

**General Instructions :**

- i) All questions are compulsory.
- ii) Answer the questions after carefully reading the text.
- iii) Please check that this question paper contains 7 questions.
- iv) Do all the parts of same questions together.

- Q1. (a) Name the basic units of a computer system. 1
- (b) What is an Operating System. Name any two example. 2
- (c) Give one point of difference between OCR and OMR. 1
- (d) What is a port ? Name any two port types. 2
- (e) Write any one advantage of TFT display. 1
- (f) What do you understand by Computer Security ? Name any two threats to computer security. 2
- (g) Why IDE are useful in application development. 1
- Q2.
- (a) What is the role of JVM in platform independence in Java. 2
- (b) Give the syntax and example of declaring variable. 1
- (c) Give any two properties of TextField control in java. 1
- (d) Differentiate between the following : 1x2
- (i) if and switch      (ii) runtime errors and logical errors
- (e) What will be the value of following expressions if j=5, 1x2
- (1)  $(5*++j)\%6$     (2)  $(5*j++)\%6$

(f) Why program maintenance is considered very important. 2

Q3. (a) What is SQL ? What are the different categories of SQL commands. 2

(b) Name all the integrity constraints used during table creation. 1

(c) Describe the following commands with syntax and example:

(i) insert command 2

(ii) update command 2

(e) When a column value is skipped in an insert command , which value is inserted 1  
in the table.

(d) A table has 5 columns and 10 rows. What is its degree and cardinality. 1

(e) Give one point of difference between the primary key and foreign key. 1

Q4.

(a) Write a program in java to calculate the sum of all the no. divisible by 5 in 2  
the range 1 to 50.

(b) Write the output of the following code: 2

```
int i=0,x=0;
do{
 if(i%5==0){
 x++;
 System.out.println(x + "\n");
 }
 ++i;
}while(i<20);
System.out.println(x);
```

(c) Rewrite the following while loop into a for loop: 2

```
int s=0;
while(s<=13){
 if(s%2==2)
```

```

 { System.out.println("Color is red");
 }
 else
 {System.out.println("Color id blue");
 }
 System.out.println("New color");
 s=s+1;
}

```

(d) Rewrite the corrected program after removing errors, underline the corrections: 2

```

Int l=5,J=10;

if (l<J)||l=10)

 System.out.println("OK \n");

System.out.println("Not OK");

```

(e) Design the following application and answer the questions that follow :

The screenshot shows a web form titled "ICICI Bank". The form includes the following elements:

- Principal**: A text input field.
- Time**: A text input field.
- Rate**: A text input field.
- Senior Citizen**: A checkbox.
- Account Type**: A group box containing two radio buttons: "Fixed Deposit" and "Recurring Deposit".
- Calculate**: A button.
- Clear**: A button.
- Interest**: A text input field.
- Amount**: A text input field.

(c) Write the code for the Clear button to clear all the textfields (txtPrincipal & txtTime) 2 and checkbox. Set the default choice in the radio button as Fixed Deposit. Suppose the name of radio button Fixed Deposit is radioFD and Recurring Deposit is radioRD.

- (d) Write the code for the calculate button to calculate compound interest ( $P*(1+R/100)^T$ ) and amount ( Principal + Compound Interest) and display the values in the txtInterest and txtAmount depending on principal, rate and time.

Rate is calculated based on the time according to the following table:

5

| Account           | Time       | Rate |
|-------------------|------------|------|
| Fixed Deposit     | <= 1       | 10%  |
|                   | >1 and <=5 | 12%  |
|                   | >5         | 15%  |
| Recurring Deposit | <= 2       | 11%  |
|                   | >2 and <=7 | 12%  |
|                   | >7         | 15%  |

An additional rate of 2% is given to the senior citizens i.e. if the chkSR checkbox is checked.

**Q5.**

- (a) (i) Write an SQL query to create table "bank" with the following structure :

2

| Field     | Type        | Constraint     |
|-----------|-------------|----------------|
| AccountNo | Integer     | Primary Key    |
| CustName  | Varchar(20) | Not Null       |
| Address   | Varchar(30) | -              |
| ContactNo | Varchar(10) | Not Null       |
| Balance   | Decimal     | Must be >=1000 |

(b) Write an SQL query to create table "transaction" with the following structure : 2

| Field      | Type        | Constraint                                         |
|------------|-------------|----------------------------------------------------|
| AccountNo  | Integer     | Foreign Key related to the AccountNo of bank table |
| Trans_date | Varchar(10) | Not Null                                           |
| Trans_type | Varchar(20) | -                                                  |
| Amount     | Decimal     | Must be >0                                         |

(c) Write the output of the following SQL command: 4

(i) select concat(Lcase('To be'),trim(Trailing ':' From ' continued...'));

(ii) select round(15.193,1)+truncate(2.24,1);

(iii) select len(trim('Ajay#Jain###')) (# means blank space)

(iv) select mid(trim('#Informatics Practices##'),6,6); (# means blank space)

(d) What is the difference between DELETE and DROP commands of SQL. 1

(e) What is a constraint. 1

Q6.

(a) There is a table T1 with combination of columns C1, C2, and C3 as its primary key? Is it possible to enter:

- NULL values in any of these columns?
- Duplicate values in any of these columns?

(b) Consider the following "employee" table and write the output of the following 4

SQL queries:

| EmpNo | Name    | Job       | Gender | Salary | DeptNo | Commission |
|-------|---------|-----------|--------|--------|--------|------------|
| 101   | Reena   | President | F      | 30000  | 10     | 300        |
| 102   | Shankar | Manager   | M      | 18000  | 10     | 400        |
| 103   | Meena   | Manager   | F      | 15000  | 20     | 300        |
| 104   | Payal   | Clerk     | F      | 5000   | 30     | 100        |
| 105   | Rony    | Manager   | M      | 23000  | 20     | 500        |

- (i) Display the name of those employees whose name contains 'ee'.
- (ii) Display the name, salary and deptno of those employees whose salary is in the range 10000 and 30000. Order the query output in ascending order of name.
- (iii) Display all the details of Female Manager and President having salary >10000.
- (iv) Double the commission of those employees working in deptno 20 and 30.

(c) Consider the above table and perform the following: 4

- (i) In the employee table add a column mobileno. of datatype number with maximum of 10 digits with default value of 0000.
- (ii) Display the names of employees having exactly four lettered names.
- (iii) Add a primary key constraint EmpNo in the employee table.
- (iv) Remove the column Gender.

Q7.

- (a) Name any two e-governance websites of India. 1
- (b) How has e-learning benefited the students. 2
- (c) Describe any two positive impacts of e-business. 2



## MARKING SCHEME

Subject : Informatics Practices

Class- XI

MM:70

Time : 3 hours

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- Q1. (a) Input Unit, Output Unit, CPU , Memory ( 1 mark)
- (b) Operating System is a program which act as an interface between a user ( 1 marks) and the hardware(i.e. all computer resources).  
Example : Windows & Unix ( ½ + ½ marks)
- (c) Any one difference between OCR and OMR. ( 1 mark)
- (d) Ports are the points on computer having associated circuitry to allow ( 1 mark) connection of external devices with computer.  
Serial port and parallel port ( ½ + ½ marks)
- (e) Use less power than a normal monitor and can display text and graphics ( 1 mark) in a wide range of colours.
- (f) Computer Security: It is the ability of a system to protect information and system resources with respect to confidentiality and integrity . ( 1 mark)  
Viruses and spyware ( ½ + ½ marks)
- (g) It is a software tool to help programmer to edit, compile, interpret and debug the (1 marks) program in the same environment.
- Q2. (a) JVM is an abstract machine designed to implemented on the top of (2 marks) existing processors. It hides the underlying operating system .  
(b) datatype <variable\_name>; (1/2 mark)  
int a; (1/2 mark)
- (c) text and name (any two properties) ( ½ + ½ marks)

(d)

(i) if can evaluate a relational or logical expression whereas switch can test  
for equality ( 1 mark)

(ii) Runtime errors occurs at run time whereas in case the application is not  
giving any compilation or runtime error but still giving a incorrect output, it is  
logical errors. ( 1 mark)

(e) (i) 0 ( 1 mark) (ii) 1 ( 1 mark)

(f) Correct explanation (2 mark)

Q3. (a) SQL: In order to access data within the database, all programs and user (1 mark)

must use , SQL . It is the set of commands that is recognized by nearly all  
RDBMS.

DDL , DML, TCL Session Control and System control commands. (1 mark)

(b) Primary Key, Not Null, Foreign Key, Check, Default, Unique (1 mark)

(c)

(i) insert command is used ti insert new record into the table. (1 mark)

The syntax is

Insert into tablename values(exp-1,exp-2,exp-3.....);

Insert into emp values(101,'seema','president'.....); ( ½ + ½ marks)

(ii) update command is used to change some or all of the values in an (1 mark)  
existing row.

The syntax is

Update <table\_name> set colname-newvalue,.....

Where <search\_condition>;

Exp: update item set itemname='key' where itemno=1;

( ½ + ½ marks)

(d) degree=5 and cardinality = 10 ( ½ + ½ marks)

(e) primary key is used ti uniquely identify the tuples of a table whereas

Foreign key is a column of a table which is primary in parent table (1 mark)

Q4. (a) int i , sum=0; (2 marks)

```
for(i=1;i<=50;++i)
{
 if(i%5= =0)
 sum=sum+i;
}
System.out.println("Sum" + sum);
```

(b) Output is (2 marks)

```
1
2
3
4
4
```

(c) (2 marks)

```
for(int s=0;s<=13;++s){
if(s%2==2)
{ System.out.println("Color is red");
}
else
{System.out.println("Color id blue");
}
System.out.println("New color");
}
```

(d) Rewrite the corrected program after removing errors, underline the corrections:

int l=5,J=10; (1/2 mark)

if ((I<J)||I==10) (1 mark)

System.out.println("OK"+ "\n"); (1/2 mark)

System.out.println("Not OK");

(e)

(a) txtPrincipal.setText(" "); (1/2 mark)

txtTime.setText(" "); (1/2 mark)

chkSR.setSelected(false); (1/2 mark)

radioFD.setSelected(true); (1/2 mark)

(b) float P= Float.parseFloat(txtPrincipal.getText()); (4 marks)  
float T= Float.parseFloat(txtTime.getText());

if(radioFD.isSelected()==true)

{

if(T<=1)

R=10;

elseif(T>1 && T<=5)

R=12;

elseif(T>5)

R=15;

}

else

{

if(T<=2)

R=11;

elseif(T>2 && T<=7)

```

R=12;
elseif(T>7)
 R=15;
}

if(chkSR.isSelected()==true)
 R=R + 2;
float CI= (P*Math.pow((1+R/100),T));
float A=P+CI;
jLabelInt.setText(""+CI);
jLabelAmt.setText(""+A);

```

Q5. (a) (i) SQL query to create table "bank"

|                                                   |      |
|---------------------------------------------------|------|
| Create table bank( AccountNo Integer Primary Key, | (1/2 |
| mark)                                             |      |
| CustName varchar(20) Not Null,                    | (1/2 |
| mark)                                             |      |
| Address varchar(30),                              |      |
| ContactNo varchar(10) Not Null,                   | (1/2 |
| mark)                                             |      |
| Balance Decimal check(Salary>=1000)               | (1/2 |
| mark)                                             |      |
| );                                                |      |

(b) SQL query to create table "transaction"

|                                                                         |            |
|-------------------------------------------------------------------------|------------|
| Create table transaction( AccountNo Integer references bank(AccountNo), | (1/2 mark) |
| Trans_date varchar(10) Not Null,                                        | (1/2 mark) |
| Trans_type varchar(20),                                                 | (1/2 mark) |
| Amount Decimal check(Amount>0)                                          | (1/2 mark) |
| );                                                                      |            |

| Field      | Type        | Constraint                                         |
|------------|-------------|----------------------------------------------------|
| AccountNo  | Integer     | Foreign Key related to the AccountNo of bank table |
| Trans_date | Varchar(10) | Not Null                                           |
| Trans_type | Varchar(20) | -                                                  |
| Amount     |             | Must be >0                                         |

(c) Write the output of the following SQL command:

4

- (i) To be continued 1 mark
- (ii) 17.4 1 mark
- (iii) 9 1 mark
- (iv) matics 1 mark

(d) DELETE is DML command while DROP is a DDL command. 1 mark

Delete is used to delete rows from a table while DROP is used to remove the entire table from the database.

(e) A constraints is a condition or check application on a field or set of fields.. 1 mark

Q6.

- (a)
  - a. it is not possible to enter NULL values in any of these columns. 1 mark
  - b. While it is possible to enter duplicate values in these columns but the combination of C1,C2,C3 should be unique. 1 mark

(b)

- (i) select Name from employee where Name like '%ee%'; 1 mark
- (ii) select Name, Salary, DeptNo from employee 1 mark
  - where Salary between 10000 and 30000
  - order by Name;
- (iii) select \* from employee 1 mark
  - where Gender ='F' and Job in ('Manager','President') and salary >10000;
- (iv) update employee set Commission=2\*Commission 1 mark
  - Where Deptno in (20,30);

(c )

- (i) alter table employee add (mobileno Integer default 0000); 1 mark
- (ii) select Names from employee where Name like ' \_ \_ \_ \_'; 1 mark
- (iii) alter table employee add constraint pk primary key EmpNo 1 mark
- (iv) alter table employee drop column Gender. 1 mark.

Q7.

- (a) (i) [www.incometaxindia.gov.in](http://www.incometaxindia.gov.in) (ii) [www.india.gov.in](http://www.india.gov.in) (1 mark)
- (b) (1) availability of same course to millions. (2 marks)
- (2) boon for working class.
- (c)
- (1) Offers opportunity to access new markets across the globe. (2 marks)
- (2) Provides convenience and comfort for customers.

**Kendriya Vidyalaya Sangathan**

**Practice Paper**

**Class - XI**

**Sub : Informatics Practices**

MM : 70  
hours

Time : 3

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Instructions:

- i) All questions are compulsory.
- ii) Answer the questions after carefully reading the text.
- iii) Please check that this question paper contains 7 questions.
- iv) Do all the parts of same questions together.

**Q1**

(a) Out of the following devices , classify them as input & output devices.

- (i) Light pen 1
- (ii) flatbed plotter 1
- (iii) drum printer 1

(iv) OMR 1

(b) Differentiate between the application software & system software 2

(c) What measure would you take to avoid: 2

(i) virus attack (ii) PC intrusion

(d) Write the function of the following : (i) address bus (ii) control bus 2

**Q2**

(a) What is the name of event listener interface for action events ? 1

(b) What is the significance of break in a switch. 2

(c) Differentiate between the following: 2

(i) for and while 1

(ii) break and continue 1

(d) Why is program maintenance considered very important. 2



(e) Marks of a student is stored in a string variable strMarks. Write a java statements 1  
to convert marks in double variable dblMarks.

### Q3

(a) What is a database? Also explain the relational database. 2

(b) What is Primary Key? How it is different from candidate key ,explain with eg. 2

(c) Differentiate between the following: 2

(i) DDL & DML commands. (ii) in / between operator

(d) Describe the order by clause with syntax & example. 2

(e) A table 'Customers' in a database has 5 columns and no rows in it. What is its 2  
cardinality? What will be its cardinality if 4 rows are added in the table?

### Q4

(a) The following code has some errors. Rewrite the correct code :

```
int i,j=5; 2
i==j+5;
if(i=j)
{
 jTextField1.setText("i and j are unequal");

 jTextField2.setText("they are not equal"); break;
}
else jTextField1.setText("i and j are equal");
```

(b) Write code to add an element ("New Course") to a list (SubList) at the beginning 1  
of the list.

(c) What will be the output produced by following code fragment? 2

```
float x=9;
float y=5;
int z=(int)(x/y);
switch(z)
{
```

```

case1: x=x+2;

case2: x=x+3;

default: x =x+1;

}

System.out.println("value of x:"+x);

```

(d) Rewrite the following code using while loop: 2

```

int i,j;

for(i=1,j=2;i<=6;i++,j+=2)

 System.out.println(i++);

 System.out.println("Finished!!!");

```

(e) Write a program in Java that takes a number and check if the number is prime or not. 2

(f) Write the expression to print the value of a variable "x" of type int in a label. 1

**(g). 6( 2+2+1+1)**

Read the following case study and answer the questions that follows :

The Pizza Cafe has computerized its billing. The following is the data entry screen used at their outlet. The outlet offers two different types of pizzas, regular and pan pizzas. The price of a regular pizza is Rs. 120 and that of a pan pizza is Rs. 160. The user can choose to have three different types of extra toppings of he wants. Extra toppings costs as :

| Topping     | Cost |
|-------------|------|
| Cheese      | 40   |
| Capsicum    | 20   |
| Pepperonion | 25   |

- (a) Write the code for Calculate Rate button to calculate the rate of the pizza and display it in txtRate depending on the type of pizza selected by the customer.
- (b) Write the code for cmdAmount to calculate the total amount and display it in txtAmount. The total amount is calculated by first finding the cost of extra toppings selected by the customer. Remember that each extra topping adds the value with previous topping. Then add it to the rate and multiply the resultant amount by the quantity ordered.
- (c) Write the code for Clear button to clear all the text boxes and make default to Regular Pizza Type and Cheese as Topping.
- (d) Write the code for cmdExit to exist the application.

**SESSION ENDING EXAMINATION**

**Informatics Practice ( CLASS XI)**

**PRACTICE PAPER**

**SECTION A**

Q1.

a) What does a bus mean? Why is data bus bi-directional? 2

b)What is a port? Name some port types. 2

c) define

2

(i) phishing

(ii)IDE

(iii)Software

(iv) firmware

d)What measures you would take to avoid 2

(i) Spyware

(ii) PC Intrusion

e) Distinguish between RAM and ROM? 2

Q2.

a) What benefits an e-business offers to a customer? What issues are till to be care of?

2

b)Define 2

(i) e-learning

(ii) e-governance

c)Name any two e-business sites.

1

d) Name event listeners for the following actions:- 2

(i) a component receives capability to receive input i.e focus

(ii)key is pressed on the keyboard

e) Define 2

(i) Algorithm

(ii) Robustness

f) Method call in which data in actual parameter remains intact is known as \_\_\_\_\_? 1

Q3.

a) What is data redundancy? What are the problems associated with it? 2

b) Differentiate between DDL and DML commands. 2

c) How is round( ) function different from truncate( ) function? Explain giving suitable example. 2

d) Write a query to create a string from the ASCII values 70,65,67,69. 1

e) What is the following command doing? 1

```
ALTER TABLE persons ADD CONSTRAINT chk_Person
CHECK(P_ID>0 AND City='Simla');
```

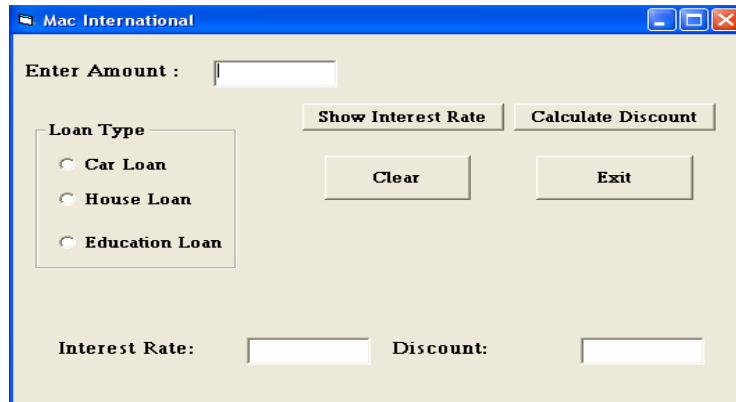
f) Write command to display current date and time. 1

g) Differentiate between CHAR and VARCHAR. 1

### SECTION B

Q4.

a) HSBC is a bank. The Bank provides three types of loans- Car loan, House Loan, Education Loan.



Read the following case study and answer the questions that follow:

Make a java swing frame as shown above and accept values through JTextFields. Perform according to following questions:

a. Write the commands to show the interest rate according to the following criteria.: 2  
Car loan – 10%

House Loan – 8.5%

Education Loan – 5%.

b. Calculate the discount on the amount according to following criteria. 4

- If amount > 10,000,00 and < 20,000,00 then 20% discount.
- If amount > 20,000,00 then 25 % discount.

b) Write a for loop to find sum and average of n natural numbers, odd numbers, and even numbers. 2

c) Identify errors :  
2

(i) for(a=1,a>10,a=a+1)

(ii)while(i<j);

{

System.out.println(i\*j);

i++;

}

Q5.

a) Find out output of the following code: 2

(i) int i,j,n;

n=0;i=1;

do{

n++; i++;

}while(i<=5);

System.out.println(n);

b) Write a program using while loop to compute the sum of following series: 2

$$1 + \frac{1}{4} + \frac{1}{7} + \frac{1}{10} + \frac{1}{13} + \frac{1}{16} + \frac{1}{19} + \frac{1}{22} + \frac{1}{25}$$

c) What will be the output of the following code: 2

```
int val, res, n=1000;
```

```
res = n+val>1750?400:200;
```

```
System.out.print(res);
```

(i) if the input given for val is 1000

(ii) if the input given for val is 500

d) Design GUI application that obtains Login ID and password and displays welcome screen if password is correct. (Note: write down steps to create GUI) 4

**SECTION C**

- Q6. a) Define: 4
- (i) Cardinality
  - (ii) View
  - (iii) Primary Key
  - (iv) Degree
- b) How would you calculate  $13*7/2$  in MYSQL? 1
- c) Write a query to create database with name MYDB. Write a query to open the same databse. 1
- d) What are the commands to undo the changes and make the changes permanent? 2
- e) Write a command to increase the size of empname column to 50 characters in an emp table. 2

**Q. 7.** Answer questions based on the table Schoolbus given below :

Schoolbus

| Rtno | Area_Covered | Capacity | No_of students | Distance | Transporter | Charges |
|------|--------------|----------|----------------|----------|-------------|---------|
| 1    | VasantKunj   | 100      | 100            | 10       | Shivam Tra  | 100000  |
| 2    | Rohini       | 80       | 80             | 10       | Anand Tr    | 55000   |
| 3    | Saket        | 50       | 50             | 30       | Bhalla Co.  | 95000   |
| 4    | Yamuna Vihar | 120      | 120            | 35       | Speed Tr    | 10000   |
| 5    | Saket        | 100      | 100            | 20       | Raj Tr.     | 80000   |
| 6    | Janak Puri   | 40       | 40             | 10       | Yadav Co.   | 60000   |

- a)
- (i) Write a query to create above table with proper Integrity constraints. 2
  - (ii) Display RtNo, Area\_Covered and charges for all the school buses. 1
  - (iii) Display all the details from above table in ascending order of Area\_Covered 1
  - (iv) Remove column Area\_Covered. 2

- f) Increase the charges of Yadav Co. by 1000. 1
- b) Write outputs of the following queries:
- (i) Select Capacity, No\_of\_students from Schoolbus where charges>60000; 1
- (ii) Select RtNo charges/4 "Quaterly Charges" from Schoolbus; 1
- (iii) Select Transporter from Schoolbus where Area\_Covered like 'S%'; 1