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तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

STUDY MATERIAL

(INFORMATICS PRACTICES)

Class – XI

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Chapter-1
HARDWARE CONCEPT

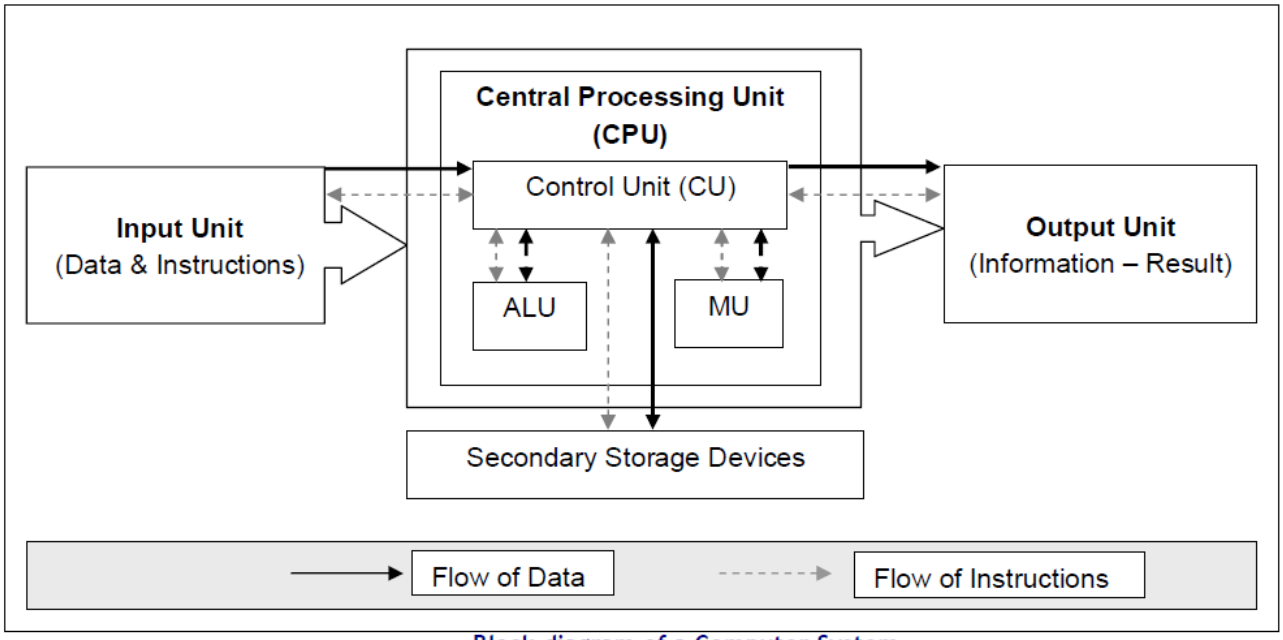
Basics of Computer System

Computer system includes software and hardware together to make it perform the required tasks. Software is a collection of instructions and related data that tells a computer what to do and how to do.

Computer Hardware is a collection of electronic and other peripheral units, which enables software to perform desired operations. And, there is important software, known as **Operating system (OS**) specially designed to establish the communication between various hardware devices and software loaded on a computer system.

A computer system is broadly divided into three units – I**nput Unit**, **Central Processing Unit (CPU)** and **Output Unit**. Input unit helps the user to enter raw data and instructions into the computer system, central processing unit performs the required operations as per given instructions and at the end output unit produces meaningful results in the desired format for the user.

Every task given to a computer follows an Input- Process- Output Cycle **(IPO cycle).** Thus the basic structure of the computer is:-

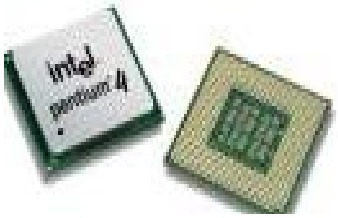


Block diagram of a Computer System

Functional Units of a Computer System

- **Input Unit:** The input unit consists of input devices that are attached to the computer system. These devices take input and convert it into binary language that the computer understands. Some of the common input devices are keyboard, mouse, joystick, scanner etc.

- **Central Processing Unit (CPU) :** The CPU is called the brain of the computer because it is the control centre of the computer. As the CPU is located on a small chip, it is also called the **microprocessor**. CPU executes the required computation and then either stores the output or displays on the output device. The CPU has three main components which are responsible for different functions – Arithmetic Logic Unit (**ALU**) , Control Unit (**CU**) and **Memory registers.**



- **Arithmetic Logic Unit (ALU):** This unit is responsible for performing various Arithmetic (+,-,/,*) , relational (=,<=,>= ,>,<) and logical operation.
- **Control Unit :** This unit is responsible for the sequence of operations. It interprets the instructions of a program in storage unit and produces signals to execute the instructions. It also controls the flow of data and instructions in the computer system.

- **Memory Unit:** Memory attached to the CPU is used for storage of data and instructions and is called internal memory. During processing, it is the internal memory that holds the data. The internal memory is also called the **Primary memory** or **Main memory**. A computer memory can be thought of as 'cell'. A **memory cell** may be defined as a device which can store a symbol selected form a set of symbols.

Since main memory is volatile (temporary), secondary memory space is needed to store data and information permanently for later use. Some of the common secondary storeage device are Hard Disk, Magnetic Tape Drive, CR-RW, DVD, Flash Drive and Floppy Diskette etc.

- **Output Unit:** Output unit consists of output devices. These are used to display results on video display or are used to print the result (hard copy). These can also be used to store the result for further use. Common output devices are Monitor (VDU), Speaker, Printer and Plotter.

INPUT DEVICES

Input devices are used to enter data and instructions into the computer. An input device converts 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. Some of the common input device are:

- **Keyboard** : Keyboard is a primary input device. This is the most common input device which uses an arrangement of buttons or keys. In a keyboard each press of a key typically corresponds to a single written symbol. In normal usage, the keyboard is used to type text and numbers while in a modern computer, the interpretation of key press is generally left to the software.

  A computer keyboard distinguishes each physical key from every other and reports the key-presses to the controlling software. Keyboards are also used for computer gaming, either with regular keyboards or by using keyboards with special gaming features. Keyboard consists following parts :

  Alphanumeric Keys: Typewriter keys that consistes alphabets, common symbols, puntuation marks and number keys along with common mathematical symbol, shif keys and space bar.

  Numeric Key Pad: The 10 number keys 0-9 and common mathematical operation symbols. This part is activated by Num Lock key.

  Function Keys : F1 To F12 having special function. These keys have special tasks and the tasks may change from program to program.

  Nevagation and Cursor Movement keys : Arrow keys, and set of special keys as Insert, Home, Page Up, Page Down, Delete, End and Home key.

Special Keys : There are several other non-printable keys for various different purposes. These include caps lock, tab, ctrl, pause, delete, backspace, spacebar, shift, enter etc which are used for special purposes.

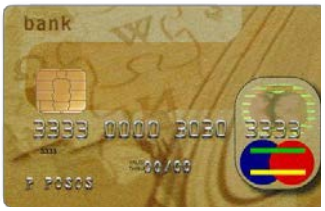
- **Mouse**: A mouse is a pointing device that functions by detecting two-dimensional motion relative to its supporting surface. The mouse's motion typically translates into the motion of a cursor on a display, which allows for fine control of a Graphical User Interface.
  a) Mechanical Mouse
  b) Opto-Mechanical 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**

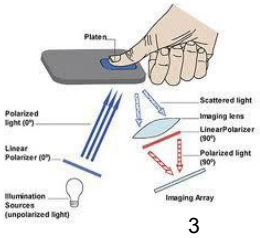
- **Optical Character Recognition (OCR):** - Optical character recognition, usually abbreviated to OCR, is the mechanical or electronic conversion of scanned images of handwritten, typewritten or printed text into machine-encoded text. It is widely used as a form of data entry from some sort of original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

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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.

- **Printers**: These are used to produce hard copy of output as text or graphics. 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 typewriter approach of hammering a typeface against the paper and inked ribbon. Ex. Dot-matrix printers, Daisy Wheel Printer, Drum Printer.

  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, or 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.

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SECONDARY STORAGE DEVICE

Alternatively referred 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.

Magnetic storage media: Examples of magnetic storage media are **hard disks, floppy disks and magnetic tapes.** Magnetic media is coated with a magnetic sensitive layer and this layer is magnetized in clockwise or anticlockwise directions, which then are interpreted as binary 1s and 0s at reading.

Floppy Disk (Diskette): A floppy disk is a flexible disk made up of mylar with a magnetic coating on it. It is packaged inside a protective plastic envelope. These were one of the oldest type of portable storage devices that could store up to 1.44 MB of data but now they are no longer in use.

Hard Disk: Hard disks are used to record computer data magnetically. A hard disk drive consists of a stack of inflexible magnetic disks mounted on a motor. As the disks spin at high speeds, read/write heads at the end of a metal fork swing in and out to access sectors of the disks.

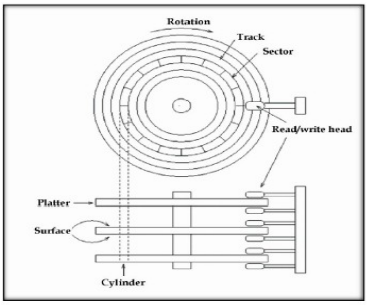


Fig: Hard Disk

Optical storage media

On an optical storage media information is stored and read using a laser beam. The data is stored as a spiral pattern of pits and ridges denoting binary 0 and binary 1.

Examples of optical media are CDs, DVDs etc.

Compact Disk: A compact disk or CD can store approximately 650 to 700 megabytes (MB) of data. We must have a CD drive in our computer to read the CD content.

How data is stored in optical storage?

The bits (0 and 1) are encoded as transitions between raised ridges (reflective area) and etched pits, which are lined up in a spiral like pattern. CD surface is covered with a super thin coating of reflective metal (usually aluminum or gold) and a label.

To read the data, an infrared laser is beamed through the CD's polycarbonate substrate. The wavelength of light that bounces off the mirror-like reflective backing is then measured. A pit scatters the light and the ridge reflects the light. Since pits and ridges pass different amounts of light, and translated back into the original ones and zeros.

DVD: It stands for Digital Versatile Disk or Digital Video Disk. DVDs consist of two halfthickness (0.6-mm) back to back CDs. Delicate reflective coating protects it. A DVD holds 4.7 GB to 17 GB of data. Like CDs DVDs also come in three varieties –

- DVD- ROM
- DVD- R
- DVD-RW

Blue Ray Disk: This is the latest optical storage media to store high definition audio and video. It can store up to 27 GB of data on a single layer disk and up to 54 GB of data on a dual layer disk. The blue ray disk uses a blue laser to read/write data on a disk. wavelength of the blue ray is shorter, more data per unit area can be stored on the disk.

Solid State Memories

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.

Memory Concepts:

Memory is one of the most important components of a computer system as it stores data and instructions. Every memory chip contains thousands of memory locations. In the computer, the data is stored in the form of bits and bytes. A **bit** is the smallest storage unit of memory. A **nibble** is a collection of 4 bits. **Eight bits** combined together to form a single **byte**, which in turn represents a single character.

Memory unit	Relationship with earlier memory unit	In equivalent Bytes
Kilo Byte (KB)	1 Kilo Byte = 1024 Bytes(or 2^{10} Bytes)	1024
Mega Byte (MB)	1 Mega Byte = 1024 Kilo Byte(or 2^{10} KB)	1024x1024
Giga Byte (GB)	1 Giga Byte = 1024 Mega Byte(or 2^{10} MB)	1024x1024x1024
Tera Byte (TB)	1 Tera Byte = 1024 Giga Byte(or 2^{10} GB)	1024x1024x1024x1024
Peta Byte (PB)	1 Peta Byte = 1024 Tera Byte(or 2^{10} TB)	1024x1024x1024x1024x 1024
Exa Byte(EB)	1 Exa Byte = 1024 Peta Byte(or 2^{10} PB)	1024x1024x1024x1024x 1024x1024
Zetta Byte(ZB)	1 Zetta Byte = 1024 Exa Byte(or 2^{10} EB)	1024x1024x1024x1024x 1024x1024x 1024
Yotta Byte(YB)	1 Yotta Byte = 1024 Zetta Byte(or 2^{10} ZB)	1024x1024x1024x1024x 1024x1024x 1024x1024

The computer memories can be divided into following categories:

- Primary Memory
- Secondary memory
- Cache Memory

Primary Memory

Primary memory or main memory is a Metal Oxide Semiconductor (MOS) memory used for storing program and data during the execution of the program. It is directly accessible to CPU.

The memory unit is divided into :

- Random Access Memory (RAM)
- Read Only Memory(ROM)

Information stored in RAM can be accessed in any order, and may be erased or written over. Information stored in ROM may also be random-access, in that it may be accessed in any order, but the information recorded on ROM is usually permanent and cannot be erased or written over.

Comparison between ROM and RAM	
ROM	**RAM**
Read Only Memory	Random Access Memory
It stores information permanently.	It holds information temporarily.
Information is not lost even if the computer is switched off.	Information is lost when power supply is switched off.
Known as non-volatile memory.	Known as volatile memory.
Holds system software such as Boot Loader.	Holds operating system and application programs which are currently in use
Types of ROMs are PROM, EPROM EEPROM.	Types of RAMs are Dynamic RAM and Static RAM

What is a Communication Port?
A computer port is a physical docking point using which an extenal device can be connected to the computer.

A computer port can also be programmatic docking point through which information flows from a program to computer or over the network/internet.

Characteristics of Communication Ports.
External devices are connected to a computer using cables and ports. Ports are slots on the motherboard into which a cable of external device is plugged in. Examples of external devices attached via ports are mouse, keyboard, monitor, microphone , speakers etc.

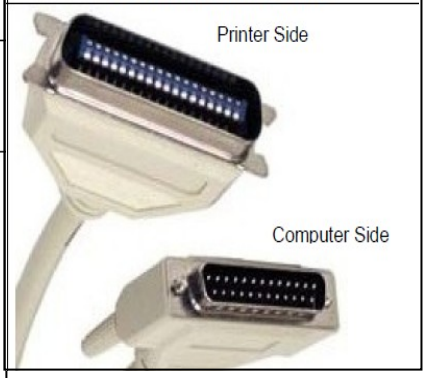
Types of Ports: - Following are few important types of communication ports:

1. **Serial Port :** Used for external modems and older computer mouse. It has two versions: 9 pin, 25 pin model. Data travels at 115 kilobits per second.
2. **Parallel Port:** Used for scanners and printers.Also called printer port (LPT). 25 pin model. Also known as IEEE 1284-compliant Centronics port.
3. **PS/2 Port:** Used for old computer keyboard and mouse . Also called mouse port. Most of the old computers provide two PS/2 port, each for mouse and keyboard. Also known as IEEE 1284-compliant Centronics port.
4. **Universal Serial Bus (or USB) Port :** Can connect all kind of external USB devices such as external hard disk, printer, scanner, mouse, keyboard etc. Introduced in 1997. Most of the computers provide two USB port as minimum. Data travels at 12 megabits per seconds USB compliant devices can get power from a USB port
5. **VGA Port :** Connects monitor to a computer's video card. Has 15 holes. Similar to serial port connector but serial port connector has pins, it has holes.
6. **Power Connector :** Three-pronged plug Connects to the computer's power cable that plugs into a power bar or wall socket.
7. **Firewire Port :** Transfer large amounts of data at very fast speed. Connects camcorders and video equipments to the computer Data travels at 400 to 800 megabits per seconds Invented by Apple Three variants: 4-Pin FireWire 400 connector, 6-Pin FireWire 400 connector and 9-Pin FireWire 800 connector

8. **Modem:** It is a modulation demodulation device that converts analog signals to digital signals and vice versa. It is used to Connects a PC's modem to the telephone network.
9. **Ethernet Port:** Connects to a network and high speed Internet. Connect network cable to a computer. This port resides on an Eternet Card. Data travels at 10 megabits to 1000 megabits per seconds depending upon the network bandwidth.
10. **Game Port :** Connect a PC to a joystick. Now replaced by USB.
11. **Digital Video Interface , DVI port :** Connect a Flat panel LCD monitors to the computer's high end video graphic cards. Very popular among video card manufacturers.

USB Port & Cables	Firewire Port & Cables	Ethernet (RJ45) Port & Cables
		
		

Parallel Port Printer Cable



Parallel Port

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QUESTIONS AND ANSWERS

1. What are Input devices for PDAs, Smart Phones and Tablet PCs ?

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. Ex. Keyboard, Mouse etc.

Set of programs that performs some specifice task is called **software**. For example : Micorosoft Word, PageMaker, Typing tutor, Computer Games etc.

A computer program that is permanently stored in a chip (ROM) while manufacturing is called **Firmware**. Firmware are stored to define the basic functioning of a computer system. For example: Program stored in bootstrap loader to initiate booting.

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 : Unix, Linux, Windows 7, XP, BeeOS, Mac OS, DOS etc
(ii) Language processors : Assembler, Compiler and Interpreter
(iii) Application software :
   a. Wordprocessor (MS-Word, PageMaker, WordPerfect)
   b. Electronic Spreadsheet (MS Excel, VisiCalc, Lotus 123 etc)
   c. Database Management System (DBMS) : (Access, Paradox, FoxPro etc)

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. Therefor a computer works on machine language. The Binary language if 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 prinited using a special magnetic ink. The MICS 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 drak 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. 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 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. It is of three types address bus, data bus and control bus.

16. What is Port? Name some communication ports.

Ans. Port is a point on a computer having circuitry to allow connection of external devices with computer.
Ports are of various types : For Example :
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 sticks ProDuo, SD Card, MMC Plus, and Smart Media Card.

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

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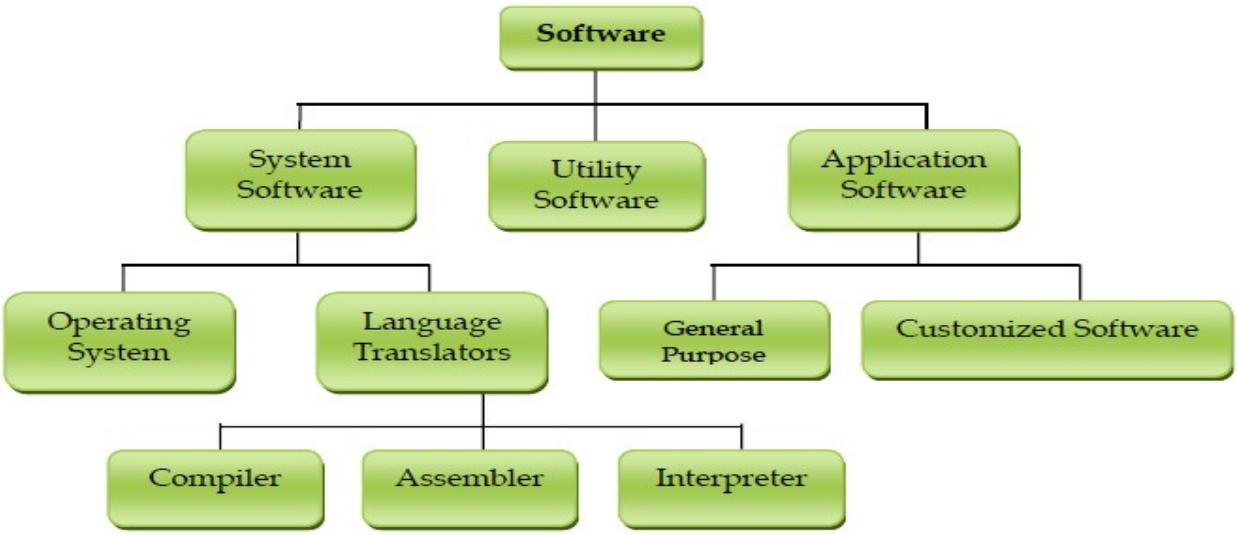
Chapter-2
SOFTWARE CONCEPTS AND PRODUCTIVITY TOOLS

Software is a general term used for computer programs that control the operations of the computer. A program is a sequence of instructions that perform a particular task. A set of programs form software. It is the software which gives hardware its capability. Hardware is of no use without software and software cannot be used without hardware.

Types of Software



- **SYSTEM SOFTWARE:**
  System Software is the software that controls internal computer operations and performs tasks associated with controlling and utilizing computer hardware. It can be further classified as:
  - ✓ Operating System
  - ✓ Language Translators (Language Processor)

- **OPERATING SYSTEM:**

An Operating system is system software which acts as an interface between user and hardware. . It manages all hardware and software, input, output and processing activities within the computer system, the flow of information to and from the processor, sets priorities for handling different tasks, and so on. Without operating system a computer cannot do anything useful For example: Microsoft Winddows 7, Windows XP, Mac OS, UNIX, Linux, Andriod Kit Kat etc.

- **NEED OF AN OPERATING SYSTEM:**
  Operating System provides an environment to run applications thus programmer can design the application without concerning the details of the computer's internal structure. Operating system is required because of following reasons: -

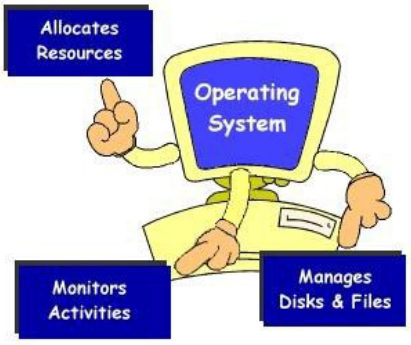
1. Easy interaction between user and hardware.
2. Starting computer operation automatically when power in turned on.
3. Loading & scheduling users program.
4. Controlling input & output.
5. Controlling program execution.
6. Managing use of main memory.
7. Providing security to users program.

- **FUNCTIONS OF AN OPERATING SYSTEM :**

An operating system has variety of functions to perform. Some of them are:

1. **Processor Management:** This deals with management of the Central Processing Unit (CPU). OS allocate CPU time for different processes by different **job scheduling techniques.**

2. **Device Management:** OS is responsible to control Processing and I/O devices. It maintains a balance between different devices and CPU because of speed mismatch. In order to optimize the CPU time, the operating system employs two techniques - Buffering and Spooling.



3. **Memory management:** CPU and the I/O devices interact with the memory. When a program needs to be executed it is loaded onto the main memory till the execution is complete. Thereafter that memory space is freed and is available for other programs. The common memory management techniques are **Partitioning** and **Virtual Memory.**

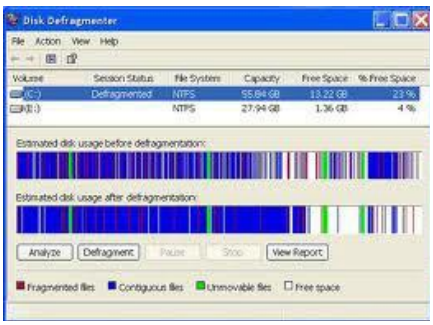
4. File Management: The operating System manages the files, folders and directory systems on a computer. Any data on a computer is stored in the form of files and the operating system keeps information about all of them using File Allocation Table (FAT). The operating system also takes care that files are opened with proper access rights to read or edit them.

- **TYPES OF OPERATING SYSTEM**
  - ✓ **Single User Operating System**: Only one user program can execute at a time. For example: MS DOS
  - ✓ **Multi-user Operating System** : An operating system that can execute two or more programs at the same time on a single computer system. For example Unix, Linux, Windows XP, Vista.
  - ✓ **Real time Operating System**: Operating system that response instantly as received the input or process it within strict time deadline is called real time operating system. Commonly used in Air traffice control, communication etc. For ex LYNX and Windows CE

- **APPLICATION SOFTWARE :**

Set of programs to carry out specific task like word processing, spreadsheet, presentation tools, library management, railway reservation etc is termed as Application software. Application software can be classified as:

- o General Purpose Application Software :
- o Specific Purpose Application Software
- o Utility Software
- o Developer Tools



➢ **UTILITIES SOFTWARE:**

Utility software are those application program that assist the computer by performing housekeeping function like compression of files/folders or taking backup, disk defragmentation and antivirus software.

- **Compression Tools:** This utility software can reduce (compress) the storage size of program/files/folders while not in use. It helps to transfer big file/program from one computer to another. Ex: 7-Zip, IZArc, WinRAR, WinZip etc.

- **Disk Defragmenter:** In a computer memory a file may store in scattered form i.e at different memory locations. This fragments of the file takes extra access time when used and slow down the computer processing. Disk de-fragmentation utility software speeds up the system by rearranging such fragmented files stored on a disk in contiguous locations in order to optimize the system performance.

- **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.

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Chapter-4
INFORMATION SECURITY AND SOCIAL NETWORKING

➢ 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. The effects of various threats vary 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. Common examples of Malware include viruses, worms, Trojan horses, and Spyware.

Virus :

Computer viruses are small programs or scripts that are designed to do hamper the performance of a computer system. These malicious programs have self replicating capability and can duplicate themselves, attach themselves to programs, and travel across networks/ in removable devices. Opening an infected e-mail attachment or affected file is the most common way to get a virus.

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, Quick Heal etc.

Trojan Horse:

A Trojan horse is a type of malware that claim as a helpful program but when install or used capture the computer rights and hack the system. It provides unauthorized access of computer to hacker or perform malfunctioning.

Trojans do not attempt to inject themselves or duplicate themselves into other files like a computer virus. Trojan horses may steal information, or harm their host computer systems.

Trojans hourse usually spread throuh downloading online games or internet-driven applications in order to reach target 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.
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.

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.

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.

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 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. Coolies are also known as an HTTP cookie, web cookie, or browser cookie,

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.

Hardware Firewall: Hardware firewall providing protection to a Local Network.

Software Firewall: Computer running firewall software to provide protection

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). 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 and Answers

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 that perform specific task.

Q.2. What BIOS? What is its use?

Ans. BIOS-The basic input/output system is the built-in software that contains the code required to control the keyboard, monitor, disk drives, communications ports, and other functions independently of the computer operating system.

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: 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, financial accounting, result preparation, railway reservation, billing etc. Application Software are of following 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 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 is DBMS ? How it is useful

Ans. DBMS stands for Data Base Management System. It is software that can handle and manage bulk of stored data in the form of tables and records. It can manuplate, create, delete and modify data from the database.

Q.7. 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.

Q.8. Name the major functions of an Operating system ?

Ans Major functions of an operating system are Device Manager, Memory Manager, Interface Manager, Program Manager, Task Manager, File Manager, Network Manager, Security Manager.

Q.9. What is spreadsheet software?

Ans Spreadsheet is general purpose application software that facilitates creation of worksheets that stores text and numerical data in tabular form. It performs mathematical, statistical, financial and database calculations automacially with the help of formula and functions. Performing basic statistical analysis including graphs is the main utility of this software.

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Chapter-4

PROGRAMMING FUNDAMENTALS

- **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 valid name.
(ii) It is capable of storing values.
(iii) It provides temporary storage.
(iv) It is capable of changing its value during program execution.
(v) Each variable must declare before use along with its data type.

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.

Atithmetic operators:

Operator	Description	Example
+	Addition - Adds values on either side of the operator	A + B will give 30
-	Subtraction - Subtracts right hand operand from left hand operand	A - B will give -10
*	Multiplication - Multiplies values on either side of the operator	A * B will give 200
/	Division - Divides left hand operand by right hand operand	B / A will give 2
%	Modulus - Divides left hand operand by right hand operand and returns remainder	B % A will give 0
++	Increment - Increase the value of operand by 1	B++ gives 21
--	Decrement - Decrease the value of operand by 1	B-- gives 19

Relational Operators :

Operator	Description	Example
==	Checks if the value of two operands are equal or not, if yes then condition becomes true.	(A == B) is not true.
!=	Checks if the value of two operands are equal or not, if values are not equal then condition becomes true.	(A != B) is true.
>	Checks if the value of left operand is greater than the value of right operand, if yes then condition becomes true.	(A > B) is not true.
<	Checks if the value of left operand is less than the value of right operand, if yes then condition becomes true.	(A < B) is true.
>=	Checks if the value of left operand is greater than or equal to the value of right operand, if yes then condition becomes true.	(A >= B) is not true.

Logical Operators:

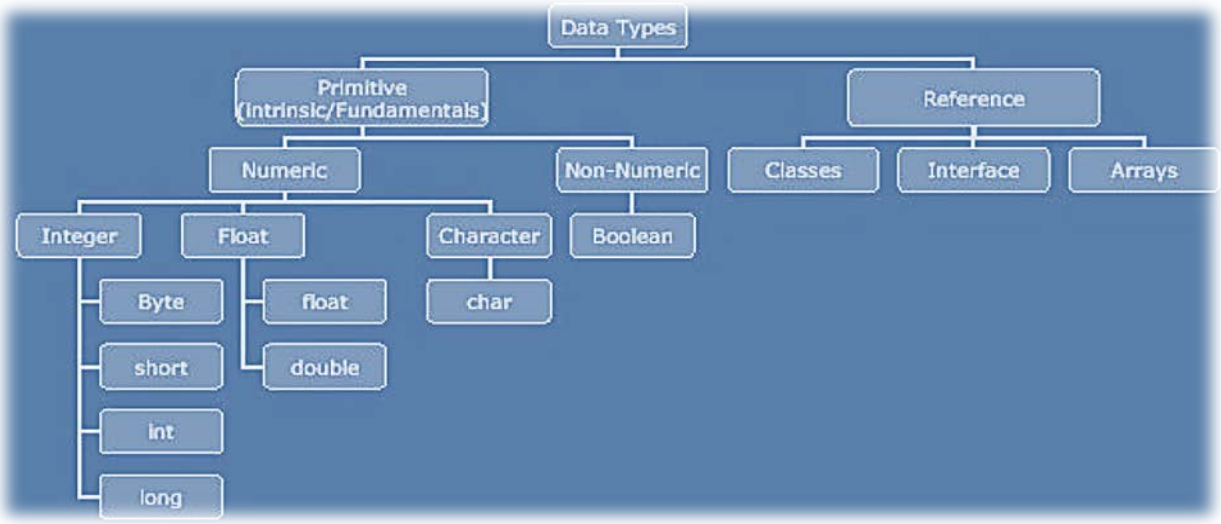
Operator	Description	Example
&&	Called Logical AND operator. If both the operands are non zero then then condition becomes true.	(A && B) is false.
||	Called Logical OR Operator. If any of the two operands are non zero then then condition becomes true.	(A || B) is true.
!	Called Logical NOT Operator. Use to reverses the logical state of its operand. If a condition is true then Logical NOT operator will make false.	!(A && B) is true.

Bitwise operators

Operator	Description	Example
&	Binary AND Operator copies a bit to the result if it exists in both operands.	(A & B) will give 12 which is 0000 1100
|	Binary OR Operator copies a bit if it exists in eather operand.	(A | B) will give 61 which is 0011 1101
^	Binary XOR Operator copies the bit if it is set in one operand but not both.	(A ^ B) will give 49 which is 0011 0001
~	Binary Ones Complement Operator is unary and has the efect of 'flipping' bits.	(~A) will give -60 which is 1100 0011
<<	Binary Left Shift Operator. The left operands value is moved left by the number of bits specified by the right operand.	A << 2 will give 240 which is 1111 0000
>>	Binary Right Shift Operator. The left operands value is moved right by the number of bits specified by the right operand.	A >> 2 will give 15 which is 1111
>>>	Shift right zero fill operator. The left operands value is moved right by the number of bits specified by the right operand and shifted values are filled up with zeros.	A >>>2 will give 15 which is 0000 1111

Data type: Data type states the way the values of that type are stored in memory, and the range for that type. There are two data types available in Java:

- Primitive Data Types
- Reference/Object Data Types



- **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

- Byte data type is a 8-bit signed two's complement integer.
- Minimum value is -128 (-2^7)
- Maximum value is 127 (inclusive)(2^7 -1)
- Default value is 0
- Byte data type is used to save space in large arrays, mainly in place of integers, since a byte is four times smaller than an int.

  Example : byte a = 100 , byte b = -50

t data type is a 16-bit signed two's complement integer.

short:

- Minimum value is -32,768 (-2^15)
- Maximum value is 32,767(inclusive) (2^15 -1)
- Short data type can also be used to save memory as byte data type. A short is 2 times smaller than an int
- Default value is 0.
- Example : short s= 10000 , short r = -20000

int:

- Int data type is a 32-bit signed two's complement integer.
- Minimum value is - 2,147,483,648.(-2^31)
- Maximum value is 2,147,483,647(inclusive).(2^31 -1)
- Int is generally used as the default data type for integral values unless there is a concern about memory.
- The default value is 0.
- Example : int a = 100000, int b = -200000

long:

- Long data type is a 64-bit signed two's complement integer.
- Minimum value is -9,223,372,036,854,775,808.(-2^63)
- Maximum value is 9,223,372,036,854,775,807 (inclusive). (2^63 -1)
- This type is used when a wider range than int is needed.
- Default value is 0L.
- Example : int a = 100000L, int b = -200000L

float:

- Float data type is a single-precision 32-bit IEEE 754 floating point.
- Float is mainly used to save memory in large arrays of floating point numbers.
- Default value is 0.0f.
- Float data type is never used for precise values such as currency.
- Example : float f1 = 234.5f

double:

- double data type is a double-precision 64-bit IEEE 754 floating point.
- This data type is generally used as the default data type for decimal values. generally the default choice.
- Double data type should never be used for precise values such as currency.
- Default value is 0.0d.
- Example : double d1 = 123.4

boolean:

- boolean data type represents one bit of information.
- There are only two possible values : true and false.
- This data type is used for simple flags that track true/false conditions.
- Default value is false.
- Example : boolean one = true

char:

- char data type is a single 16-bit Unicode character.
- Minimum value is '\u0000' (or 0).
- Maximum value is '\uffff' (or 65,535 inclusive).
- Char data type is used to store any character.
- Example . char myLtr = 'P'

- Shor

Reference Data Types: Reference variables are created using defined constructors of the classes. They are used to access objects. These variables are declared to be of a specific type that cannot be changed.

For example, Student, Employee etc.

- **Class objects**, and various type of **array** variables come under reference data type.
- Default value of any reference variable is null.
- A reference variable can be used to refer to any object of the declared type or any compatible type.
- Example : **Animal** animal = **new** Animal("Elephant");

Variable Declaration:

In Java, all variables must be declared before they can be used. The basic form of a variable declaration is:

```
DataType  identifier  [ = value][, identifier [= value] ...] ;
```

Here, The **DateT*ype*** is one of Java's data types. The ***identifier*** is the name of the variable. To declare more than one variable of the specified type, use a comma-separated list.

Note: *Java variable names are case sensitive, so **MySum** and **mySum** are not same variable.*

Example:

```
int x, y, z; // declares three integers type (int) x, y, and z.
int d = 3, e, f = 5; // declares three more integer with
initialization byte z = 34; // initializes z.
double pi = 3.14; // declares an approximation of pi.
char ch = 'H'; // the variable x has the value 'x'.
```

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
pareseDouble()	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.
  The implicit type conversion wherein datatypes are promoted to higher data type is called **Coercion**.

- **Explicit Type Conversion:**
  An explicit type conversion is user defined that forces an expression to be of specific type.
  Syntax :

  ```
  (DataType)  expression
  ```

  Example :

  ```
  int  x=10, y=15;
  (float) ((x+y)/2);
  ```

BOOLEAN (LOGICAL) EXPRESSION

Expression that result either true or false is known as boolean expression. It is the combination of constants, variables, logical and relational operators.

For example:

(a>b) && (a>c) (m+n) > b || (c+d) > a

Chapter 5
CONTROL STRUCTURES

Control Flow Statements: There are the situtations when a programmer requires taking decision or to iterate block of statements for specific number of time, there we use control flow statements. Control flow statements, however, breakup the flow of execution by decision making, looping, and branching, by execute condition expressions for particular blocks of code.

Control flow structure are of three types :

1. Sequence Control Structure
2. Selection Control Structure
3. Iteration Control Structure (loops)

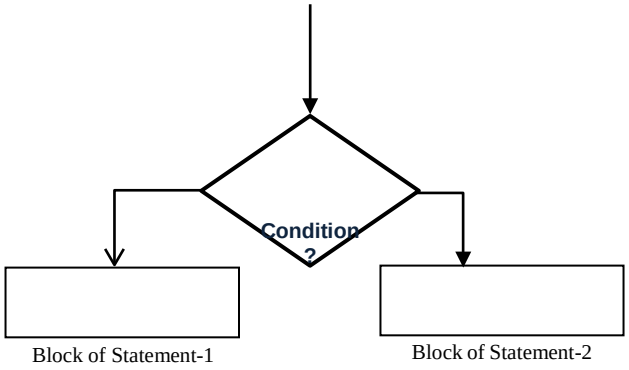
Sequence Control Structure : Sequence construct means the statements are being executed sequentially. It is a default flow of statement from top to bottom.

Selection Control Structure: When the execution of the statement(s) depends upon a condition test then it is called selection flow of control. If a condition evaluates to true, one course of action is followed other wise another course of action is followed. It is achieved by if……else conditional statement and switch …….. case conditional statement.

if statement:

Syntax:

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



if-else

Syntax:

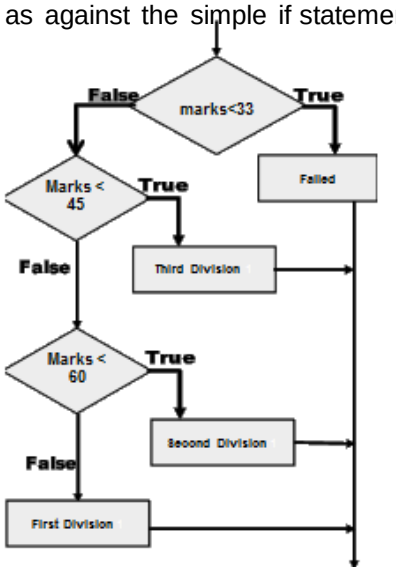
```
if (conditional expression)
    {
    Statement Block;
    }
else
    {
    Statement Block;
    }
```

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.:

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 :
        statements Block 1 ;
break ;

case Value2 :
        statements Block 2
break ;

default:
        statements Block 3
}
```

LOOPING (ITERATION) : These statements are used to perform a set of instructions repeatedly while the condition is true.

- **for** ……. Loop Statement :- It is basically used to repaeat block of statement { } for specific number of times.

Syntax

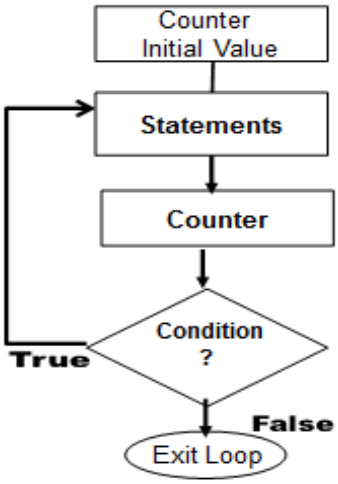
```
for( initialization; test expression; increment/decrement expression)
        {
        statements;
        }
```

- **while** loop statement**:** 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
}
```



- **do…..while** loop statement : 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);
```

JUMP STATEMENTS:

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

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

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

Chapter-6
JAVA IDE PROGRAMMING – I , II & III

In Java, the GUI programmin is done through Swing API (**A**pplication **P**rogramming **I**nterface). Swing is a set of classes that provides more powerful and flexible components than are possible with AWT (Abstract Windows Toolkit). It supplies buttons, chekboxes, labels, tabbed panes, scrool pans, trees, tables, dialog boxes etc.

The swing controls/components are categorized as:

- **Components :** Self contained graphic entity (eg. JLabel, JBotten, JTextField etc)
- **Containers:** Component that can hold other components (eg. JPanel, JFrame, JDialog, JWindow)

COMMONLY AVAILABLE SWING CONTROLS IN JAVA

- **jFrame:** A Frame is a container control, in which all the controls can be lace.
- **jLabel**: JLable allows placing un-editable text on the Frame/Panel
- **jTextField:** JTextFeild allows placing editable text on the Frame/Pane. 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 jTextFiled 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 form the user.
- **getText():** getText() method is used to obtain the text from a jTextFeild during the run time.
- **setText():** setText() method is used to set or change the text of a jTextFeild 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	• getText() • setText()	Background •Enabled •Font •Foreground •Text •Label
jLabel	•getText()	Background Enabled Font Foreground Text

Swing Controls	Methods	Properties
jTextField	•getText() •isEditable() •isEnabled() •setText()	•Background •Editable •Enabled •Font •Foreground •Text
jRadioButton	•getText() •setText() •isSelected() •setSelected()	•Background •Button Group •Enabled •Font •Foreground •Label •Selected
jCheckBox	•getText() •setText() •isSelected() •setSelected()	•Button Group •Font •Foreground •Label •Selected •Text
jButtonGroup		•Add
jComboBox	•getSelectedItem() •getSelectedIndex() •setModel()	•Background •ButtonGroup •Editable •Enabled •Font •Foreground •Model •SelectedIndex •SelectedItem •Text
jList	•getSelectedValue()	•Background •Enabled •Font •Foreground •Model •SelectedIndex •SelectedItem •SelectionMode •Text
jTable	•addRow() •getModel()	•model
JoptionPane	•showMessageDialog()	•getRowCount() •removeRow() •addRow()

Some Important Questions with Answers

1. Which window is used to designed 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) jListBox
(ii) jComboBox

7. Name any two commonly used method of ListBox.
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:	**Control Name**	**Properties**
(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: **ActionPerformed**

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 = "Manas ";

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

Ans: Full Name:
ManasPranav

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: d . None of these

24. What will be used if there are two or more possible options?
Ans: We can use if…..else conditional statement or switch……case statement.

25. Name the loop that never ends.
Ans: Infinite loop. For example:

```
for( k=1;k<=10;k++)
    {
        System.out.println("It is infinite loop"); k=k-
        1;
     }
```

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: **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() 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:
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 whreas 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, wheras 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 repeat 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 default clause in a switch statement?
Ans: The default statement gets executed when no match is found in switch.

16. 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.

17. 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.

18. Excessive comments add time to the execution of your program. (True/False).
Ans: False because comments are non executable.

19. 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.

20. 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 need to be scanned.

21. 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

22. What even is firen when you ckick a Jbutton?
Ans: Action Event

23. Write the use of following methods used with check box control.
a) getText( ), b) setText(String s) c) isSelected( ) d) setSelected( )

Ans a) getText( ) Returns the text displayed by the checkbox
b) setText(String s) Sets the text displayed by the check box to the String value specified in parenthesis.
c) isSelected( ) Returns the state of check box - true if selected else returns false.
d) setSelected( ) Sets the state of the button - true if the button is selected, otherwise sets it to false.

24 What is the use of isSelectedIndex( ) method in Jlist control?
Ans: This method is used to check whether the index specified in the parenthesis has been selected or not.
The syntax of this method is given below:
Syntax:

```
jList.isSelectedIndex(int num);
```

---X---

OUTPUT FINDING QUESTIONS

1 Write the output following code when executed:

(i) System.out.printl(“Hello”.charAt(3));
(ii) System.out.printl(“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 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

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

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

Ans: 0 times

6. How many times, the following loop gets executed? i=0;

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

Ans: 1 time

7. What will be the contents of jTextield1 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

8. Find the output of the following code snippet:

```
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

9. 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

10. How many times will the following loop get executed? x = 5;
y = 36; while (x <= y) { x+=6; }

Ans: 6

11. 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

12. 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

13. 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

14. 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
Information Technology

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. What will be the output produced by following code fragment?

```
flaot x=9;
float y=5;
int z=(int)(x/y); switch(z)
                  {
```

```
                                    case 1: x=x+2;  case 2: x=x+3; default: x =x+1;
                                    }
                    System.out.println("value of x:"+x);
```

Ans: 15

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

ERRORS FINDING QUESTIONS

1. Rewrite the following code after removing the errors(if any). Underline the corrections.

```
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. Rewrite the code after removing the errors (if any) and 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++;
```

3. Rewrite the code after removing the errors (if any) and underline the corrections.

```
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):
}
```

4. Rewrite the code after removing the errors (if any).

```
int x = = 0;
int n= Integer.parseInt(Jlabel1.getText);
```

Ans:

```
int x = 0;
int n= Integer.parseInt(JLabel1.getText());
```

5. Rewrite the code after removing the 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;
```

6. Rewrite the code after removing the errors (if any).

```
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);
```

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

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

Ans:

```
int i, sum=0;
for(i=0;i<10;i+=2)
{
sum +=i;
}
```

8. Rewrite the following code using while loop :

```
int  i,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();
          }
```

9. Rewrite the following code using while loop

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

Ans:

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

10. 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++);
}
```

11. 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"); }
```

12. 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");
        }
```

13. Rewrite the following code using for loop:

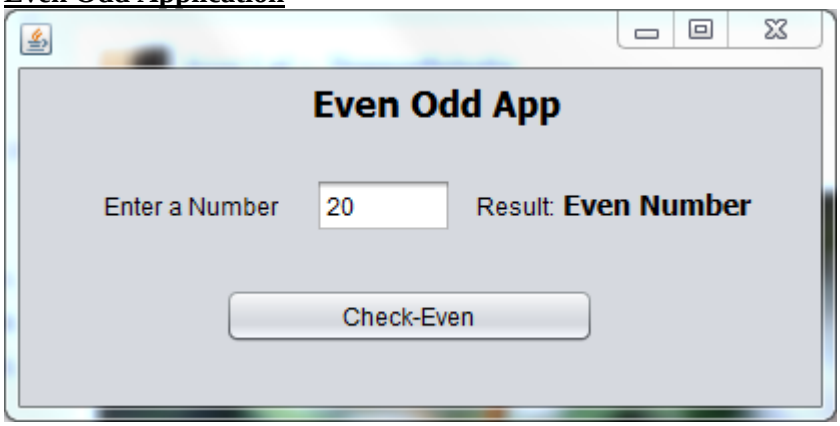
```
int i = 0;
while(++i <20)
 {
  if(i = = 8)
     break;
     System.out.println(++i);
  }
```

Ans:

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

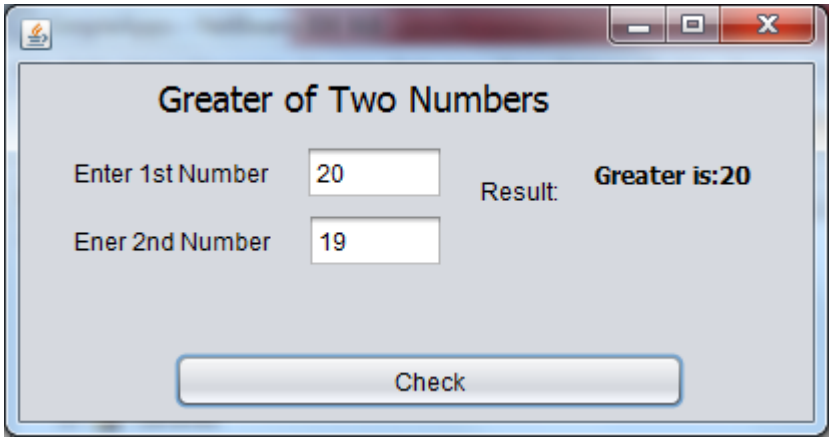
JAVA_SWING_APPLICATIONS

1 **Even Odd Application**



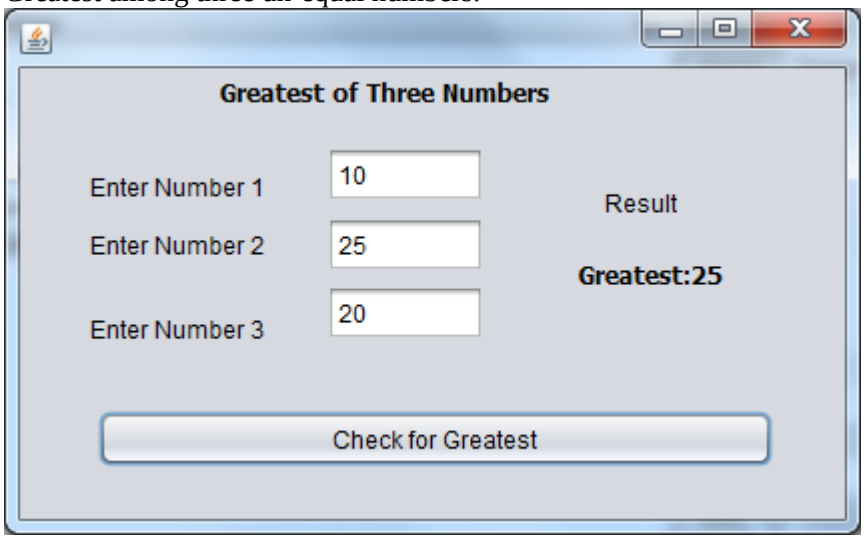

```
private void btnResActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        int num = Integer.parseInt(tNum.getText());
        if(num%2==0)
           lRes.setText("Even Number");
        else
           lRes.setText("Odd Number");
    }
```

2 **Greater of Two numbers:**




```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        int m = Integer.parseInt(txtM.getText());
        int n = Integer.parseInt(txtN.getText());
        if(m>n)
           lblRes.setText("Greater is:"+ m);
        else if(n>m)
           lblRes.setText("Greater is:"+ n);
        else
           lblRes.setText("Both are equal");
    }
```

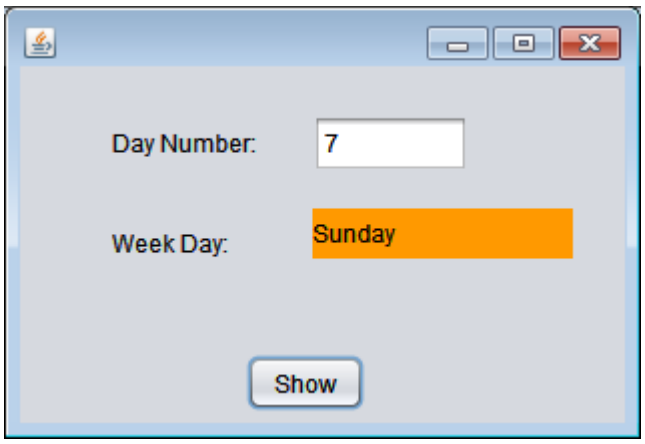
3 Greatest among three un-equal numbers:




```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
      // we are not taking into account the cases of equality here:
      int x = Integer.parseInt(txtX.getText());
      int y = Integer.parseInt(txtY.getText());
      int z = Integer.parseInt(txtZ.getText());

      if(x>y && x>z)
         lblRes.setText("Greatest:"+x);
      else if(y>z)
         lblRes.setText("Greatest:"+y);
      else
         lblRes.setText("Greatest:"+z);
   }
```

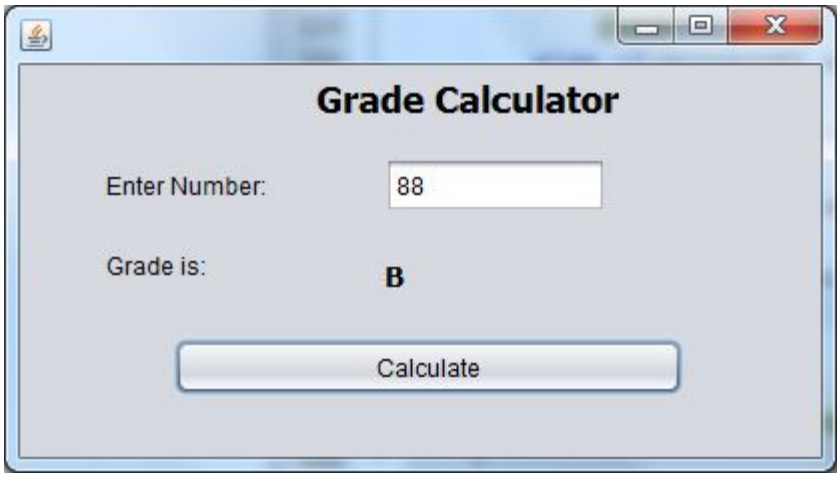
4 Week Day Application that prints the week day depending upon the weekday number




```
private void btnResActionPerformed(java.awt.event.ActionEvent evt) {
int daynum =
Integer.parseInt(txtNum.getText());        String
day;
      switch(daynum)
      {
        case 1:
          day=”Monday”; break;
        case 2:
          day=”Tuesday”; break;
       case 3:
          day=”Wednesday”; break;
       case 4:
          day=”Thursday”; break;
       case 5:
                day=”Friday”; break;
            case 6:
              day=”Saturday”; break;
            case 7:
              day=”Sunday”; break;
            default:
              day=”Invalid day number”;
             }
            lblRes.setText(day);
```

5 Grade calculation based on marks scored out of 100

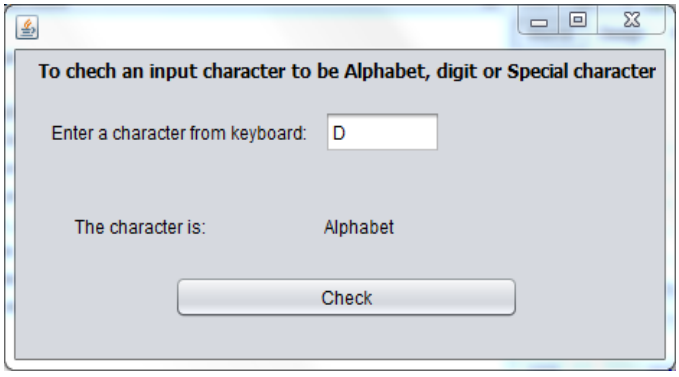
90 to 100 - A
75 to <90 - B
60 to <75 - C
45 to <60 - D
33 to <60 - E
0 to <33 - F
other invalid score



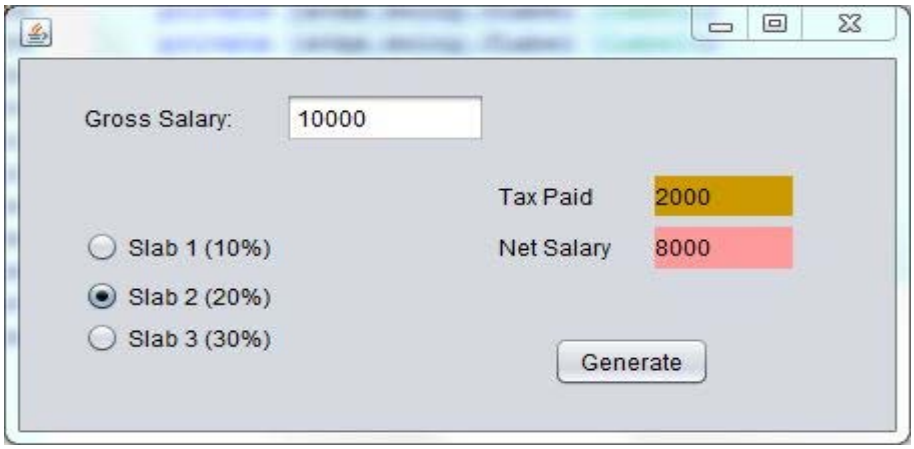

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    int score = Integer.parseInt(txtNum.getText());
    String grade;
    if(score>=90 && score<=100)
       grade ="A";
    else if(score>=75 && score<90)
       grade="B";
    else if(score>=60 && score<75)
       grade="C";
    else if(score>=45 && score<60)
       grade="D";
    else if(score>=33 && score<45)
       grade="E";
    else if(score>=0 && score<33)
       grade="F";
    else
       grade="Invalid score";
    lblRes.setText(""+grade);
  }
```

6 Check whether an input character is Alphabet, digit or special character

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
    char ch = txtChar.getText().charAt(0);
    String res;
    if(Character.isLetter(ch))
       res = "Alphabet";
    else if(Character.isDigit(ch))
       res = "Digit";
    else
       res = "Special Character";
    lblRes.setText(res);
  }
```

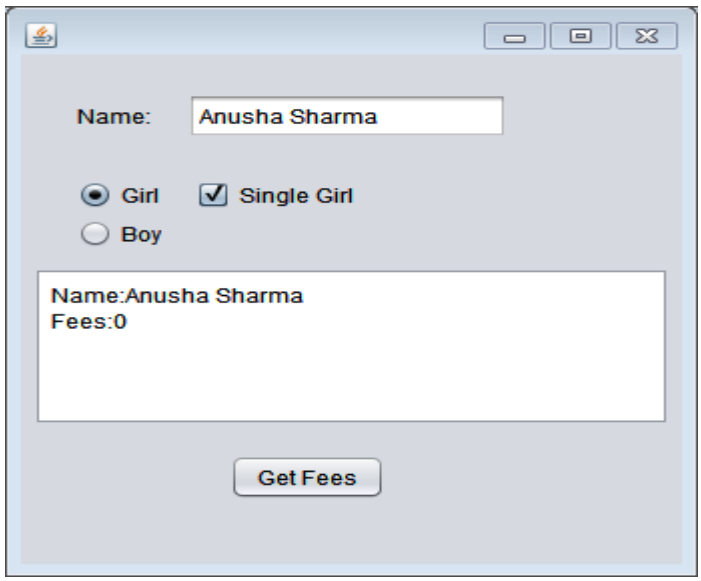


7 The following interface is used to calculate the net salary of a person after deducting the tax from the gross based upon the selection from the avaliable radiobutton options (10%, 20% and 30%). The click event of the button will display the tax and the net salary.



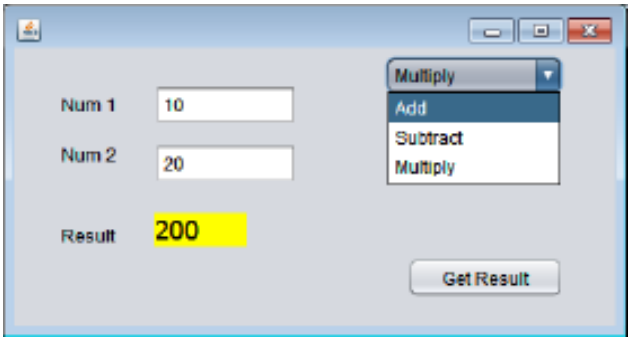

```
private void btnGenActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        int gross = Integer.parseInt(txtSal.getText());
        int tax, net;
        if(rbTe.isSelected())
           tax = gross*10/100;
        else if(rbTw.isSelected())
           tax = gross*20/100;
        else
           tax = gross*30/100;
        net = gross - tax;
        lblTax.setText(""+tax);
        lblNet.setText(""+net);
    }
```

8 The following interface calculate the fees of a student based upon the given criteria. For a boy the fees is 1000. For a girl the fees is 500. For a single girl child as selected from the check box there is no fees. Write code under the Action event of the button to display the name and fees in a jTextArea as shown.



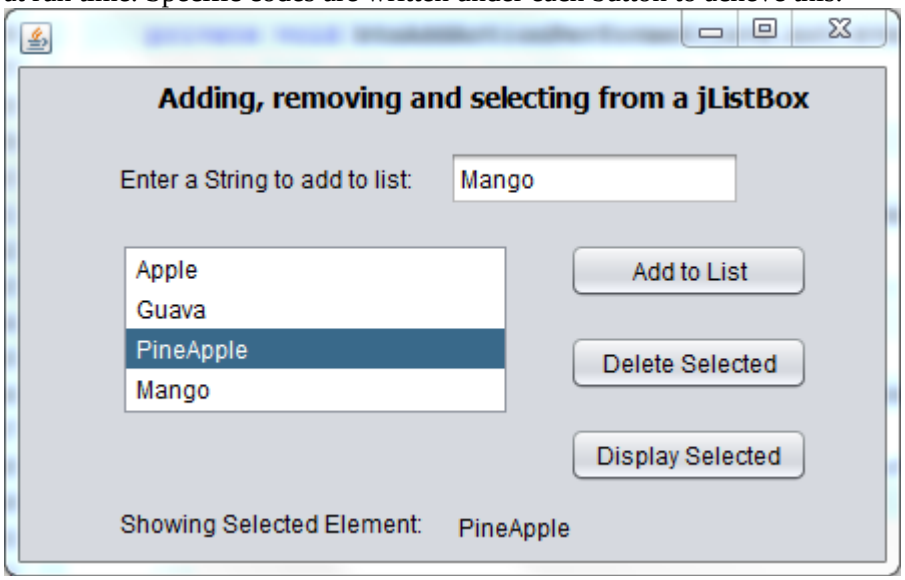

```
private void btnResActionPerformed(java.awt.event.ActionEvent evt) {
        String name = txtName.getText();
        int fee;
        if(rbtG.isSelected())
        {
          fee = 500;
          if(chkSg.isSelected())
              fees=0;
        }
        else
           fees=1000;
      txtRes.append("Name:"+name+"\n");
      txtRes.append("Fees:"+fee);
    }
```

9 The math editor interface is shown below. It performs the Add, Subtract and Multiply operations based on the seclections from the jComboBox. Write code under the get Result button to achieve the desired results.




```
private void btnResActionPerformed(java.awt.event.ActionEvent evt) {
        int choice = cmb1.getSelectedIndex();//index for the elements from 0 to n-1
        int n =    Integer.parseInt(t1.getText());
       int m = Integer.parseInt(t2.getText());
      switch (choice)
      {
       case 0:
          lblRes.setText(“”+(m+n));
         break;
       case 1:
          lblRes.setText(“”+(m-n));
         break;
       case 2:
          lblRes.setText(“”+(m*n));
         break;
      }
```

10 The following application is used to add, delete and display selected element from a jListBoxt (lstName) at run time. Specific codes are written under each button to acheve this.



Step 1: To make it possible to use the dynamic feature of jListBox we must import the following:

```
import javax.swing.DefaultListModel;
```

Step 2: Declare an object of DefaultListModel class as the first statement in jFrame class:

```
public class ListApp extends javax.swing.JFrame {
    DefaultListModel listModel;
```

Step 3: Instantiate the listModel object inside the constructor of the jFrameC class:

```
public ListApp() { //this is the already available inside the jFrame code window
```

```
 initComponents(); // this is already available
        listModel = new DefaultListModel();
        lstName.setModel(listModel);
    }
```

Step 4: Adding elements in the jListBox:

```
private void btnAddActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        listModel.addElement(txtName.getText());
    }
```

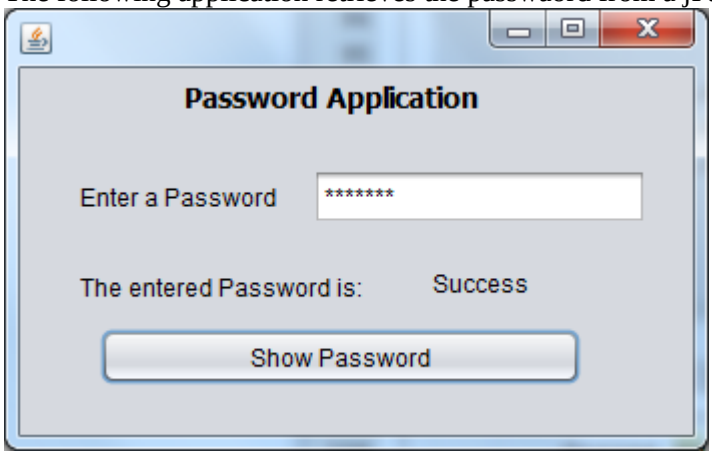
Step 5: Deleting the selected element from the jListBox:

```
private void btnDelActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        listModel.remove(lstName.getSelectedIndex());
    }
```

Step 6: Displaying the selected el;ement in a jLabel:

```
private void btnShowActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        lblRes.setText((String) lstName.getSelectedValue());
    }
```

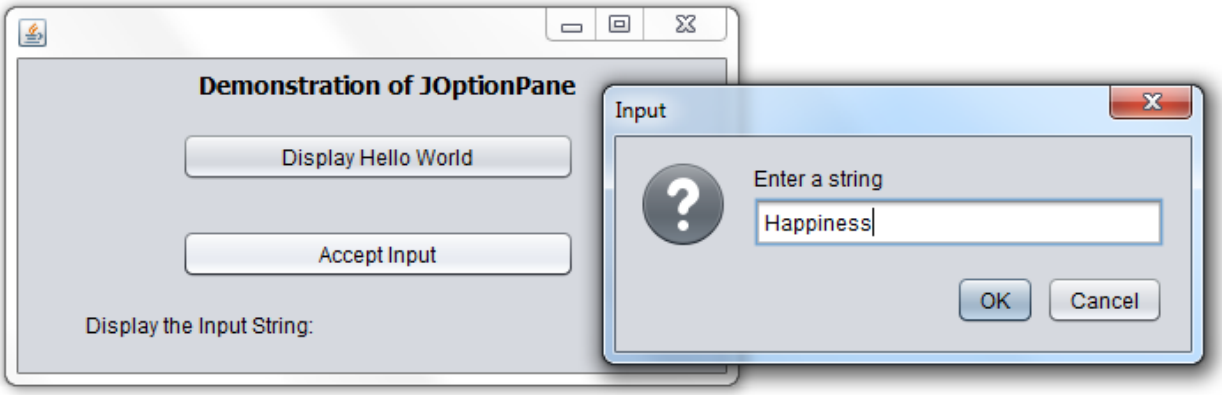
11 The following application retrieves the passwaord from a jPasswordField and displays it in a jLabel




```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        String pw = new String(txtPw.getPassword());
        lblPw.setText(pw);
    }
```

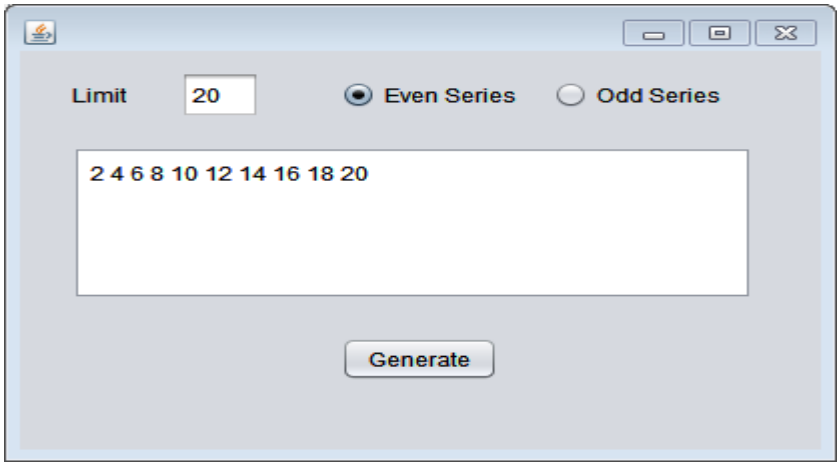
12 The following application demonstrates the use of jOptionPane for displying message and for accepting input from a user.

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        javax.swing.JOptionPane.showMessageDialog(rootPane,"Hello World", "My Caption", 1);
    }
```



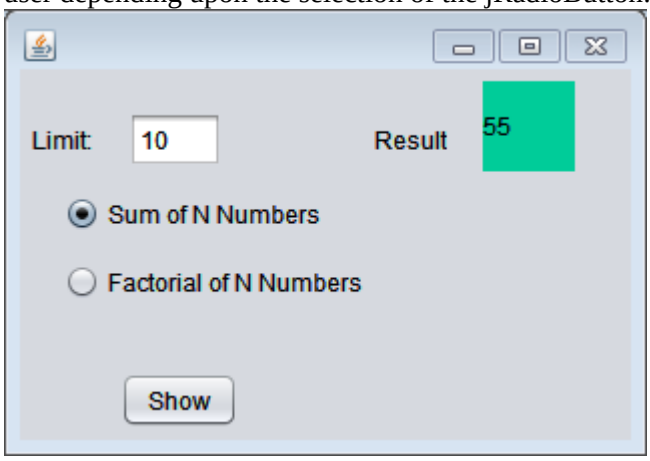

```
private void jButton2ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        String str = javax.swing.JOptionPane.showInputDialog("Enter a string");
        lblRes.setText(str);
    }
```

13 The following application displays the series of even and odd natural numbers depending upon the selected option from the jRadioButton



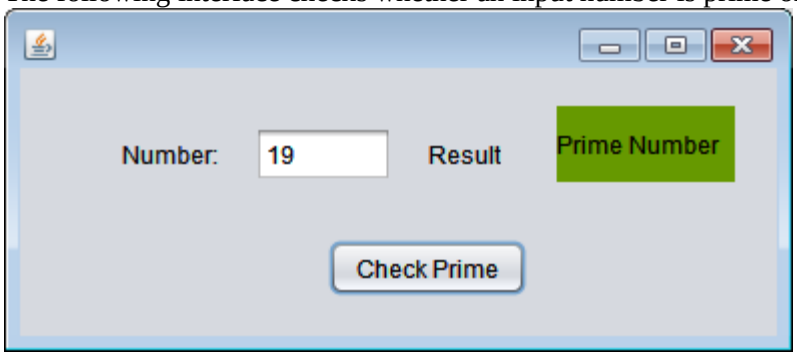

```
private void btnShowActionPerformed(java.awt.event.ActionEvent evt) {
    int limit = Integer.parseInt(txtNum.getText());
         if(rbtEven.isSelected())
            {
                for(int i=2;i<=limit;i+=2)
                    txtRes.append(""+i+" ");
            }
        else
            {
                for(int i=1;i<=limit;i+=2)
                    txtRes.append(""+i+" ");
            }
}
```

14 The following interface computes the sum of n natural numbers and factorial of a number as entered by user depending upon the selection of the jRadioButton:




```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
      int limit = Integer.parseInt(txtNum.getText());
      int sum = 0, fact = 1;
       if(rbtSum.isSelected())
       {
              for(int i=1;i<=limit;i++)
                 sum=sum+i;
             lblRes.setText(“”+sum);
       }
      else
       {
            for(int i=1;i<=limit;i++)
                 fact=fact*i;
             lblRes.setText(“”+fact);
       }
  }
```

15 The following interface checks whether an input number is prime or composite.




```
private void btnCheckActionPerformed(java.awt.event.ActionEvent evt) {
     int num = Integer.parseInt(txtNum.getText());
     boolean prime = true;
     for(int i=2;i<=num/2;++i)
              if(num%i==0) {
                    prime=false;
                     break;
              }
       if(prime==true)
               lblRes.setText(“Prime Number”);
      else
             lblRes.setText(“Composite  Number”);
```

Chapter-7
PROGRAMMING GUIDELINES

GUI application development guidelines:

GUI Programming adopts simplified approach to programming. In GUI Programming, most of the components are predefined in a generic way to be adapted and incorporated according to the needs of the application. Some guidelines for good GUI Programming are:

- Understand the need of the application before starting the development.
- Find out all possible inputs, which are required to produce the desired result/output.
- Avoid ambiguity and use appropriate input component.
- Provide appropriate labels for each input and output options.
- Use meaningful names for variable, controls etc. and follow naming conventions.
- Ensure clarety of expression so user can easly understand it.
- Use comments and proper indentation.
- Insert blank lines and blank spaces where necessary to separate logical group of statements.
- Avoid using free formatting style.

Characteristic for a Good Program

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

Stages of Program Development Process

Program/application development is a step by step process. Effective and efficient software is developed only throuth systematic apporach. Stages of the application development are:

Phase 1: Analysis : This phase contains following steps:

- Problem Specification: To understand the problem and set the **objective.**
- Requirement Analysis: To find the technical, financial, and operational requirement for the new application.
- Possible Input and Output for obtaining desired results.

Phase 2: Designing : In this phase detailed design of the following components is to be made:

- Input Design
- Ouput Design
- Interface Designing (Forms)
- Modular Components
- Algorithms

Phase 3: Coding

Phase 4: Testing and Debugging:

Phase 5: Implementation

Phase 6: Documentation and Maintenance:

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:-

Syntax error: it occurs when a grammatical rule of Java is violated
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.

Questions & Answers on Programming Guidelines

Q1. 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.

Q2. 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.

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.

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

Q3. 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 coorect, 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+Sci/3) instead of (Eng+Math+Sci)/3 to calculate average of marks of 3 subjects.

Q4. Explain the term 'Exception Handling'.

Ans. 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.

Q5. Define Syntax :

Ans **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(;).

Q6. Define Protability.

Ans. **Portability** -Portability means an application should run on different platform without doing any changes.

Q7. Prettyprinting

Ans. 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.

Q8 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= Intger.parseInt(t1.getText());
b= Intger.parseInt(t2.getText());
c= a / b;
```

Ans: The error is logical error. int a,b,c;

```
a= Intger.parseInt(t1.getText());
b= Intger.parseInt(t2.getText()); if(b!=0)
c= a / b;
else {
   JOptionPane.showMessageDialog(null,"Denominator cann't be zero");
      t2. setText(" ");
      t2.requestFocus( ) ;
     }
```

Q9. What are the characteristics of a good program?

Ans: The characteristics of a good program are-

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

Q10. 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 the opening braces should properly match with a closing braces.

Spaces should be inserted between operator and operands in an expression.

Chapter-8

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-organized collection of interrelated data that ensures safety, security and integrity of data is called database.

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:

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

Examples of Common Database Management Systems:
MySQL, INGRES, POSTGRES, ORACLE, DB2, Microsoft Access.

Levels of Database Implementation:

- Internal Level (Physical Level) : It describes how the data are actually stored on the storage media.
- Conceptual Level : It describes what data are actually stored in the database. It also describes the relationships existing among data.
- 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 are:-

- **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.
- **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 (Database) Model: A way by which data structures and their relationships are analyzed.

- Relational data model
- Network data model
- Hierarchical data model

Relational Data Model:

In this model data is organized into tabular structures (tables) 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). In a relation the rows represent the record and known as **Tuple** and the columns referred as **Attribute.**

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 :

- Data is stored in a relational database in one or more tables. These tables termed as **relation**.
- **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.

Relational Database terminology

- **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

FOREIGN KEY

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.

REFERENTIAL INTEGRITY

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.

Do Yourself :

Identify Tuple, Attributes, Field Names, Primary Key in the table Custmer shown below.

Table: Customer

Column

Row

Customer_ID	FirstName	LastName	Address	Telephone No
101	Prachi	Mehra	145, Mahatma Avenue, Delhi	9178908767
102	Vinay	Ahlurkar	76-A/32, Adarsh Nagar, Delhi	9278906351
103	Venu	Magalam	C-6, Kanthi Nagar, Delhi	9323764561
104	Neeza	Ali	B-6-B,Fateh Nagar, Meerut	9143347330

Chapter-9
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. Released under open source and available free of cost.
2. Easy to learn and use..
3. Fast processing speed and easy in installation. Occupy very less space.
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' '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' 'Me and u'
NUMERIC	DECIMAL(p,s)	It can represent number with or 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	17.3
	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 conditions the 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	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 (SRNo 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) REFRENCES 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]);

Example :

>> 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..] [WHEREsearch_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;
```

For example :

```
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 you can write following statement for the same:

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 you can Not with IN as:

SELECT * **FROM** Customer
WHERE city **NOT IN** ('Ahmedabad', 'Baroda', 'Delhi','Mumbai','Chennai');

✓ Null values

SELECT * FROM Customer WHERE city is NULL;

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 along with 3 characters in the beginning but 'g' as the 4th 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: To add **age** column in student table.

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

- **Modify a column :**

Syntax :

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

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

Chapter-10
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

Example: LENGTH('INFORMATICS'); Result:11
LENGTH() : Returns the length of a string in bytes/no.of characters in string.

CHAR() : Returns the corresponding ASCII character for each integer passed.

Example : CHAR(65) ; Result : A

Example : CONCAT('Informatics',' ','Practices'); Result : Informatics Practices'
CONCAT(): Returns concatenated string i.e. it adds strings.

Example : INSTR('Informatics',' mat'); Result : 6(since 'm' of 'mat' is at 6th place)
INSTR(): Returns the index of the first occurrence of substring.

LOWER('INFORMATICS')
LOWER()/ LCASE(): Returns the argument after converting it in lowercase.

Example: ; 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 AND ANSWERS
(MySQL)

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.

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.

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

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

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.

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.

What do you understand by MySQL Client?

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

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;
```

Query Based question & answers

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

.Pincode
10001
120012
300048
281001

Ans: SELECT Pincode from Post where Pincode LIKE " %1" ;

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

i) 110001 ii) No Output

2. A table "Animals" in a database has 3 columns and 10 records. What is the degree and rdinality 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 '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.

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

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

   Mysql> Select * from Loan_Acc where Int_rate is NULL;

10. 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

11. 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;

12. 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)

13. 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;

14. 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;

15. 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;

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

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

17. 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 50000;

18. 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%';

Using ORDER BY clause

23. 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;

Using UPDATE, DELETE, ALTER TABLE

29. 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:

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

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

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

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

SQL PRACTICAL ASSIGNMENT

Lab Activity 1: Create a table STUDENT with under mentioned structure by using SQL Statement:

StdID	**Number**	**Primary Key**
StdName	**Character (30)**	**NOT NULL**
Sex	**Character(6)**	**Male or Female**
Percentage	**Number**	
SClass	**Number**	
Sec	**Character**	
Stream	**Character(10)**	**Science or Commerce**
DOB	**Date**	**Date of Birth**

Step 1: Open MySQL, Open Database and create table as:

```
CREATE TABLE Student (
StdID INT(4) PRIMARY KEY, StdName VARCHAR(30) NOT NULL,
Sex VARCHAR(1), Percentage DECIMAL(5,2), SClass INT ,
Sec VARCHAR(1), Stream VARCHAR(10), DOB  DATE );
```

Step 2: Press Enter key to complete create table:

Step 3: Insert records into STUDENT table.

INSERT INTO Student VALUES (1001, 'AKSHRA AGARWAL,'FEMALE',70,11,'A', '10/11/1996');

Step 4: As you press enter key after typing above statement, 1 record will be stored into STUDENT table.

Step5: Similarly like step 3, enter other records of the following table.

StdID	StdName	Sex	Percentage	Class	Sec	Stream	DOB
1001	AKSHRA AGARWAL	FEMALE	70	11	A	Science	10/11/1996
1002	ANJANI SHARMA	FEMALE	75	11	A	Commerce	18/09/1996
1003	ANSHUL SAXENA	MALE	78	11	A	Commerce	19/11/1996
1004	AISHWARYA SINGH	FEMALE	79	11	A	Commerce	1/11/1996
1005	AKRITI SAXENA	FEMALE	76	11	A	Commerce	20/09/1996
1006	KHUSHI AGARWAL	FEMALE	77	11	A	Commerce	14/09/2003
1007	MAAHI AGARWAL	FEMALE	74	11	A	Science	21/04/1997
1008	MITALI GUPTA	FEMALE	78	12	A	Science	26/11/1997
1009	NIKUNJ AGARWAL	MALE	58	12	A	Science	12/7/1997
1010	PARKHI	FEMALE	59	12	A	Commerce	20/12/1997

1011	PRAKHAR TIWARI	MALE	43	12	A	Science	22/04/1997
1012	RAGHAV GANGWAR	MALE	58	12	A	Commerce	21/12/1997
1013	SAHIL SARASWAT	MALE	57	12	A	Commerce	13/08/1997
1014	SWATI MISHRA	FEMALE	98	11	A	Science	13/08/1996
1015	HARSH AGARWAL	MALE	58	11	B	Science	28/08/2003
1016	HARSHIT KUMAR	MALE	98	11	B	Science	22/05/2003
1017	JAHANVI KAPOOR	MALE	65	11	B	Science	10/1/1997
1018	STUTI MISHRA	MALE	66	11	C	Commerce	10/1/1996
1019	SURYANSH KUMAR AGARWAL	MALE	85	11	C	Commerce	22/08/2007
1020	TANI RASTOGI	FEMALE	75	12	C	Commerce	15/01/1998
1021	TANISHK GUPTA	MALE	55	12	C	Science	11/4/1998
1022	TANMAY AGARWAL	MALE	57	11	C	Commerce	28/06/1998
1023	YASH SAXENA	MALE	79	11	C	Science	13/3/1998
1024	YESH DUBEY	MALE	85	12	C	Commerce	3/4/1998

Lab Activity 2: Open school database, then select student table and use following SQL statements.
TYPE THE STATEMENT, PRESS ENTER AND NOTE THE OUTPUT

1 To display all the records form STUDENT table.

SELECT * FROM student ;

2. To display ony name and date of birth from the table STUDENT.

SELECT StdName, DOB FROM student ;

3. To display all students record where percentage is greater of equal to 80 FROM student table.

SELECT * FROM student WHERE percentage >= 80;

4. To display student name, stream and percentage where percentage of student is more than 80

SELECT StdName, Stream, Percentage WHERE percentage > 80;

5. To display all records of science students whose percentage is more than 75 form student table.

SELECT * FORM student WHERE stream = 'Science' AND percentage > 75;

Lab Activity 3: Open school database, then select student table and use following SQL statements.
TYPE THE STATEMENT, PRESS ENTER AND NOTE THE OUTPUT

1. To display the STUDENT table structure.

DESCRIBE Student;

2. To add a column (FIELD) in the STUDENT table, for example TeacherID as VARCHAR(20);

ALTER TABLE Student ADD TeacherID VARCHAR(20);

3. Type the statement

DESC Student;

Press enter key, now note the difference in table structure.

4. Type the statement and press enter key, note the new field that you have added as TeacherID

SELECT * FROM student;

5. To modify the TeacherID data type form character to integer.

```
ALTER TABLE   Student   MODIFY   TeacherID    INTEGER ;
DESC Student;
SELECT * FROM   student;
```

Lab Activity 4

1. To Drop (Delete) a field form a table. For e.g you want to delete TeacherID field.

```
ALTER TABLE Student DROP TeacherID;
```

2. To subtract 5 form all students percentage and display name and percentage.

```
SELECT name, percentage - 5 FROM Student;
```

3. Using column alise for example we want to display StdName as Student Name and DOB as Date of Birth then the statement will be.

```
SELECT StdName AS "Student Name",
     DOB As "Date of Birth"  FROM Student;
```

4. Display the name of all students whose stream is not Science

```
SELECT  StdName FROM student
WHERE   Stream <> 'Science';
```

5. Display all name and percentage where percentage is between 60 and 80

```
SELECT StdName, percentage FROM student WHERE percentage >=60 AND
percentage<=80 ;
```

Lab Activity 5:

1. To change a student name from SWATI MISHRA to SWATI VERMA whose StdID is 1014 and also change percentage 86.

```
UPDATE Student SET  StdName  = 'SWATI VERMA', percentage = 86
WHERE StdId = 1014;
```

2. To delete the records form student table where StdId is 1016.

```
DELETE FROM Student WHERE StdID = 1016;
```

3. Type the following SQL statement and note the output.

```
SELECT * FROM Student WHERE StdName LIKE 'G_' ;
SELECT * FROM Student WHERE StdName='G';
SELECT * FROM Student WHERE StdName LIKE 'G%' ;
SELECT * WHERE Student WHERE StdName='%G%' ;
```

4. Display all the streams in student table.

```
SELECT DISTINCT Stream FROM Student;
```

5. Note the output of the following statement.

```
SELECT StdName, Sex, Stream FROM Student WHERE percentage  BETWEEN 70 AND 80;
```

Do yourself:

Create a Table **Empl** to store employee details as shown below and write statements for following queries based on the table.

empno	ename	job	mgr	hiredate	sal	comm	deptno
8369	SMITH	CLERK	8902	1990-12-18	800.00	NULL	20
8499	ANYA	SALESMAN	8698	1991-02-20	1600.00	300.00	30
8521	SETH	SALESMAN	8698	1991-02-22	1250.00	500.00	30
8566	MAHADEVAN	MANAGER	8839	1991-04-02	2985.00	NULL	20
8654	MOMIN	SALESMAN	8698	1991-09-28	1250.00	1400.00	30
8698	BINA	MANAGER	8839	1991-05-01	2850.00	NULL	30
8882	SHIVANSH	MANAGER	8839	1991-06-09	2450.00	NULL	10
8888	SCOTT	ANALYST	8566	1992-12-09	3000.00	NULL	20
8839	AMIR	PRESIDENT	NULL	1991-11-18	5000.00	NULL	10
8844	KULDEEP	SALESMAN	8698	1991-09-08	1500.00	0.00	30

1. Consider the **Empl** table and write SQL command to get the following.

a. Write a query to display EName and Sal of employees whose salary are greater than or equal to 2200?

b. Write a query to display details of employs who are not getting commission?

c. Write a query to display employee name and salary of those employees who don't have their salary in range of 2500 to 4000?

d. Write a query to display the name, job title and salary of employees who don't have manager?

e. Write a query to display the name of employee whose name contains "A" as third alphabet?

f. Write a query to display the name of employee whose name contains "T" as last alphabet?

g. Write a query to display the name of employee whose name contains "M" as First and "L" as third alphabet?

h. Write a query to display details of employs with the text "Not given", if commission is null?

Chapter-11
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
www.incometaxindia.gov.in	It Provides all the services of Income Tax department
www.indiancourts.nic.in	It provides information related to Supreme Court and High Courts of India.
www.rti.gov.in	Right to information Act 2005 mandates timely response to citizen requests for government information
india.gov.in	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
www.drdo.nic.in	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 described 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 accessed to learning and clear accountability for all participants in the learning process.

KENDRIYA VIDYALAYA SANGATHAN, BANGALORE REGION

SESSION ENDING EXAMINATION – 2014

INFORMATICS PRACTICES – (065)

Max Marks : 70 CLASS : XI TIME : 3 Hours

General Instructions :

1. *Please check that this question paper contains 5 printed pages.*
2. *Please check that this question paper contains 7 questions.*
3. *Please write down the serial number of the question before attempting it.*
4. *15 minutes has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer book during these 15 minutes.*
5. *Use appropriate variable names.*
6. *Indent your program appropriately.*
7. *All questions are compulsory & answer the questions after carefully reading the text.*

Q.1 a) Arrange the following units of memory in ascending order of their capacity: Terabyte, Petabyte, Megabyte, gigabyte 1

b) Differentiate between a RAM and a ROM? 2

c) Ramesh works for Info Solutions Bangalore. He was signing in the attendance register daily till now. Recently his employers started taking attendance by registering his thumb impression on an electronic device. Name the category of these devices used for individual's recognition using physical traits like thumb impression or retina recognition? 1

d) You are regularly visiting your School's Computer Lab. Enlist two items that you consider as e-waste. Also justify your answer. 2

e) Ravi is unaware of the possible cyber-threats. He receives an email from an unknown person containing an attractive offer. He is asked to download a file looking like a MS-Word document. His Computer gets infected soon after he clicks the link. Which type of Security threat he was subjected to? 1

f) Which technique is used to validate the authenticity of an electronic document sent over a network? 1

g) Name the language processor that converts the whole set of source code into object code at one go and reports the errors at the end? 1

h) Which software tool will you prefer to re-arrange files in your hard disk so that the computer works faster? 1

Q.2 a) What is Rapid Application Development? 1

b) Name the Java methods used to achieve the following action: 2

i) To check whether a jRadioButton has been selected or not.

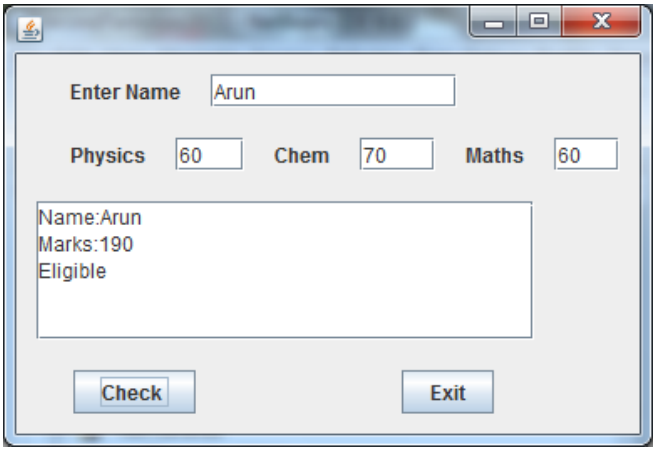
ii) To add text in a jTextArea along with existing text.

c) Amit wants to extract an item from a jComboBox in his GUI application with the following code: 2

String str = combo1.getSelectedItem();

He gets a compilation error. Why do you think this code will not compile? Re-write the above code to remove the error.

d) 4



jTextField – txtName
jTextFiled – txtPhy
jTextField – txtChe
jTextField – txtMat
jTextArea – txtRes
jButton – btnRes
jButton - btnExit

CET counselor for Karnataka uses this interface to decide the eligibility for admission to Engineering Colleges. If the sum of marks of Physics Chemistry abd Mathematics is greater or equal to 180 out of 300 maximum marks then only a student is eligible.

i. Write code under the action event of the Check Button to add all the three marks and verify if the total is greater or equal to 180. If yes the details are displayed in the jTextArea as shown. (3)

ii. Write code under the Exit button to quit the application. (1)

e) How is a JCheckbox different from a JRadioButton? 1

Q.3 a) What is a Java variable? Enlist two naming rules in declaring a java variable. 2

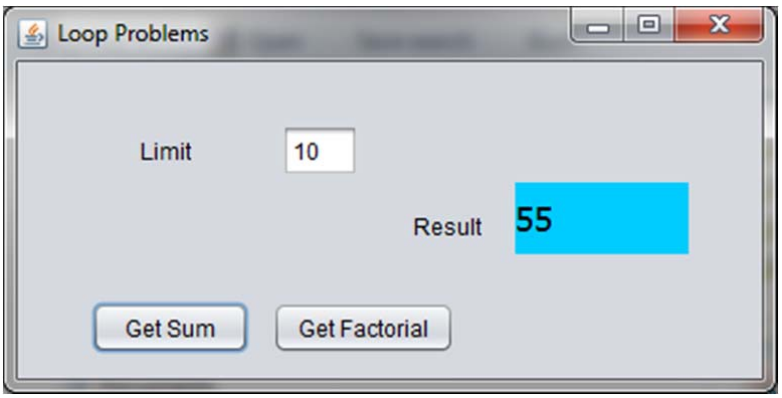
b) Re-Write the following code fragments after removing the errors. Also underline the corrected code: 2

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

c) Convert the following java code using switch-case: 2

```
int num = Integer.parseInt(t1.getText());
String result;
If(num==2 || num==4)
  result =”Even Number”;
else if(num==1 || num==3)
 result=”Odd Number”
else
 result=”Wrong Choice”;
```

d) The given application is used to calculate the sum of natural numbers up to given limit and also obtain the factorial (product of numbers upto given limit). 6



jTextBox – tb1
jLabel – lb1

Write java code under the action event of the two jButtons to achieve the goals.

e) What will of value of variable c after execution of the following java code: 1

```
int a=10, b=20;
int c= (++a) + (b++);
lblRes.setText(“”+c);
```

F) What are comments in a program? Enlist at least two types of comments supported in java. 2

Q.4 a) Differentiate between DDL and DML queries in SQL. 1

b) A relation in MySQL has 5 attributes and 8 tuples. What will be the cardinality and degree of the relation? 1

c) What is the difference between Candidate key and Alternate Key in a Relation? 2

d) Give one word answer to the following questions: 4

i. An attribute that is a Primary key of one table and used as non-key attribute in another table.
ii. A SQL command used to display the structure of a table in MySQL
iii. A SQL command used to remove duplicate rows from a SELECT query.
iv. An SQL query that uses SET command to make modification on table data.

e) What is a Column alias in SQL? Give an example of using column alias in a query. 2

Q.5 a) What will be the output of the following SQL queries: 4

i. SELECT MID('AVATAR',3,2)
ii. SELECT CHAR(66,65,68)
iii. SELECT DAYOFYEAR('2011-12-31')
iv. SELECT ROUND(15.15, -1)

b) Study the following table's structure and answer the given questions. 6

Table: **STUDENT**

Column name	Data type	Limit	Constraint
ROLLNO	Integer	4 digits	Not Null
SNAME	Varchar	25 characters	Not Null
GENDER	Char	1	Not Null
DOB	Date		Not Null
HOUSEID	Integer	2	Not Null
FEES	Integer	4 digits	Not Null
HOBBEY	Varchar	15 characters	Null
Primary Key is ROLLNO			

i. Write SQL query to create the STUDENT table. (2)
ii. Write SQL query to increase the size of the SNAME to hold 30 characters (2)
iii. Write SQL query to insert a row in the student table. (2)

Q.6 a) Sample data is given for STUDENT table. Answer the queries that follow. 6

Sample Data in Student Table:

ROLL NO	SNAME	GENDER	DOB	HOUSEID	FEES	HOBBY
1001	RAVI	M	2002-01-20	10	850	HOCKEY
1002	AMAR	M	2001-03-20	11	550	SOCCER
1003	SUJA	F	2004-11-25	10	650	
1004	RUMA	F	2003-12-31	12	650	SKATING
1005	SIJU	M	2002-09-11	13	550	
1006	ARUNA	F	2001-12-20	10	750	HOCKEY
1007	HYDER	M	2004-09-18	11	850	SOCCER
1008	RAINA	M	2005-08-21	12	850	SOCCER

i. Write SQL query to display the details of STUDENT table in the descending order of the FEES.
ii. Write SQL query to display the SNAME, GENDER and FEES for all the students whose HOUSEID is either 10 or 11 or 13.
iii. Write SQL query to display the SNAME, FEES and HOBBY for all the students who do not have a hobby.
iv. Write SQL query to display the SNAME and GENDER for all the students who are paying fees in the range of 600 to 800.
v. Write SQL query to display the ROLLNO and SNAME for all the students whose SNAME is ending with 'A'.
vi. Write SQL query to display the STUDENT details whose year of birth is 2002.

b) Study the given HOSPITAL table and write the DML queries that follow. 4

PID	PNAME	DOA	DOD	WARD	FEES
1001	RAVI	2008-01-10	2008-01-20	SURGERY	2000
1002	AMAR	2008-02-21	2008-03-20	MEDICINE	1500
1003	SUJA	2009-10-02	2009-11-25	SURGERY	2500
1004	RUMA	2007-12-12	2007-12-31	OPTHALMO	1800
1005	SIJU	2008-08-10	2008-09-11	MEDICINE	2800
1006	ARUNA	2007-10-10	2007-12-20	NEURO	3500
1007	HYDER	2008-09-15	2008-09-18	OPTHALMO	3250
1008	RAINA	2009-06-12	2009-08-21	SURGERY	3000

i. Write a query Increase the FEES by 200 for all patients whose WARD is SURGERY.
ii. Write a query to delete all the rows from the HOSPITAL table whose WARD is NEURO.

Q.7 a) How e-Governance has benefited the Common man? 2

b) Enlist two websites that offers e-learning. 1

c) Abhinav wants to create a GUI using the swing controls jLabel, jTextField, jComboBox, jRadioButton, jTextArea. Suggest him the control for the following: 2

i) To enter multiline text.
ii) To select gender from male and female
iii) To display results that cannot be edited.
iv) To select hobbies from a list of hobbies.

KENDRIYA VIDYALAYA SANGATHAN, BANGALORE REGION

SESSION ENDING EXAMINATION – 2014

INFORMATICS PRACTICES – (065) Marking Scheme

Max Marks : 70 CLASS : XI TIME : 3 Hours

Q.1	a)	Megabyte, gigabyte, Terabyte, Petabyte ½ marks for partially correct answer.	1
	b)	Expanding the terms RAM and ROM 1 mark One significant difference 1 mark.	2
	c)	Biometric Sensor 1 mark for correct answer. Ignore spelling mistakes.	1
	d)	Any two Computer Hardware Item that are not usable or reparable (CPUs, Monitors, Keyboards, Printer Cartridges, Printers, Scanners…). 1 mark Justification – dumped in lab due to its obsoleteness, damaged beyond repairs.. any one point 1 mark	2
	e)	Trojan horse.	1
	f)	Digital Signature.	1
	g)	Compiler	1
	h)	Disk-Defragmenter	1
Q.2	a)	Mention of drag and drop features and/or Wizards will fetch 1 mark	1
	b)	Name the Java methods used to achieve the following action: i) isSelected() – 1 ii) append() – 1	2
	c)	Data Type mismatch Object to String. 1 mark String str = (String) combo1.getSelectedItem(); 1 mark Or String str = (String) combo1.getSelectedItem().toString();	2
	d)	a) Proper logic will fetch 2 mark Correct decleration of variables and assigment fetch 1 mark For each Syntax error deduct ½ mark b) System.exit(0) 1 mark… partially correct answer ½ mark	4
	e)	One difference will fetch 1 mark	1
Q.3	a)	Correct definition of variable 1 mark. Each correct naming rule ½ mark	2
	b)	There are two errors and each correct identification of error carries 1 mark	2
	c)	Correct conversion carries 2 marks. For each syntax error deduct ½ mark. Writing of proper switch-case construct with out the correct conversion 1 mark.	2

	d)	Each correct solution carry 3 mark. Deduction of marks is based on syntax error and logical errors.	6
	e)	The answer is 31 for Java compiler and 1 mark for correct answer	1
	b)	Correct definition 1 mark. For each type out of possible 3 types of java comments ½ marks.	2
Q.4	a)	One difference carry 1 mark.	1
	b)	Cardinality – 8 Degree – 5 … ½ mark for each correct answer	1
	c)	Correct difference between the two fetches 2 marks. For partial answer deduct marks as per your judgement.	2
	d)	Give one word answer to the following questions: i. Foreign Key ii. DESC or DESCRIBE iii. DISTINCT iv. UPDATE	4
	e)	Proper definition 1 mark. Correct SELECT query example 1 mark.	2
Q.5	a)	What will be the output of the following SQL queries: i. AT ii. BAD iii. 365 iv. 20	4
	b)	For question i. to iii, Correct query 2 marks for each question. Deduct ½ mark for each mistake.	6
Q.6	a)	i. Correct SQL Query 1 mark. (Use of SELECT query ½ mark, ORDER BY clause ½) ii. Correct SQL Query 1 mark. (Use of SELECT query ½ mark, IN Clause ½ mark, OR clause ½ mark) iii. Correct SQL Query 1 mark. (Use of SELECT query ½ mark, IS NULL fetch ½ mark.) iv. Correct SQL Query 1 mark. (Use of SELECT query ½ mark, BETWEEN ½ mark | <= and >= ½ mark). v. Correct SQL Query 1 mark. (Use of SELECT query ½ mark, LIKE clause ½ mark). vi. Correct SQL Query 1 mark. (Use of SELECT query ½ mark,YEAR() function ½ mark | LIKE clause ½ mark).	6
	b)	i. Correct SQL Query 2 mark. Use of UPDATE and SET command 1 mark, partial answer 1 mark, only UPDATE ½ mark ii. Correct SQL Query 2 mark. DELETE command 1 mark, partial answer 1 mark.	4
Q.7	a)	Correct explanation fetches 2 marks. Partial answer 1 mark	2
	b)	Each legitimate website name will carry ½ mark.	1
	c)	i) Text Area. ii) jRadioButton or jComboBox or jListBox iii) jLabel iv) JListBox or CheckBox	2

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: 2

(a) Nibble (b) Byte (c) Kilo Byte (d) Giga Byte

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 command to create the table STUDENT (Decide the type and size of column of your own). 2

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)

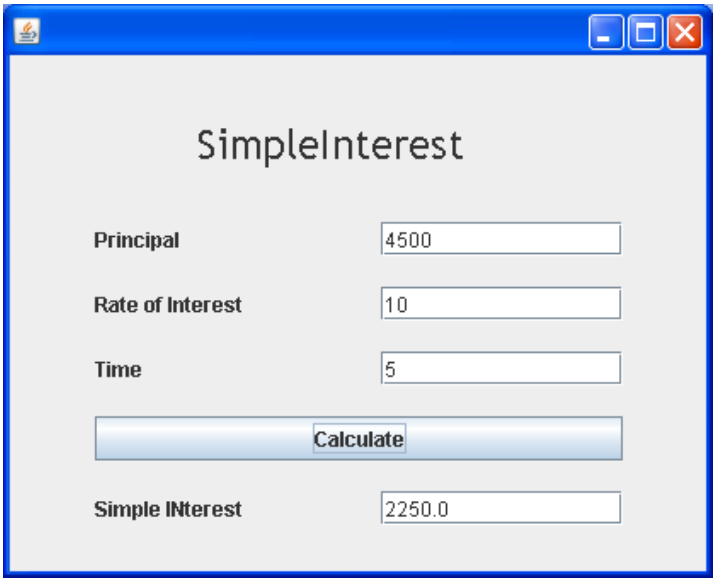
```
6
55
444
3333
22222
111111
```

(ii)

```
A
AAA
AAAAA
AAAAAAA
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



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	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	

(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

2

2

2

(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.

1

(c) To list names of all patients with their date of admission in ascending order.

(d) To display Patient's Name, Charges, Age for only female patients. 1

Find Out the Output of Following SQL Command:-

(i) Select COUNT(DISTINCT charges) from HOSPITAL;

(ii) Select MIN(Age) from HOSPITAL where Sex="F";

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, 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

Ans.

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 – Create table student (Gender char(1) Default 'M');	Ex – Create table student (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)

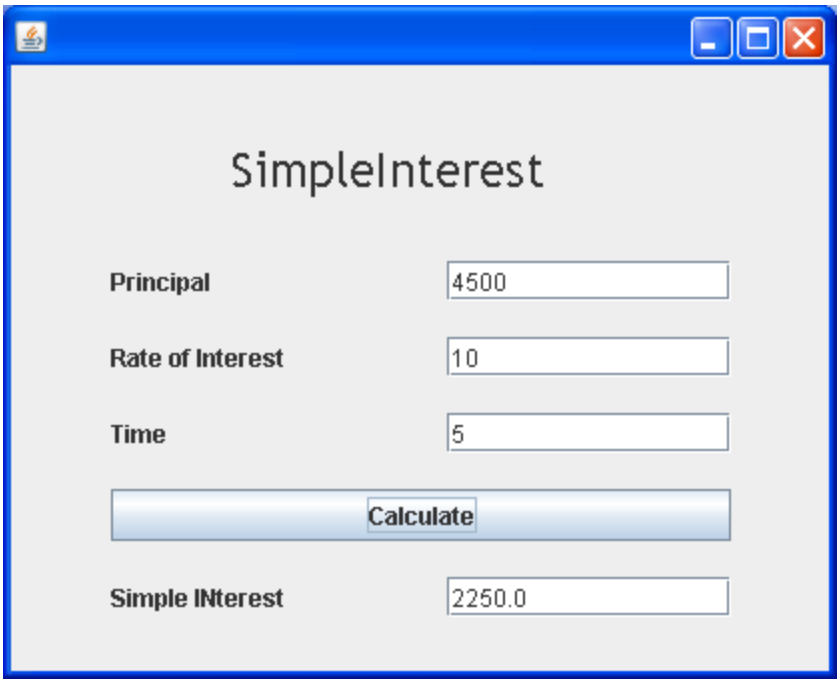
```
for(int i=1; i<=5;i++)
{
   for(int j=4; j>=i; j--)
     System.out.print(“ ”);
     for(int k=1; k<=(2*i-1); k++)
     System.out.print(“A”);
System.out.println();
}
```

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, 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	

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;

(viii) Drop 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

(e) To list the names all the patients admitted after 15/01/98. 2

(f) To list the names of female patients who are in ENT department. 2

(g) To list names of all patients with their date of admission in ascending order. 2

(h) To display Patient's Name, Charges, Age for only female patients. 2

Find Out the Output of Following SQL Command:-

(iii) Select COUNT(DISTINCT charges) from HOSPITAL; 1

(iv) Select MIN(Age) from HOSPITAL where Sex="F"; 1

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';

[1 mark each for each correct Query]

I. 5

II. 16

[1 mark each for each correct output]

SESSION ENDING EXAMINATION
CLASS – XI
SUBJECT : INFORMATICS PRACTICES
(065)

Time Allowed : 3 Hrs. **Max Marks : 70**

Note :

1-This question paper is divided into three sections.

2- Section-A and Section-B are of 25 marks each.

3-Section-C consists of 20 marks.

4-Answer the questions after carefully reading the text.

5-All questions are compulsory.

Section – A

Q1- Answer the following questions :

a) **Explain the various function of ALU?** **2M**
b) **Differentiate between Compiler and Interpreter?** **2M**
c) **What do you understand by Application Software? Write the name of any one application software?** **2M**
d) **Write the function of following :** **2M**
   (i) Address Bus (ii) Control Bus
e) **What is computer virus? What are its preventive measures?** **2M**

Q2- Answer the following questions :

a) **What is e-Governance? How e-Governance beneficial for citizens?** **2M**
b) **What is e-Learning? Give two names of web sites that provides e-Learning?** **2M**
c) **Define e-Business?** **1M**

Q3- Answer the following questions :

a) **What is DBMS?** **1M**
b) **What do understand by Candidate Keys?** **1M**
c) **What do you understand by Degree and Cardinality of a table?** **2M**

d) What are the advantages of using a DBMS? 2M
e) Define ROUND() and TRUNCATE() function with example? 2M
f) Define the function CONCAT()? 2M
g) What is database? 1M

Section – B

Q4- Answer the following questions :

a) Differentiate between syntax error and logical error? Explain with suitable example? 2M
b) What is JFrame? 1M
c) What is Casting? When do we need it? 2M
d) What are the container or container controls? 2M
e) Write Java statement to accomplish each of the following tasks : 3M
   (i) Declare variables sum and a to be of type int.
   (ii) Assign 1 to variable a
   (iii) Add variable a to variable sum and assign the results to variable sum.

Q5- Answer the following questions :

a) What will the output of following code fragment if the value of ch is : 2M

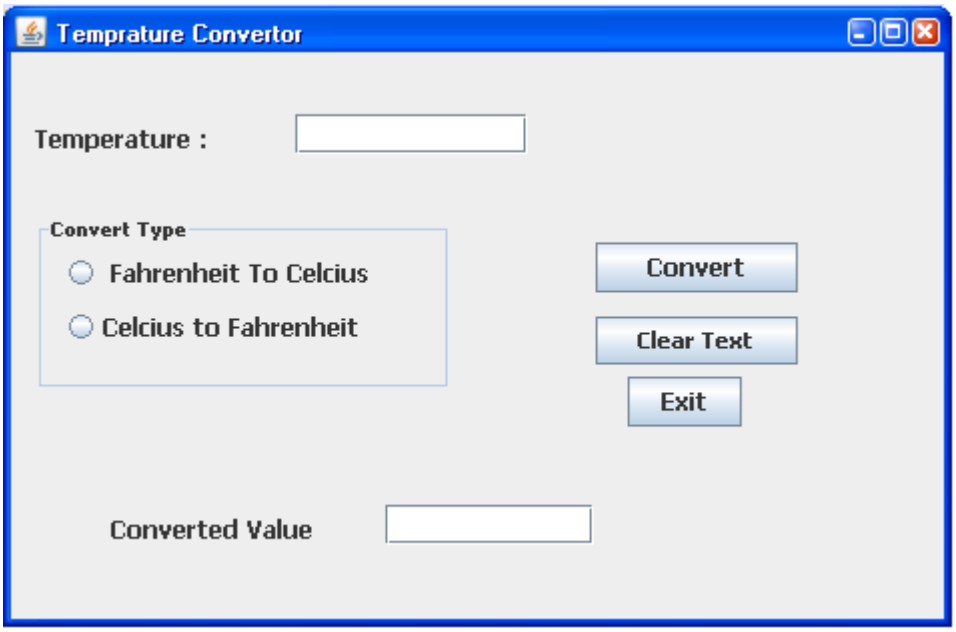
(i)a (ii) c (iii) d (iv) h

```
Switch(ch)
{       case 'a' :  System.out.println("It is a.");
        case 'b' :  System.out.println("It is b.");
        case 'c' :  System.out.println("It is c.");  break;
case 'd' :  System.out.println("It is d.");  break;
        default :  System.out.println(" Not a, b, c, d); break;
}
```

b) Create a Java Desktop Application to convert a given temperature Fahrenheit to Celsius and Vice Versa using switch case statement.
Hints : C=5/9 * (F-32) and F=1.8*(C+32)
Using a JButton's click event handler, display the corresponding temperature value in a JTextField control. Implement the following settings for IDE :

Controls	Property Name	Property Value
JRadioButton1	Text buttonGroup	Fahrenheit to Celcius buttonGroup1
JRadioButton2	Text	Celcius to Fahrenheit

	buttonGroup	buttonGroup1
JTextField1	Text Variable Name	txtTemp
JTextField2	Text Variable Name	txtCon
JButton1	Text Variable Name	Convert btnDisc
JButton2	Text Variable Name	Clear the text btnClear
JButton3	Text Variable Name	Exit btnExit



(i) On the Action event of the *Clear button* the text fields and radio buttons get clear. 2M

(ii) On the Action event of the *Exit button* the application gets closed. 2M

(iii) On the Action event of the button "*Convert*" the temperature is converted as per user choice. 3M

c) Rewrite the following code using while loop : 2M

```
int sum=0;
for(int i=1; i<=5;i++)
{
sum=sum+i;
}
```

d) Rewrite the correct code after removing the syntax errors if any in the following code : 2M

```
if(sex==1)
JLabel1.setText("Women");
else;
jLabel1.setText("Man");
```

e) Consider the following program code and tell how many time the loop will execute : 2M

```
int x=5, y=50;
 while(x<=y)
```

```
{
y=y/x;
x=x+5;
}
```

Section-C

Q6- Answer the following questions :

(a) Write the difference between Primary Key and Unique Key? 2M

(b) You have the following table CUSTOMER. Identify the required data types for each attributes : 2M

Cust_ID	Customer Identification Number
Cust_Name	Customer Name
Cust_Add	Customer Address
Bill_No	Customer bill Number

(c) Create a table name as Deptm with the following structure : 2M

Field Name	Field Type	Constraint
DEPTNO	Integer	NOT NULL PRIMARY KEY
DNAME	Varchar(14)	NOT NULL
LOC	Varchar(13)	
Salary	Integer(5)	

(d) Write a SQL command to add following column in above table. 1M

Column Name	Data Type	Size	Constraint	Description
Address	Varchar	40		Address of the Person

(e) Write SQL Commands for the questions form (a) to (h) on the basis of table Teacher. [7 X 1M]

Table : Teacher

No.	Name	Age	Department	Dateojjoin	Salary	Sex
1	Jugal	34	Computer	2007-02-10	12000	M
2	Shanti	31	History	2008-03-24	20000	F
3	Sandeep	32	Maths	2009-02-25	14000	M
4	Sangeeta	45	History	2007-04-15	20000	F
5	Rakesh	35	Computer	2007-05-17	21000	M

(i) To show all information about the teacher of History department in descending order of their name .
(ii) To list the male teacher who are in Maths department.
(iii) To display Name, Salary, Age of all male teacher.
(iv) Update the Salary by increasing Rs. 1000 for female teacher.
(v) To Insert a new record in table Teacher with the following data : 9, 'Raja', 23, 'Hindi', '2005-08-19',12675, 'M'
(vi) Display the name of those teacher whose name started with alphabet 'S';
(vii) To Delete those records where Department is History.
(viii) Write SQL Command to drop the table Teacher.

(f) Find the Output of following : **[5 X 1M]**

(i) SELECT ROUND (1.298,1);
(ii) SELECT POW(3,4);
(iii) SELECT LOWER('MYSQL QUERY LANGUAGE');
(iv) SELECT SUBSTR('MYSQL LANGUAGE', 7,8);
(v) SELECT LENGTH('INFORMATION');

SESSION ENDING EXAMINATION
CLASS – XI
SUBJECT : INFORMATICS PRACTICES (065)

Marking Scheme

	Question-1
a)	**This unit of computer system performs arithmetical and logical operations. In the ALU addition, subtraction, multiplication, division, and logical operations or comparisons are performed.** **(2 Marks for correct definition)**
b)	**1 Marks for each correction definition of Compiler and interpreter.**
c)	**Application Software is a set of program designed for specific users or applications such as word processing, graphics etc. for ex. MS-Word, MS-Excel etc.** **1 Marks for correct definition and 1 marks for correct example.**
d)	**1 Marks for each correction definition.**
e)	**1 Marks for correction definition of Virus and 1 marks for preventive measures.**
	Question-2
a)	**1 Marks for correction definition and 1/2 marks for each points (at least 2 points)**
b)	**1 Marks for correction definition of e-Learning and 1 marks for correct example : www.moodle.org, www.w3schools.com**
c)	**1 Marks for correction definition of e-business.**
	Question-3
a)	**The database is managed by a software package know as DBMS** **1 Marks for correction definition of DBMS**
b)	**If a table has more than such attributes which identify a tuple uniquely, then all such attributes are known as Candidates keys.** **1 Marks for correction definition Candidate Key .**
c)	**1 Marks for Degree : total number of attributes and 1 marks for Cardinality : total number of rows.**
d)	**1/2 Marks for each point (at least four points)**
e)	**1 Marks for Round() function and 1 marks for Truncate().**
f)	**1 Marks for CONCAT() function.**
g)	**1 Marks for correction definition of database.**
	Question-4
a)	**1/2 Marks for correct definition of Syntax error and 1/2 marks for correct example.** **1/2 Marks for correct definition of Logical error and 1/2 marks for correct example.**
b)	**JFrame is a superclass which provides the basic attributes and behaviors of a window .** **1 Marks for correction definition**
c)	**Casting is a form of conversion which uses the cast operator to specify by a type name in parentheses and is placed in front of the value to be converted. For example :** **Res=(float) total/count.** **They are helpful in situations where we temporarily need to treat a value as another type.** **1 Marks for correction definition and 1 marks for its use.**
d)	**2 Marks for correction definition of container class.**
e)	**(i) int sum, a ;** **(ii) a=1;** **(iii) sum=sum+a; or sum+=a;** **(1 Marks for each correct statements)**
	Question-5
a)	**(i) It is a.** **It is b.**

	It is c. **(ii) It is c.** **(iii) It is d.** **(iv) Not a, b, c, d .** **(1/2 for each correct output)**
b)	**Event on Clear button :** **jTextField1.setText(""); jRadioButton1.setSelected(false);** **jRadioButton2.setSelected(false); jTextField2.setText("");** **(1/2 marks for each correct coding)** **Event on Exit Button :** **System.exit(0);** **(2 Marks for statement).** **Event on Convert Button :** **int t = Integer.parseInt(txtTemp.getText());** **if(JRadioButton1.isSelected()==true)** **{** **float c=(5 * (t-32))/9;** **txtCon.setText(“”+c);** **}** **if(JRadioButton2.isSelected()==true)** **{** **float F=1.8*(t+32)** **txtCon.setText(“”+F);** **}** **1 1/2 marks for each correct output.**

c	int sum=0, i=0;
	while(i<=5)
	{
	sum=sum+i;
	i=i+1;
	}

d)	There should be not ; at the end of else jLable1 instead of JLable1; 1 marks of each correction.
e)	2 times 2marks for correct answer.
	Question-6
a)	**Unique can be NULL while primary key cannot be NULL** **2 Marks for correct answer.**

b)	**Cust_ID Integer Primary Key** **Cust_Name varchar(25)** **Cust_Add varchar(45)** **Bill_No Integer** **1/2 marks for each.**
c)	**Create table Deptm (DEPTNO integer primary key, DNAME varchar(14) NOT NULL, LOC VARCHAR (14), Salary Integer(5));** **2 Marks for writing correct query.**
d)	**Alter table Deptm ADD (Address Varchar(40));** **1 Marks for writing correct query.**
e)	**(i) SELECT * FROM TEACHER WHERE DEPARTMENT='History' ORDER BY Name DESC;**
	(ii) SELECT * FROM TEACHER WHERE DEPARTMENT='Maths' AND SEX='M';
	(iii) SELECT NAME, SALARY, AGE FROM TEACHER WHER SEX='M';
	(iv) UPDATE TEACHER SET SALARY= SALARY+1000 WHERE SEX='F';
	(v) INSERT INTO TEACHER VALUES (9, 'Raja', 23, 'Hindi', '2005-08-19',12675, 'M');
	(vi) SELECT Name FORM TEACHER WHERE NAME LIKE 'S%';
	(vi) DELETE FORM TEACHER WHERE DEPARTMENT='HISTORY'; **(1 MARKS FOR WRITING EACH CORRECT QUERY)**
f)	**(i) Output will be = 1.3** **(ii) 81** **(iii)** mysql query language **(iv) LANGUAGE** **(vi) 11**