केन्द्रीय विद्यालय संगठन

Kendriya Vidyalaya Sangathan

STUDY MATERIAL
(Informatics Practices)

CLASS-XI
2014-15

KENDRIYA VIDYALAYA SANGATHAN
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STUDY MATERIAL
CLASS XI (Informatics Practices)

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Syllabus

Informatics Practices (065)

Class - XI

Unit	Topic	Periods			Marks
		Theory	Practical	Total	
1	Introduction to Computer Systems	20	08	28	10
2	Introduction to Programming	45	42	87	25
3	Relational Database Management System	50	45	95	30
4	IT Applications	10	20	30	05
		125	115	240	70

Unit 1: Introduction to Computer Systems **10 Marks (20 Theory + 8 Practical) Periods**

Hardware Concepts:

- Computer organization (basic concepts): CPU, Memory (RAM and ROM), I/O devices, communication bus, ports (serial, parallel), device specific ports;
- Input devices: Keyboard, Mouse, Light pen, Touch screen, Graphics Tablet, Joystick, Microphone, OCR, Scanner, Smart Card reader, Barcode reader, Biometric sensor, Web camera;
- Output Devices: Monitor/Visual Display Unit (VDU), LCD screen, Television, Printer (Dot Matrix Printer, Deskjet/ Inkjet/ Bubble jet Printer, Laser Printer), Plotter, Speaker;
- Secondary Storage Devices: Floppy disk, Hard disk, Compact disk, Magnetic tape, Digital Versatile disk (DVD), Flash drive, Memory cards.Comparative properties of storage media;
- Memory Units: bit, byte (Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte)
- E-waste disposal.

Security of computer system

Sources of attack and possible damages, malware – virus, worms, 203oolea, spyware- and their propagation, cookies as security threat, malware detection using a tool.Computer security, Digital certificate, Digital signature, firewall, password, file access permissions

Types of Software:

a) System Software:

   (i) Operating systems: Need for operating system, major functions of Operating System; Examples of OS for mainframe, PC/Server, and mobile devices.

   (ii) Language Processors: Assembler, Interpreter, and Compiler

b) Utility Software: Compression tools, disk defragmenter, anti-virus.

c) Application Software:

   (i) General Purpose Application Software: Word Processor, Presentation Tool, Spreadsheet Package, Database Management System, Integrated Development Environment (IDE)

   (ii) Specific Purpose Application software: Inventory Management System, Purchasing System, Human Resource Management System, Payroll System, Financial Accounting, Hotel Management and Reservation System, etc.

Unit 2: Introduction to Programming **25 Marks (45 Theory + 42 Practical) Periods**

Getting started with Programming using IDE

- Introduction, Rapid Application Development using IDE (Integrated Development Environment); Familiarization of IDE using basic Interface components- Label, Text Field, Text Area, Button, Checkbox, Radio Button. (As per appendix A)
- Developing General Application (As per the guidelines at appendix B) – Getting Familiar with Java Swing User Interface components-Frame, Dialog, Option Pane, Panel, Scroll Pane, Label, Text Field, Password Field, Text area, Button, Check Box, Radio Button, Combo Box, List.
- Basic component handling methods and properties: setText(), getText(), is Selected(), set Selected().

Programming Fundamentals

- Data Types: Concept of data types; Built-in data types – byte, short, int, long, float, double, char, String, Boolean
- Variables: Need to use variable, declaring variables, variable naming convention, assigning value to variables;
- Integer object method: parseInt
- Double object method: parseDouble, parseFloat
- Control structures:

  Decision structure – if, if-else, switch;

  Looping structure- while, do . . while, for;

Programming Guidelines:

- General concepts; modular approach;

- Stylistic guidelines: clarity and simplicity of expressions and names; comments, indentation;
- Running and debugging programs, syntax errors, run-time errors, logical errors;
- Problem solving methodology: Understanding of the problem, Identifying minimum number of inputs required for output, breaking down problem into simple logical steps.

Unit 3: Relational Database Management System **30 Marks (50 Theory+45 Practical) Periods**

Database Management System

- Introduction to database concepts: database, relational database, relation/table, attribute/field, tuple / row;
- Data types: Text (CHAR, VARCHAR), Number (DECIMAL, INT/INTEGER), Date and Time
- Keys: candidate key, primary key, alternate key, foreign key;
- Examples of common Database Management System: MySQL, Ingres, Postgres, Oracle, DB2, MS SQL, Sybase, etc.; Common Database management tools for mobile devices.

Introduction to MySQL

(ANSI SQL 99 standard commands)

- Classification of SQL Commands:

  DML – SELECT, INSERT, UPDATE, DELETE

  DDL – CREATE, DROP, ALTER

- Creating and using a database: SQL CREATE command to create a database, USE command to select a database.
- Creating a table: CREATE command to create a table, DESC command to display a table structure, INSERT command for inserting new rows, inserting new rows with null values and values of all the studied data types.
- Displaying table data: SELECT command for selecting all the columns, selecting specific column(s) using arithmetic operators, operator precedence.
- Defining and using column alias.
- Eliminating duplicate values from display using DISTINCT keyword
- Limiting rows during selection (using WHERE clause)
  - Using comparison operators - =, <, >, <=, >=, <>, BETWEEN, IN, LIKE(%,_);
  - Logical operators –AND, OR, NOT and corresponding operator precedence;
- Working with NULL values.
- ORDER BY clause: Sorting in ascending/descending order, sorting by column alias name, sorting on multiple columns;
- Manipulating data of a table/relation: update command to change existing data of a table, delete command for removing row(s) from a table.
- Restructuring a table: ALTER TABLE for adding new column(s) and deleting column (s);

Functions in My SQL:

- String Functions: ASCII(), CHAR(), CONCAT(), INSTR(), LCASE(), UCASE(), LEFT(), LOWER(), LENGTH(), LTRIM(), MID(), RIGHT(), RTRIM(), SUBSTR(), TRIM(),UPPER(), ASCII()
- Mathematical Functions: - POWER(), ROUND(), TRUNCATE().
- Date and Time Functions: CURDATE(), DATE(), MONTH(), YEAR(), DAYNAME(), DAYOFMONTH(), DAYOFWEEK(), DAYOFYEAR(), NOW(), SYSDATE().

Unit 4: IT Applications **5 Marks (10 Theory + 20 Practical) Periods**

- e-Governance: Definition, benefits to citizens, e-Governance websites and their salient features and societal impacts; e-Governance challenges.
- e-Business: Definition, benefits to customers and business, e-Business websites and their salient features and societal impacts; e-Business challenges.
- e-Learning: - Definition; benefits to students (learners), teachers (trainers) and school (institution) management; e-Learning websites and their salient features and societal impacts; e-Learning challenges.

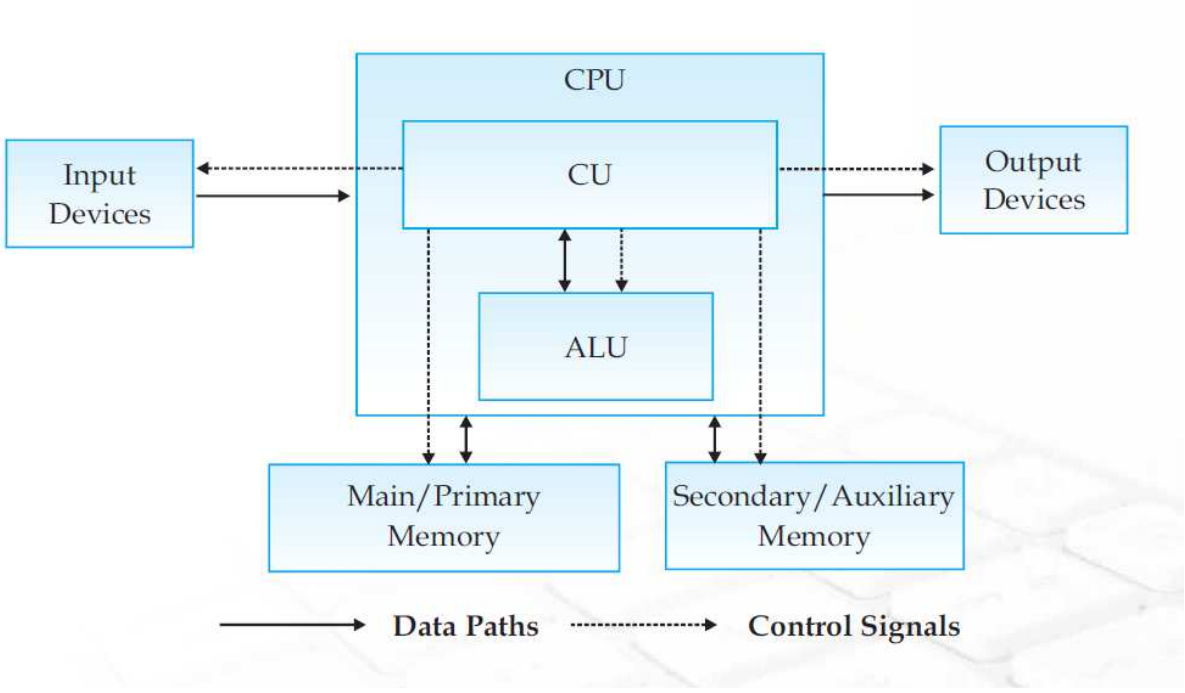
  In each of the above domains, identify at least two real-life problems, list the input(s) required for the expected output(s), and describe the problem solving approach.

  Impact of ICT on society – social and economic benefits, infomania.

Unit-I
Introduction to Computer System
Hardware Concepts

A computer is an electronic device that processes input data and produces result (output) according to a set of instructions called program.
A computer performs basically five major functions irrespective of its size and make.

- ✓ It accepts data or instructions by way of input
- ✓ It stores data
- ✓ It processes data as required by the user
- ✓ It controls operations of a computer
- ✓ It gives results in the form of output
- ✓ In order to carry out the operations mentioned above the computer allocates the task among its various functional units.



Block diagram of functional units of a computer

A computer receives data and instructions through "Input Devices" which get processed in Central Processing Unit, "CPU" and the result is shown through "Output Devices". The "Main / primary Memory" and "Secondary / Auxiliary Memory" are used to store data inside the Secondary/Auxiliary

Input Devices

1. **Keyboard-** This is the most common input device which uses an arrangement of buttons or keys. Apart formal phablet keys (26 keys), there are several other keys for various purposes such as

a) **Number keys**

b) **Direction keys**
c) **Function keys**
d) **Other keys**

2. **Mouse** - A mouse is a pointing device that functions by detecting two-dimensional motion relative to its supporting surface. By default, the mouse is configured to work for the right hand.

3. Light Pen- It is a light sensitive stylus attached to a video terminal to draw pictures or to select menu options.

4. **Touch Screen -** This device allow interacting with the computer without any intermediate device. You may see it at as KIOSKS installed in various public places

5. **Graphics Tablet -** This device is used to enter data using a stylus. Most commonly it is used to enter digital signatures.

6. **Joystick -** It is an input device consisting of a stick that pivots on a base and translates its angle or direction as data. Joysticks are often used to control inputs in video games.

7. **Microphone -** It is used to input audio data into the computer. They are mainly used for sound recording.

8. O C R (Optical Character Reader) - It is used to convert images of text into machine editable text. It is widely used to convert books and documents into electronic files.

9. **Scanner -** It is a device that optically scans images, printed text or an object and converts it to a digital image.

10. **Smart card reader -** It is used to access the microprocessor of a smart card. There are two broad categories of smart cards - Memory cards and microprocessor cards. Memory cards contain only non-volatile memory storage components, and some specific security logic. Microprocessor cards contain volatile memory and microprocessor components.

11. **Bar Code Reader-** This device read the bar code as input data. It consists of a light source, a lens and a light sensor which translates optical impulses into electrical signals

12. **Biometric Sensors-** It is used to recognize individuals based on physical or behavioral traits. Biometric sensor is used to mark attendance of employees/students in organizations /institutions. It is also popular as a security device to provide restricted entry for secured areas.

13. **Web Camera-** This captures video as data for computer with reasonably good quality. It is commonly used for Web Chats.

CPU

It is responsible for processing the data and instruction. This unit can be divided into three sections:

- ✓ Control Unit
- ✓ Arithmetic and Logical Unit (ALU)
- ✓ Central Processing Unit

Control Unit - This unit coordinates various operations of the computer like:

- It directs the flow of data and instructions in the computer system

- It interprets the instructions of a program in storage unit and produces signals
- It executes the instructions

Arithmetic and Logical Unit- This unit is responsible for performing various Arithmetic operation subtraction, multiplication, division and relational operations such as equal to , greater than , less than, greater than or not equal to and logical operation etc.

Primary Memory Unit
The main or primary memory stores information (instruction and data)
The memory unit is divided into :
Random Access Memory (RAM)
Read Only Memory(ROM)

Random Access Memory is used for primary storage in computers to hold active information of data and instructions.
ROM (Read Only Memory) is used to store the instructions provided by the manufacturer, which holds the instructions to check basic hardware interconnected and to load operating system from appropriate storage device.

Memory: The elementary unit of memory is a bit. A group of 4 bits is called a nibble and a group of 8 bits is called a byte. One byte is the minimum space required to store one character.
Other units of memory are:
1 KB(Kilo Byte) = 210 bytes = 1024 bytes
1 MB(Mega Byte) = 210 KB = 1024 KB
1 GB(Giga Byte) = 210 MB = 1024 MB
1 TB(Tera Byte) = 210 GB = 1024 GB
1 PB(Peta Byte) = 210 TB = 1024 TB

Output Devices
These are used to display results on video display or are used to print the result. These can also be used to store the result for further use.
Monitor or VDU-It is the most common output device. It looks like a TV. Its display may be CRT, LCD, Plasma or touch sensitive.
Speakers-These are used to listen to the audio output of computer.
Printers-These are used to produce hard copy of output as text or graphics.
Dot Matrix Printer-This printer prints characters by striking an ink soaked ribbon against the paper.
Inkjet/Deskjet/Bubble jet printers-These all are low cost printers which use a controlled stream of ink for printing.
Laser Printers :- These printers use laser technology to produce printed documents. These are very fast printers and are used for high quality prints.
Plotters- These are used to print graphics. It is mainly used in computer aided designing.

Communication Bus:- In computer architecture, a bus is a system that transfers data between computer components or between computers.
Address Bus: This is a system of bus, which is used to specify the address of a memory location.

Data Bus-This system of bus is a medium, which transfer the data from one place to another in a computer system.
Control Bus-This system of bus carries the signals that give the report about the status of a device.
Ports - A motherboard has a set of connection points called ports to connect units such as disk, VDU, keyboard etc. In a parallel port data bits are transmitted in parallel (16 or 32 bits simultaneously) to peripherals via a set of parallel wires (called ribbon cables). Serial ports transmit single bits serially, one after another. Serial ports come in the form of 9-pin or 25-pin male connector. Faster peripherals such as hard disk are connected to parallel ports. Slower devices such as keyboard are connected to serial port. A standard serial port is known as Universal Serial Bus (USB)
RJ-45 Port-This port is used for Ethernet connections and can be used between computer and any networked device, such as a cable modem or a network hub.

USB stands for Universal Serial Bus, used for short distance digital data communications. This port allows data transfer between devices with little electric power.

Secondary Storage Devices
If we want to save data for future reference and retrieval then it needs to be saved in memory other than primary memory, which is called secondary memory, or auxiliary memory. Normally hard disk of computer is used as secondary memory but this is not portable so there are many other secondary storage media in use.
Hard disk-This is a high capacity storage device ranging from 1GB to Tera Bytes nowadays. Generally hard disks are sealed units fixed in the cabinet.
Compact Disk-Capacity of standard 120mm CD is 700MB. It is a thin optical disk which is commonly used to store audio and video data. Transfer speed is mentioned as multiple of 150 KB/s. 4x means 600 KB/s.
DVD-Digital Versatile Disc or Digital Video Disc
This is an optical disc storage device. It can be recorded on single side or on double side.
Its capacity may range from 4.7 GB to 8.5 GB

Memory Cards
This is small, portable memory, which can be plugged into a computer with USB Port. They have capacity lesser than hard disk but much larger than a floppy or CD. They are more reliable also. They are also called pen drive. These are data storage devices mainly used with digital cameras, computers, mobile
phones, music players, video game console etc. They offer high recordability with power free storage.

E-Waste-It refers to the discarded electronic devices such as old version computers, office electronic equipment , mobile phones, TVs and refrigerators.
E-waste disposable mechanism- E-waste contains metallic and nonmetallic components , alloys and compounds like Copper, Aluminum, Gold, Silver etc. E-waste management involves proper recycling and recovery of the disposed material.

Software Concepts & Productivity Tools

An ordered set of instructions given to the computer is known as a program and a set of such programs that governs the operation of a computer system and/or its related devices is known as Software.

Types of Software:

System Software:

Software can be divided into different types depending upon their uses and application- System Software &Application Software.

Software required to run and maintain basic components of computer system come under the category of system software whereas software required to solve some specific task of daily use is generally called ***application software.***

An operating system is an example of system software while documentation tool, a presentation tool, a spreadsheet tool are all examples of application software. Even your favorite computer game is an example of application software. Some common examples of System Software as follows :

1.**BIOS**- The basic input/output system (BIOS) is also commonly known as the System BIOS. The BIOS is boot firmware, a small program that controls various electronic devices attached to the main computer system. The BIOS sets the machine hardware into a known state to help the operating system to configure the hardware components. This process is known as booting, or booting up. BIOS programs are stored on a chip

2.**Operating System**- Operating system is a set of system programs that controls and coordinates the operations of a computer system. Operating systems perform all basic tasks, such as identifying basic input/output devices, accepting input from the input devices, sending results to the output devices, keeping track of files and directories on the disk, and controlling other peripheral devices such as disk drives and printers

Need for an Operating System

Operating system provides a software platform, on top of which, other programs, called application programs are run.

Major Functions of an Operating System

The functions of an operating system can be broadly outlined as follows:

- Communicate with hardware and the attached devices [Device Manager]
- Manage different types of memories [Memory Manager]
- Provide a user interface [Interface Manager]
- Provide a structure for accessing an application [Program Manager]
- Enable users to manipulate programs and data [Task Manager]
- Manage the files, folders and directory systems on a computer [File Manager]

Following types of operating system are generally available and used depending upon the primary purpose and application and the type of hardware attached to the computer:

Single User: Allows one user to operate the computer and run different programs on the computer. MS DOS is a common example of single user operating system.

Multi-user: Allows two or more users to run programs at the same time on a single computer system. Unix, Linux, Windows are common examples of multi user operating system.

Real time: Responds to input instantly. Real-time operating systems are commonly found and used in robotics, complex multimedia and animation, communications and has various military and government uses. LYNX and Windows CE are examples of real time operating systems.

3.**Device Driver** - A device driver is a system software that acts like an interface between the Device and the user or the Operating System. All computer accessories like Printer, Scanner, Web Camera, etc come with their own driver software.

4. Language Processor-A computer system understands only machine language or binary language, also known as Low Level Language(LLL). This language is extremely difficult to learn for a general programmer and thus there is a need for some special language that is easy to learn and understand for the programmer in order to interact with the computer system. These special languages or set of commands are collectively known as programming languages or High Level languages (HLL).

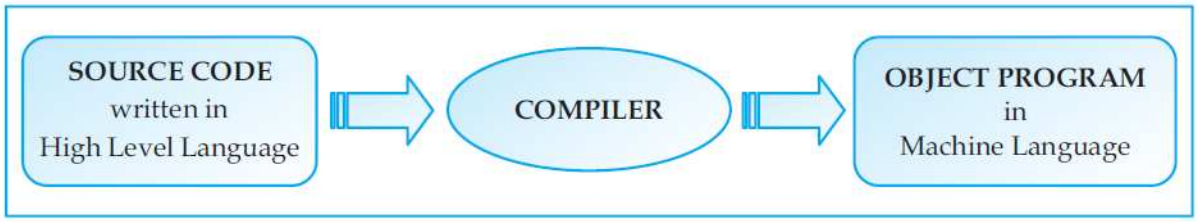
Some examples of High Level Programming

Languages are Basic, C, C++, JAVA, etc. These high level programming languages can easily be translated into machine language using Language Processors. These are:

Assembler - Assembler is a language processor, which translates a program written in assembly language into machine language.

Compiler - A compiler is a language processor which converts (or translates) the entire program written in high level language into machine language in one go.

Interpreter-This language processor converts a high level language program into machine language line by line as well as executes it.



Conversion of Source Code into Object Code

Application Software: Application software is a set of programs to carry out a specific task like word processor, spreadsheet, presentation tools, library management software, railway reservation, antivirus software, etc.

Application Software can be divided into different categories depending upon their uses as follows:

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

Utility Software

We also require some additional software to keep our computer system efficient and trouble free. Generally these software come bundled with the Operating System Software but we can also use utility software provided by other vendors. Few examples of utility software are as follows:

- **Compression utility software:** Using this software, you can reduce (compress) the storage size of any computer program/file while not in use.
- **Backup utility software:** Though computer is in general a dependable device but it is always advisable to take regular back up of important data and programs stored in the computer. In case of any damage to the system, the back-up files can be restored and the important data can be recovered from the back-up files. This utility software facilitates

you to take regular back-up of important files and folders stored in a drive into another storage device

- **Disk De-fragmentation Utility software:** When computer system finds a file too large to store in a single location, it splits the file and stores it in pieces(called fragments), which are logically linked. This simply means that different parts of the file are scattered across the hard drive in noncontiguous locations. 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 detection and protection software:** This utility software provides the user with a virus free work environment by restricting the entry of any unwanted program into the system.
- **Text Editor:** This utility software helps one to create, store or edit a basic text file examples of text editors are Notepad, Gedit and KWrite

General Purpose Application Software

Some of the application software are designed for general day to day applications and uses. Some of these popular general purpose application software are discussed below:

Word Processor: Word Processor is general purpose application software that facilitates the creation of text documents with extensive formatting.

Spreadsheet Tools: Spreadsheet Tool is general purpose application software that facilitates creation of tabular forms where some text and numerical values can be stored

. **Database Management System:** Database Management System is general-purpose application software that facilitates creation of computer programs that control the creation, maintenance, and the use of database for an organization and its end users.

Specific Purpose Application Software

Some application software are made for performing specific tasks generally used by the institutions, corporate, business houses, etc. e.g.

Inventory Management System & Purchasing System: Inventory Management System is generally used in departmental stores or in an institution to keep the record of the stock of all the physical resources.

Developer tools

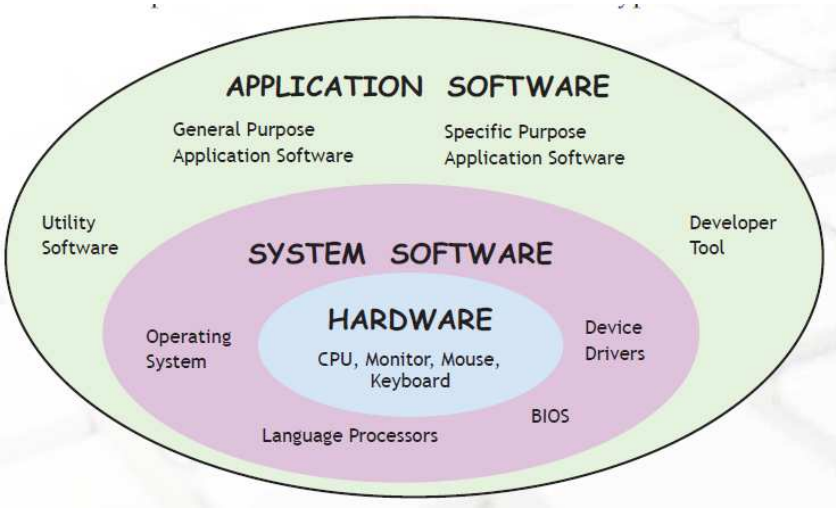
When a programmer starts the process of writing a program to develop software for any type of application, he/she requires a series of software developing tools like code editor, debugger and compiler.

Integrated Development Environment

An Integrated Development Environment (IDE) is an application program that consists of all required software developing tools required for developing software as part of a single interface. It typically consists of the following tools:

- Source Code Editor
- Graphical User Interface (GUI) builder
- Compiler / Interpreter
- Debugger
- Build Automation tool

Relationship between Hardware and different types of Software



UNIT – 2
Introduction to Programming

PROGRAMMING FUNDAMENTALS

Java programming language was originally developed by Sun Microsystems which was initiated by James Gosling and released in 1995 as core component of Sun Microsystems' Java platform (Java 1.0 [J2SE]).As of December 2008, the latest release of the Java Standard Edition is 6 (J2SE). With the advancement of Java and its widespread popularity, multiple configurations were built to suite various types of platforms. Ex: J2EE for Enterprise Applications, J2ME for Mobile Applications. Sun Microsystems has renamed the new J2 versions as Java SE, Java EE and Java ME respectively. Java is guaranteed to be **Write Once, Run Anywhere.**

Java is:

- **Object Oriented:** In Java, everything is an Object. Java can be easily extended since it is based on the Object model.
- **Platform independent:** Unlike many other programming languages including C and C++, when Java is compiled, it is not compiled into platform specific machine, rather into platform independent byte code. This byte code is distributed over the web and interpreted by virtual Machine (JVM) on whichever platform it is being run.
- **Simple:** Java is designed to be easy to learn. If you understand the basic concept of OOP Java would be easy to master.
- **Secure:** With Java's secure feature it enables to develop virus-free, tamper-free systems. Authentication techniques are based on public-key encryption.
- **Architectural-neutral :**Java compiler generates an architecture-neutral object file format which makes the compiled code to be executable on many processors, with the presence of Java runtime system.
- **Portable:** Being architectural-neutral and having no implementation dependent aspects of the specification makes Java portable. Compiler in Java is written in ANSI C with a clean portability boundary which is a POSIX subset.
- **Robust:** Java makes an effort to eliminate error prone situations by emphasizing mainly on compile time error checking and runtime checking.
- **Multithreaded:** With Java's multithreaded feature it is possible to write programs that can do many tasks simultaneously. This design feature allows developers to construct smoothly running interactive applications.
- **Interpreted:** Java byte code is translated on the fly to native machine instructions and is not stored anywhere. The development process is more rapid and analytical since the linking is an incremental and light weight process.
- **High Performance:** With the use of Just-In-Time compilers, Java enables high performance.
- **Distributed:** Java is designed for the distributed environment of the internet.
- **Dynamic:** Java is considered to be more dynamic than C or C++ since it is designed to adapt to an evolving environment. Java programs can carry extensive amount of run-time information that can be used to verify and resolve accesses to objects on run-time.

Programming Fundamentals:-

Token:- The smallest individual unit in a program is known as Token. Java has the following types of tokens:-Keyword ,Identifier, Literals, Punctuators and operators.

Keywords:-The following list shows the reserved words in Java. These reserved words may not be used as constant or variable or any other identifier names.

abstract	assert	boolean	break
byte	case	catch	char
class	const	continue	default
do	double	else	enum
extends	final	finally	float
for	goto	if	implements
import	instanceof	int	interface
long	native	new	package
private	protected	public	return
short	static	strictfp	super
switch	synchronized	this	throw
throws	transient	try	void
volatile	while		

Literals:- A literal is a source code representation of a fixed value. They are represented directly in the code without any computation.

Literals can be assigned to any primitive type variable. For example:

```
byte a = 68;
char a = 'A'
```

byte, int, long, and short can be expressed in decimal(base 10), hexadecimal(base 16) or octal(base 8) number systems as well.

Prefix 0 is used to indicate octal and prefix 0x indicates hexadecimal when using these number systems for literals. For example:

```
int decimal = 100;
int octal = 0144;
int hexa =  0x64;
```

String literals in Java are specified like they are in most other languages by enclosing a sequence of characters between a pair of double quotes. Examples of string literals are:

```
"Hello World"
"two\nlines"
"\"This is in quotes\""
```

String and char types of literals can contain any Unicode characters. For example:

```
char a = '\u0001';
String a = "\u0001";
```

Identifiers:-All Java components require names. Names used for classes, variables and methods are called identifiers.

In Java, there are several points to remember about identifiers. They are as follows:

- All identifiers should begin with a letter (A to Z or a to z), currency character ($) or an underscore (_).
- After the first character identifiers can have any combination of characters.
- A key word cannot be used as an identifier.
- Most importantly identifiers are case sensitive.
- Examples of legal identifiers: age, $salary, _value, __1_value
- Examples of illegal identifiers: 123abc, -salary

Java Operators

Java provides a rich set of operators to manipulate variables. We can divide all the Java operators into the following groups:

- Arithmetic Operators
- Relational Operators
- Bitwise Operators
- Logical Operators
- Assignment Operators
- Misc Operators

The Arithmetic Operators:

Arithmetic operators are used in mathematical expressions in the same way that they are used in algebra. The following table lists the arithmetic operators:

Assume integer variable A holds 10 and variable B holds 20, then:

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 - Increases the value of operand by 1	B++ gives 21
--	Decrement - Decreases the value of operand by 1	B-- gives 19

The Relational Operators:

There are following relational operators supported by Java language

Assume variable A holds 10 and variable B holds 20, then:

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

The Logical Operators:

The following table lists the logical operators:

Assume Boolean variables A holds true and variable B holds false, then:

Operator	Description	Example
&&	Called Logical AND operator. If both the operands are non-zero, then the condition becomes true.	(A && B) is false.
||	Called Logical OR Operator. If any of the two operands are non-zero, then the 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.

The Assignment Operators:

There are following assignment operators supported by Java language:

Operator	Description	Example
=	Simple assignment operator, Assigns values from right side operands to left side operand	C = A + B will assign value of A + B into C
+=	Add AND assignment operator, It adds right operand to the left operand and assign the result to left operand	C += A is equivalent to C = C + A
-=	Subtract AND assignment operator, It subtracts right operand from the left operand and assign the result to left operand	C -= A is equivalent to C = C – A
*=	Multiply AND assignment operator, It multiplies right operand with the left operand and assign the result to left operand	C *= A is equivalent to C = C * A

/=	Divide AND assignment operator, It divides left operand with the right operand and assign the result to left operand	C /= A is equivalent to C = C / A
%=	Modulus AND assignment operator, It takes modulus using two operands and assign the result to left operand	C %= A is equivalent to C = C % A
<<=	Left shift AND assignment operator	C <<= 2 is same as C = C << 2
>>=	Right shift AND assignment operator	C >>= 2 is same as C = C >> 2
&=	Bitwise AND assignment operator	C &= 2 is same as C = C & 2
^=	bitwise exclusive OR and assignment operator	C ^= 2 is same as C = C ^ 2
|=	bitwise inclusive OR and assignment operator	C |= 2 is same as C = C | 2

Misc Operators

There are few other operators supported by Java Language.

Conditional Operator (? :) :- Conditional operator is also known as the ternary operator. This operator consists of three operands and is used to evaluate Boolean expressions. The goal of the operator is to decide which value should be assigned to the variable. The operator is written as:

```
variable x = (expression) ? value if true : value if false
```

Following is the example:

```
int a , b;
a = 10;
b = (a == 1) ? 20: 30;
System.out.println( "Value of b is : " +  b );
b = (a == 10) ? 20: 30;
System.out.println( "Value of b is : " + b );
```

This would produce the following result:

```
Value of b is : 30
Value of b is : 20
```

Data Types:-

There are two data types available in Java:

- Primitive Data Types
- Reference/Object Data Types

Primitive Data Types:

There are eight primitive data types supported by Java. Primitive data types are predefined by the language and named by a keyword. Let us now look into detail about the eight primitive data types.

byte

- Byte data type is an 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

short

- Short data type is a 16-bit signed two's complement integer.
- 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: long 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 letterA ='A'

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, Employee, Puppy 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("giraffe");

TYPE CONVERSION

Java supports two types of castings – **primitive data type casting** and **reference type casting**. Reference type casting is nothing but assigning one Java object to another object. It comes with very strict rules and is explained clearly in Object Casting. Now let us go for data type casting. Java data type casting comes with 3 flavors.

1. **Implicit casting**
2. **Explicit casting**

1. Implicit casting (widening conversion)

A data type of lower size (occupying less memory) is assigned to a data type of higher size. This is done implicitly by the JVM. The lower size is widened to higher size. This is also named as **automatic type conversion**.

Examples:

```
int x = 10;                 // occupies 4 bytes
double y = x;               // occupies 8 bytes
System.out.println(y);      // prints 10.0
```

In the above code 4 bytes integer value is assigned to 8 bytes double value.

2. Explicit casting (narrowing conversion)

A data type of higher size (occupying more memory) cannot be assigned to a data type of lower size. This is not done implicitly by the JVM and requires **explicit casting**; a casting operation to be performed by the programmer. The higher size is narrowed to lower size.

```
double x = 10.5;          // 8 bytes
int y = x;                // 4 bytes ;  raises compilation error
```

In the above code, 8 bytes double value is narrowed to 4 bytes int value. It raises error. Let us explicitly type cast it.

```
double x = 10.5;
int y = (int) x;
```

Flow of Control

PROGRAMMING CONSTRUCT

1. **SEQUENCE**
2. **SELECTION**
3. **ITERATION**

Decision Making Statements (Selection Construct) :-

There are two types of decision making statements in Java. They are:

- if statements
- switch statements

The if Statement:

An if statement consists of a Boolean expression followed by one or more statements.

Syntax:

The syntax of an if statement is:

```
if(Boolean_expression)
{
  //Statements will execute if the Boolean expression is true
}
```

If the Boolean expression evaluates to true then the block of code inside the if statement will be executed. If not the first set of code after the end of the if statement (after the closing curly brace) will be executed.

Example:

```
    int x = 10;
    if( x < 20 ){
      System.out.print("This is if statement");
    }
  This would produce the following result:
This is if statement
```

The if...else Statement:

An if statement can be followed by an optional else statement, which executes when the Boolean expression is false.

Syntax:

The syntax of an if...else is:

```
if(Boolean_expression){
  //Executes when the Boolean expression is true
}else{
  //Executes when the Boolean expression is false
}
```

Example:

```
int x = 30;

if( x < 20 ){
   System.out.print("This is if statement");
}else{
   System.out.print("This is else statement");
}
```

This would produce the following result:

```
This is else statement
```

The if...else if...else Statement:

An if statement can be followed by an optional else if...else statement, which is very useful to test various conditions using single if...else if statement.

When using if , else if , else statements there are few points to keep in mind.

- An if can have zero or one else's and it must come after any else if's.
- An if can have zero to many else if's and they must come before the else.
- Once an else if succeeds, none of the remaining else if's or else's will be tested.

Syntax:

The syntax of an if...else is:

```
if(Boolean_expression 1){
  //Executes when the Boolean expression 1 is true
}else if(Boolean_expression 2){
  //Executes when the Boolean expression 2 is true
}else if(Boolean_expression 3){
  //Executes when the Boolean expression 3 is true
}else {
  //Executes when the none of the above condition is true.
}
```

Example:

```
int x = 30;

if( x == 10 ){
   System.out.print("Value of X is 10");
}else if( x == 20 ){
   System.out.print("Value of X is 20");
}else if( x == 30 ){
   System.out.print("Value of X is 30");
}else{
   System.out.print("This is else statement");
}

This would produce the following result:
```

```
Value of X is 30
```

Nested if...else Statement:

It is always legal to nest if-else statements which means you can use one if or else if statement inside another if or else if statement.

Syntax:- The syntax for a nested if...else is as follows:

```
if(Boolean_expression 1){
  //Executes when the Boolean expression 1 is true
  if(Boolean_expression 2){
    //Executes when the Boolean expression 2 is true
  }
}
```

You can nest else if...else in the similar way as we have nested if statement.

Example:

```
    int x = 30;
    int y = 10;

    if( x == 30 ){
      if( y == 10 ){
         System.out.print("X = 30 and Y = 10");
       }
```

This would produce the following result:

```
X = 30 and Y = 10
```

The switch Statement:

A switch statement allows a variable to be tested for equality against a list of values. Each value is called a case, and the variable being switched on is checked for each case.

Syntax:

The syntax of enhanced for loop is:

```
switch(expression){
   case value :
     //Statements
     break; //optional
   case value :
     //Statements
     break; //optional
   //You can have any number of case statements.
   default : //Optional
     //Statements
}
```

The following rules apply to a switch statement:

- The variable used in a switch statement can only be a byte, short, int, or char.
- You can have any number of case statements within a switch. Each case is followed by the value to be compared to and a colon.

- The value for a case must be the same data type as the variable in the switch and it must be a constant or a literal.
- When the variable being switched on is equal to a case, the statements following that case will execute until a break statement is reached.
- When a break statement is reached, the switch terminates, and the flow of control jumps to the next line following the switch statement.
- Not every case needs to contain a break. If no break appears, the flow of control will fall through to subsequent cases until a break is reached.
- A switch statement can have an optional default case, which must appear at the end of the switch. The default case can be used for performing a task when none of the cases is true. No break is needed in the default case.

Example:

```
    char grade = 'C';

    switch(grade)
    {
      case 'A' :
        System.out.println("Excellent!");
        break;
      case 'B' :
      case 'C' :
        System.out.println("Well done");
        break;
      case 'D' :
        System.out.println("You passed");
      case 'F' :
        System.out.println("Better try again");
        break;
      default :
        System.out.println("Invalid grade");
    }
    System.out.println("Your grade is " + grade);
  }
}
```

Compile and run above program using various command line arguments. This would produce the following result:

```
Well done
Your grade is a C
```

Iteration Construct :-

1. Java while Loop

The while loop or while statement continually executes a block of statements while a particular condition is true. The while syntax can be written as:

```
while (expression) {
    statement(s)
}
```
The while loop evaluates expression, which must return a boolean value. If the while loop expression returns true, then the statements with in the while block will be executed. The while loop continuously executes the statements within the block, until the expression returns false.
Here is a simple while loop example, which executes until i value became 10:

```
int i=0;
  while(i < 10){
     //this block will executed until
     //i value became 10
     System.out.print(i+" ");
     i=i+1;
   }
```

Output:
0 1 2 3 4 5 6 7 8 9

2. Java do-while Loop :-

A do-while loop is similar to a while loop, except that a do-while loop is guaranteed to execute at least one time. The difference between do-while and while loop is that do-while evaluates its condition at the bottom of the loop instead of the top. Therefore, the statements within the do block are always executed at least once.
Here is the syntax to write do-while loop:

```
do {
     statement(s)
} while (expression);
```

The do-while statement evaluates expression, which must return a boolean value. If the expression is true, the flow of control goes back to the do, and the statements within the loop executes again. This process repeats until the expression returns false.
Here is a simple do-while example:

```
int i = 0;
do {
        System.out.print(i+" ");
        i=i+1;
} while(i<10);
```

3. Java for Loop :-

The for statement or for loop provides a way to iterate over a range or list of values. Using for loop you can repeatedly loops until a particular condition is satisfied. The general form of the for statement can be expressed as follows:

```
for (initialization; condition for terminating; loop increment) {
    statement(s)
}
```

In the above statement, initialization expression initializes the loop; it is executed only once, as the loop begins.
When the termination condition returns false, then the loop terminates.

The increment expression is invoked after each iteration through the loop. Here you can either increment or decrement a value.
Here is a simple for loop example to display numbers from 1 to 10.

```
for(int i=1;i<=10;i++){
   System.out.print(i+" ");
}
System.out.println( );
/**
 * another example to increment by 2 steps
 */
for(int i=1;i<=10;i=i+2){
   System.out.print(i+" ");
}
System.out.println( );
/**
 * Below loop prints the numbers in reverse order
 */
for(int i=10;i>0;i--){
   System.out.print(i+" ");
}
System.out.println( );
```

Output:

```
1 2 3 4 5 6 7 8 9 10
1 3 5 7 9
10 9 8 7 6 5 4 3 2 1
```

Statement for Jump:--

1. break statement in java:-

The break statement is one of the control statement in java. The break statement is generally used to break the loop before the completion of the loop. The break statement is used when we want to jump out of a single loop or single case in switch statement.

Here is a simple example for break statement:

```
for(int i=0;i<10;i++){
    if(i==5){
        System.out.println("breaking the for loop...");
        break;
    }
    System.out.println(i);
 }
```

Output:

```
0
1
2
3
4
breaking the for loop...
```

2. continue statement in java:-

The continue statement skips the current iteration of a for, while , or do-while loop. The moment it encounters continue statement, it skips the rest of the statements in the loop and evaluates the expression for next iterations. The difference between break and continue statements are, break statement comes out of the loop, continue statement skips the current iteration and jumps to the next iteration in a single loop.

Here is a simple example for continue statement:

```
for(int i=1;i<=10;i++){
    /**
     * here this loop prints only odd numbers.
     * if below condition returns true, the current
     * iteration will be skipped.
     */
    if(i%2 == 0){
       continue;
    }
    System.out.println(i);
 }
```

Output:

```
1
3
5
7
9
```

Output Finding Questions:

Q.1. Write the output of the following code:

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

Ans. x=7,y=4

Q.2. Write the output of the following code

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

Ans. f= 24

Q.3. 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. j=10,k=10

Q.4. How many times ,the following loop gets executed?

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

Ans: zero times

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

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

Ans. one time

Q.6. What will be the contents of TextField after executing the following statement:

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

Ans. 20

Q.7.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 might work”);
else
jTextField1.setText(“code will not work       ”);
```

Ans. code might work

Q.8. How many times will the following loop get executed?

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

Q.9. What will be the content of the jTextArea1 after executing the following code?

```
 int num=1;
do
{
jTextArea1.setText(Integer.to String(++num)+”\n”);
num=num+1;
}while(num<=10);
```

Ans. 10

Q.10. Give the output for the following code fragment:

```
v=20;
do{
jOptionPane.showMessageDialog(numm,v+””);
}while(v<50);
jOptionPane.showMessageDialog(numm,v+””);
```

Ans. infinite loop

Q.11. Give the value after executing following java code.Also find how many times the following loop will execute?

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

Ans. x=11

Q.12.What will be the output produced by following code fragment?

```
float 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

Q.13. Predict the output of the following code fragment:

```
int i,n;
n=0;i=1;
do
{
 n++;i++;
}while(i<=5);
```

Ans. 6

Q.13. What will be the values of x and y after executing the following expressions.

```
int x=20,y=35;
x= y++ + x++;
y= ++y + ++x;
```

Ans x=56, y=93

Q.14. What will be the values of x and y after executing the following expressions.

```
int y=-1;
System.out.println("x:"+(-y--));
System.out.println("y:"+y);
```

Ans. x:= -1 ,y=-2

Q.15. What will be the values of x and y after executing the following expressions.

```
 int x = 45;
 x = x + x++;
System.out.println(x);
int y = 45;
 y = y++ + y;
System.out.println(y);
```

Ans .x=90 , y=91

Q.16. 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

Q.17. Predict an output of the following code fragment:

```
  int i=1,j=0,n=0;
while)i<4)
{
for(j=1;j<=I;j++)
{
n+=1;
i=i+1;
}
System.out.println(n);
}
```
Ans. 6

Q..18. Give the output of the following code:

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

Error Finding Questions:

Q.1. The following cade has some errors. Rewrite the corrected code:

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

Q.2. Identify the errors:

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

Ans: Two case constant doesn't have the same value
Q.3. int j=5;
i==j+5;
if(i=j)
jTextField1.setText("I and j are equal");
else
jTextField1.settext(" I and j are unequal");
Ans. int i,j=5;
i=j+5;
if(i==j)
jTextField.setText("I and j are equal");
else
jTextField1.settext(" I and j are unequal");
Q.4. Rewrite the code after making correction. Underline the correction.
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++;
Q.5. The following code has some error(s).Rewrite the correct code underlining all the corrections made.
Int y=3;
Switch(y)
{
case 1: System.out.println("yes its one");
case >2: System.out.println("yes it is more than two");
break;
case else: System.out.println("invalid number");
Ans. int y=3;
switch(y)
{
case 1 : System.out.println("yes its one");
break;
case 2: System.out.println("yes its more than two");
break;
default: System.out.println("invalid number");
}
Q.6. Rewrite the following java code after underlining the correction made:
int x==0;
int n=Integer.parseInt(jLabel1.getText( ));

Ans. int x=0;
int n=Integer.parseInt(jLabel1.getText( ));

Q.7. find out errors if any:
m=1;n=0;
For(;m+n<19;++n)
System.out.println("hello");
M=m+10;
Ans. m=1;n=0;
for(;m+n<19;++n)
System.out.println("hello");
m=m+10;
Q.8. The following code has some error(s).Rewrite the correct code underlining all the corrections made.
int y=6,p;
Do
{
y=3.14*y;
p=y%10;
If p=2
System.out.print("two");
While(y>1)
Ans.int y=6,p;
do
{
y=3.14*y;
p=y%10;
if(p==2)
System.out.print("two");
}while(y>1);

Rewrite Questions

Q.1. 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;
}

Q.2. 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.prinln( );
}
```

Q.3. Write an equivalent while loop for the following code:

```
int sz=25;
for(int i=0,sum=0;i<sz;i++)
sum+=I;
System.out.println(sum);
```

Ans.

```
int sz=25;
int i=0,sum=0;
while(i<sz)
{
sum+=i;
i++;
}
System.out.println(sum);
```

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

```
char ch=’A’;
if(ch==’A’)
System,out.println(“Account”);
if((ch==’C’)||(ch==’G’))
System.out.println(“Admin”);
if(ch==’F’)
System.out.println(“advisor”);
```

Ans.

```
char ch='A';
switch(ch)
{
case 'A':System.out.println("account");
break;
case 'C':
case 'G': System.out.println("admin");
break;
case 'F': System.out.println("advisor");
}
```

Q..5. 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!!!");
```

Q.6. Rewrite the following code using for loop.

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

Ans.

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

Q.7.Rewrite the code using switch statement:

```
if(k==1)
day=”Monday”;
else if(k==2)
day=”Tuesday”;
else if (k==3)
day=”Wednesday”;
else day=”-“;
}
```

Ans.

```
switch(k)
{
case 1:day=”Monday”;
break;
case  2”day=”Tuesday”;
break;
case 3 :day=”Wednesday”;
break;
default: day= “ “ ;
}
```

Questions

1. How do you write an infinite loop using the for statement?
2. How do you write an infinite loop using the while statement?

3. What will be the output of :.

```
if (aNumber >= 0)
if (aNumber == 0)
System.out.println("first string");
else System.out.println("second string");
System.out.println("third string");
```

If aNumber is (i) 0 (ii) 2

4.. What will be the output of the program?

```
int count = 1;
do
{
System.out.println("Count is: " + count);
count++;
} while (count < 11);
```

5. What will be the output of the program

```
int i=1,j=-1;
switch(i)
{
case 1,-1: j=1;
case 2 : j=2;
default :j=0;
}
```

6. . What will be the output of the program?

```
int i = 1, j = 10;
do
{
   if(i > j)
   {
      break;
   }
   j--;
} while (++i < 5);
System.out.println("i = " + i + " and j = " + j);
```

7. . What will be the output of the program?

```
final static short x = 2;

      for (int z=0; z < 3; z++)
      {
         switch (z)
         {
            case x: System.out.print("0 ");
            case x-1: System.out.print("1 ");
            case x-2: System.out.print("2 ");
         }       }
```

8. What will be the output of the program?

```
for (int i = 0; i < 4; i += 2)
{
   System.out.print(i + " ");
}
System.out.println(i);
```

9. What will be the output of the program?

```
int x = 3;
int y = 1;
if (x = y)
{
```

```
    System.out.println("x =" + x);
 }
```

10. What will be the output of the program?

```
  for(int i = 0; i < 3; i++)
        {
         switch(i)
                {
                 case 0: break;
                  case 1: System.out.print("one ");
                 case 2: System.out.print("two ");
                  case 3: System.out.print("three ");
                    }
                }
        System.out.println("done");
```

11. What will be the output of the program?

```
   int i = 1, j = 0;
switch(i)
{
   case 2: j += 6;
   case 4: j += 1;
   default: j += 2;
   case 0: j += 4;
}
System.out.println("j = " + j);
```

12. What will be the output of the program?

```
  int i = 1, j = 0;
  switch(i)
.    {
   case 2: j += 6;
   case 4: j += 1;
   default: j += 2;
   case 0: j += 4;
}
System.out.println("j = " + j); }
```

13. What will be the output of the program?

```
   long a=78345,s1=0,s2=0,r;
  while(a>0)
    {
    r=a%10;
    if(r%4==0)
  s1+=r;
  else s2+= r;
```

```
 a/=10;
 }
System.out.println("S1="+s1);
 System.out.println("S2="+s2);
```

14. What will be the output of the program?

```
 int nos=100;
 while(nos>=45)
 {
  if(nos%5==0)
 nos+=10;
  else
 nos+=20;
    }
```

15. What will be the output of the:

(ii) byte b;

```
double d=417.35;
b=(byte)d;
System.out.println(b);
```

(iii) int m=100;

```
int n=300;
while(++m< --n)
System.out.println(m+""+n);
```

(iv) int x=10,y=20;

```
if((x<=y)||(x==5)>10)
System.out.println(x);
else
System.out.println(y);
```

(v) int x=10;

```
float y=10.0;
System.out.println((x>y)?true:false);
```

JAVA GUI PROGRAMMING USING SWING COMPONENTS

- **JPanel** is Swing's version of the AWT class Panel and uses the same default layout, Flow Layout. JPanel is descended directly from JComponent.
- **JFrame** is Swing's version of Frame and is descended directly from that class. The components added to the frame are referred to as its contents; these are managed by the content Pane. To add a component to a JFrame, we must use its content Pane instead.
- **JInternalFrame** is confined to a visible area of a container it is placed in. It can be iconified , maximized and layered.
- **JWindow** is Swing's version of Window and is descended directly from that class. Like Window, it uses Border Layout by default.
- **JDialog** is Swing's version of Dialog and is descended directly from that class. Like Dialog, it uses Border Layout by default. Like JFrame and JWindow, JDialog contains a root Pane hierarchy including a content Pane, and it allows layered and glass panes. All dialogs are modal, which means the current thread is blocked until user interaction with it has been completed. JDialog class is intended as the basis for creating custom dialogs; however, some of the most common dialogs are provided through static methods in the class JOptionPane.
- **JLabel**, descended from JComponent, is used to create text labels.
- The abstract class Abstract Button extends class JComponent and provides a foundation for a family of button classes, including **JButton**.
- **JTextField** allows editing of a single line of text. New features include the ability to justify the text left, right, or center, and to set the text's font.
- **JPasswordField** (a direct subclass of JTextField) you can suppress the display of input. Each character entered can be replaced by an echo character. This allows confidential input for passwords, for example. By default, the echo character is the asterisk, *.
- **JTextArea** allows editing of multiple lines of text. JTextArea can be used in conjunction with class JScrollPane to achieve scrolling. The underlying **JScrollPane** can be forced to always or never have either the vertical or horizontal scrollbar; JButton is a component the user clicks to trigger a specific action.
- **JRadioButton** is similar to JCheckbox, except for the default icon for each class. A set of radio buttons can be associated as a group in which only one button at a time can be selected.
- **JCheckBox** is not a member of a checkbox group. A checkbox can be selected and deselected, and it also displays its current state.
- **JComboBox** is like a drop down box. You can click a drop-down arrow and select an option from a list. For example, when the component has focus, pressing a key that corresponds to the first character in some entry's name selects that entry. A vertical scrollbar is used for longer lists.
- **JList** provides a scrollable set of items from which one or more may be selected. JList can be populated from an Array or Vector. JList does not support scrolling directly, instead, the list must be associated with a scroll pane. The view port used by the scroll pane can also have a user-defined border. JList actions are handled using ListSelectionListener.

- Focus:- The control under execution is said to have the focus. The control having the focus obtains input from the user.
- getText( ):- getText( ) method is used to obtain the text from a jTextField during the run time.
- setText( ):- setText(0 method is used to set or change the text of a jTextField during run time.

SWING controls methods and properties

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

SWING CONTROLS	METHODS	PROPERTIES
jButton	getText( ) setText( )	• Background • Enabled • Font • Foreground • Text • Label
jLabel	getText( )	• Background • Enabled • Font • Foreground • Text
jTextField	getText( ) isEditable isEnabled setText( )	• Background • Enabled • Editable • Foreground • Text
jRadioButton	getText( ) setText( ) isSelected( ) setSelected( )	• Background • Enabled • Font • Foreground • Buttongroup • selected • Label
jCheckBox	getText( ) setText( ) isSelected( ) setSelected( )	• ButtonGroup • Font • Foreground • Label • Selected • Text
jComboBox	getSelectedItem( ) getSelectedIndex( ) setModel( )	• Background • Buttongroup • Editable • Enabled • Font

		• Foreground • Model • SelectedIndex • SelectedItem • SelectionMode • Text
jTable	addRow( ) getModel( )	• Model
jOptionPane	showMesageDialog( )	• getRowCount( ) • removeRow( ) • addRow( )

Some Important Questions with Answers

1. Which window is used to design the form

Ans. Design Window

2. Which window contains the Swing Controls components?

Ans. Palette window

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

Ans. TextArea

4. Name the different list types controls offered by Java Swing.

Ans. (i) jListBox (ii)jComboBox

5. Name any two commonly used method of ListBox.

Ans. (i)getSelectedIndex( ) (ii)getSelectedValue( )

6. 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 true.

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

Ans. ActionPerformed

8. What is the difference between a Container and Component control?

Ans. A container is a control that can hold other controls within it. E.g. Panel(there can be multiple controls inside Panel, Frame(where you can put so many controls on it.)

Component: Controls inside the container are known as container

9. Differentiate between
   (a) TextField and TextArea components
   (b) TextField and PasswordField
   (c) Combo box and list box

(a) Ans. The TextField allows the user to enter a single line of text only. But Text Area component allows to accepts multiline input from the user or display multiple lines of information.

(b) Textfield displays the obtained text in unencrypted form whereas password field displays the obtained text in encrypted form. This component allows confidential input like passwords

(c) List box :- In the list box,the users can only select from the list of choices, but in combobox a user can select from the list of choices as well as enter his/her choice(combobox=listbox+textfield)

10. Why are data types important?

Ans. Data Types define the way the values are stored, the range of the values and the operations that are associated with that type.

11. What is a variable?

Ans. Variable is named temporary storage locations.

12. 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 .

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

Ans. Assigning a value of one type to the variable of another type is known as type casting

```
int x=10;
byte y= (byte) x;
```

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

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

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

Ans. A character array.

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

Ans.. ListBox and ComboBox both

17. What command do you need to write in actionPerformed( ) event handler of a button I order to make it Exit button?

Ans. System.exit(0);

18. Which control displays text that the user cannot directly change or edit?

Ans. Label

19. Which control provides basic text editing facility?

Ans. TextField

20. Occurrence of an activity is called.

Ans. Event

21. Which property is used to set the text of the label?

Ans. Text

22. The object containing the data to be exhibited by the combo box by which property

Ans. Model

23. What is GUI programming?

Ans. We can create a GUI application on Java platform using Swing API ,which is part of java foundation classes (JFC).

24. What is an event? What is event handler, source, object?

Ans. An event is occurrence of some activities either initiated by user or by the system. In order to react, you need to implement some event handling system in your application.

Event source:-It is the GUI component that generates the event eg. Button

Event Handler or Event Listener:- It is implemented as in the form of code .It receives and handles events through listener interface.

Event object or message:- It is created when event occurs. It contains all the information about the event which includes source of event and type of even etc.

25. Which property would you set the setting the password character as $?

Ans. echoChar

26. Which method returns the password entered in a password field?

Ans. getPassword( )

27. Which method would you determine the index of selected item in a list?

Ans. getSelectedIndex(int Index)

28. Which method would you use to insert an item at specified index, in the list?

Ans. setSelectedIndex(4)

29. How you can determine whether 5^{th} item in a list is selected or not?

Ans. isSelectedIndex(4)

30. Which method you would use to insert "hello" at 10^{th} position in the TextArea control.

Ans. insert("hello",9) //index starts from zero

31. Which property would you like to set to make a combo box editable?

Ans. Editable

32. What do you understand by focus.

Ans. A Focus is the ability to receive user input/response through Mouse/Keyboard .When object or control has focus, it can receive input from user.

a) An object or control can receive focus only if its enabled and visible property are set to true.
b) Most of the controls provide FOCUS_GAINED( ) and FOCUS_LOST( ) method

33. What is meant by scope of a variable ?

Ans. In java ,a variable can be declared anywhere in the program but before using them.

1.The area of program within which a variable is accessible ,known as its scope.

2.A variable can be accessed within the block where it is declared

```
{
int x=10;
if(a>b)
{
int y=5;
//scope of x and y
}
else
{
int z=3;
//scope of z
}
……..
}
```

***DESIGN* PROBLEMS**

Q1.

Glamour Garments has developed a GUI application for their company as shown below :

The company accepts payments in 3 modes- cheque , cash and credit cards.The discount given as per mode of payment is as follows.

Mode of Payment	Discount
Cash	8%
Cheque	7%
Credit Card	Nil

If the Bill Amount is more than 15000 then the customer gets an additional discount of 10% on Bill Amount.

(1) Make Discount and Net amount uneditable.

(2) Write codes for calculate Discount and calculate Net Amount Buttons

(3) Write code to exit program when STOP button is clicked.

Solution:

(1)

```
txtDiscount.setEditable(false);
txtNetAmt.setEditable(false);
```

(2)

```
//Code for calculate button

 String name= txtname.getText( );

double bm=Double.parseDouble(txtbillamt.getText( ));
double disc=0.0, netAmt=0.0;

String s= cmbMode.getSelectedItem( );
if(s.equals("Cash"))
{
        disc= 0.08*bm;
}
else if(s.equals("Cheque"))
{
        disc=0.07*bm;
}
```

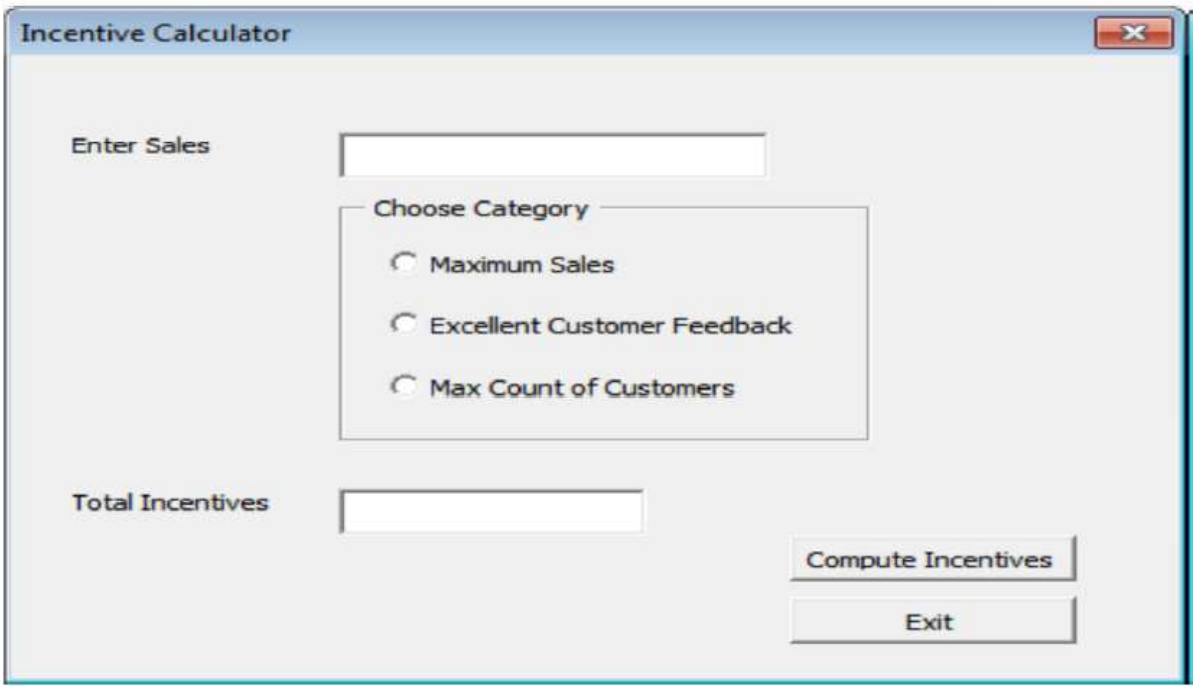
```
else if(s.equals(“Cash”))
{
        disc=0;
}
netAmt=bm-disc; txtDiscount.setText(“ “+disc); txtNetAmt.setText(“ “+netAmt);
(3)
//code for stop button

System.exit(0);
```

2. Create a Java Desktop Application to find the incentive (%) of Sales for a Sales Person on the basis of following feedbacks:

Feedback	Incentive (%)
Maximum Sales	10
Excellent Customer Feedback	8
Maximum Count Customer	5

Note: that the sales entry should not be space. Calculate the total incentive as :
Sales amount* Incentive.
The feedback will be implemented in JCheckBox controls. Using a JButton’s (Compute Incentive)
click event handler, display the total incentives in a JTextField control. Assume the nomenclature of the swing components of your own.
Note that the JFrame from IDE window will be shown as given:



Ans:- private void btnIncActionPerformed (java.awt.ActionEvent evt)

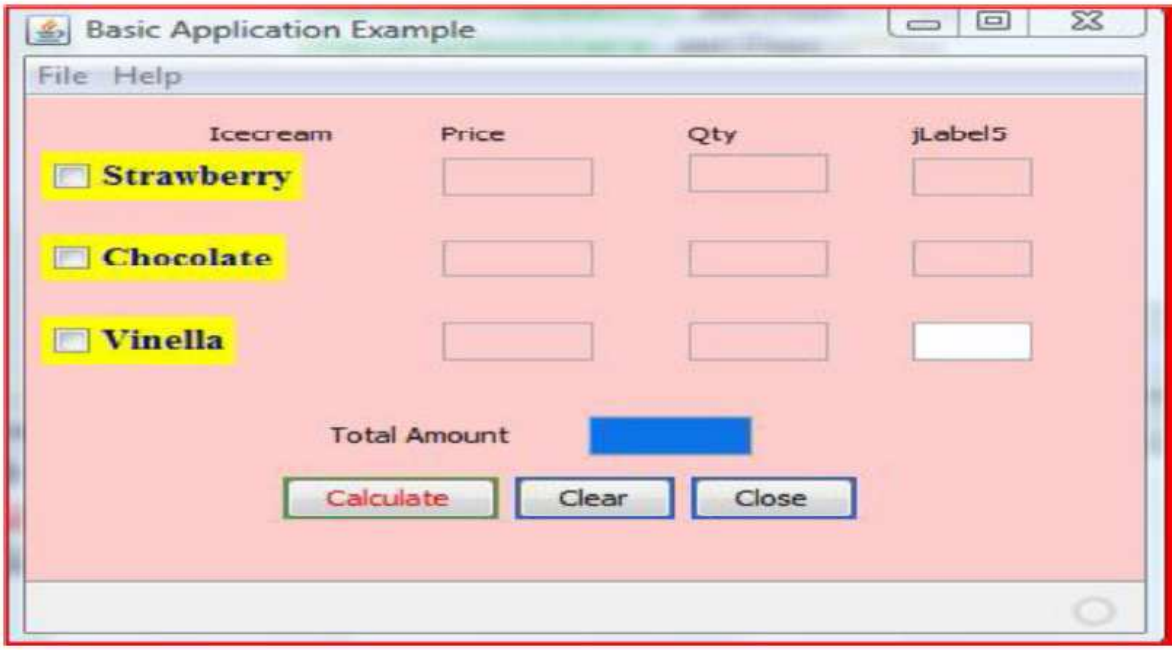
```
{
        int sales = 0;
        if (! txtSales.getText( ).trim( ).equals( “”))
        {
                sales-Integer.parseInt(txtSales.getText( ).trim ( ));
        }
        double incentive = 0.0;
        if (jCheckBox1.isSelected ( ))
        {
                incentive = incentive + 0.1;
        }
        if (jCheckBox2.isSelected ( ))
        {
                incentive = incentive + 0.8;
        }
        if (jCheckBox3.isSelected ( ))
        {
                incentive = incentive + 0.05;
        }
        txtInc.setText ( “ “ + Math.round(sales * incentive));

}
```

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

Write Java code for the following:

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



Ans: (a)

```
private void jBtncalculateActionPerformed(java.awt.event.ActionEvent evt)
{
        if(jchkStrawberry.isSelected( )==true)
                jTxtPriceStrawberry.setText("35");
        else
        {
                jTxtPriceStrawberry.setText("0");
                jTxtQtyStrawberry.setText("0");
        }
        if(jChkChocolate.isSelected( )==true)
                jTxtPriceChocolate.setText("50");
        else
        {
                jTxtPriceChocolate.setText("0");
                jTxtQtyChocolate.setText("0");
        }
        if(jChkVinella.isSelected( )==true)
                jtxtPriceVinella.setText("30");
        else
        {
                jtxtPriceVinella.setText("0");
                jTxtQtyVinella.setText("0");
        }
```

```
        int r1,r2,r3,q1,q2,q3,a1,a2,a3,gt;
        r1=Integer.parseInt(jTxtPriceStrawberry.getText( ));
        r2=Integer.parseInt(jTxtPriceChocolate.getText( ));
        r3=Integer.parseInt(jtxtPriceVinella.getText( ));
        q1=Integer.parseInt(jTxtQtyStrawberry.getText( ));
        q2=Integer.parseInt(jTxtQtyChocolate.getText( ));
        q3=Integer.parseInt(jTxtQtyVinella.getText( ));
        a1=r1*q1;
        jTxtAmtStrawberry.setText(""+a1);
        a2=r2*q2;
        jTxtAmtChocolate.setText(""+a2);
        a3=r3*q3;
        jTxtAmtVinella.setText(""+a3);
        gt=a1+a2+a3;
        jTxtTotalAmt.setText(""+gt);
}
```

Ans.(b)

```
private void jBtnClearActionPerformed(java.awt.event.ActionEvent evt)
{
        jTxtPriceStrawberry.setText("");
        jTxtPriceChocolate.setText("");
        jtxtPriceVinella.setText("");
        jTxtQtyStrawberry.setText("");
        jTxtQtyChocolate.setText("");
        jTxtQtyVinella.setText("");
        jTxtAmtStrawberry.setText("");
        jTxtAmtChocolate.setText("");
        jTxtAmtVinella.setText("");
        jchkStrawberry.setSelected(false);
        jChkChocolate.setSelected(false);
        jChkVinella.setSelected(false);
}
```

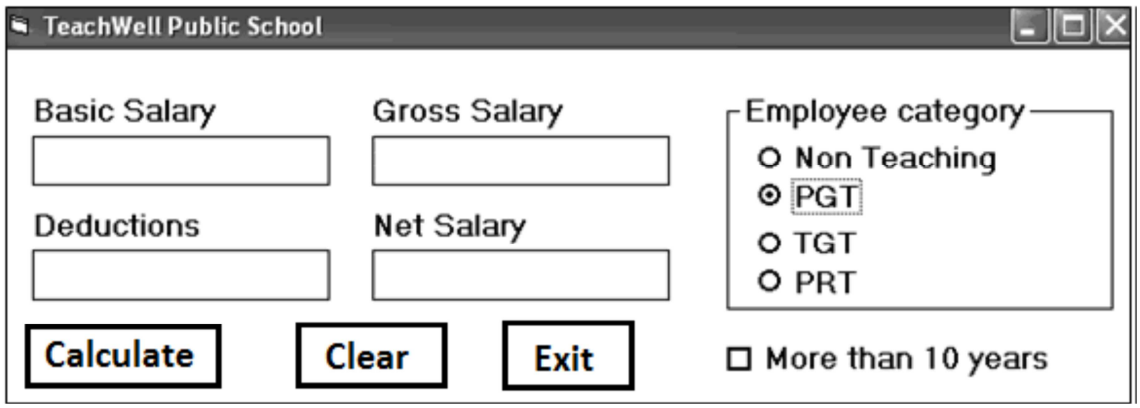
Ans: (c)

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

}
```

4. Read the following case study and answer the questions that follow.

- TeachWell Public School wants to computerize the employee salary section.
- The School is having two categories of employees : Teaching and Non Teaching. The Teaching employees are further categorized into PGTs, TGTs and PRTs having different Basic salary.
- The School gives addition pay of 3000 for employees who are working for more than 10 years.



Employee Type	Basic Salary	DA (% of Basic Sal)	HRA (% of Basic Sal)	Deductions (% of Basic sal)
Non-Teaching	25001	31	30	12
PGT	14500	30	30	12
TGT	12500	21	30	12
PRT	11500	20	25	12

(a) Write the code to calculate the Basic salary, deductions, gross salary and net salary based on the given specification. Add 3000 to net salary if employee is working for more than 10 years.

Gross salary=Basic salary + DA + HRA

Net salary = Gross salary – deductions

(b)Write the code to exit the application.

(c)Write the code to disable textfields for gross salary, deductions and netsalary.

Ans: (a)

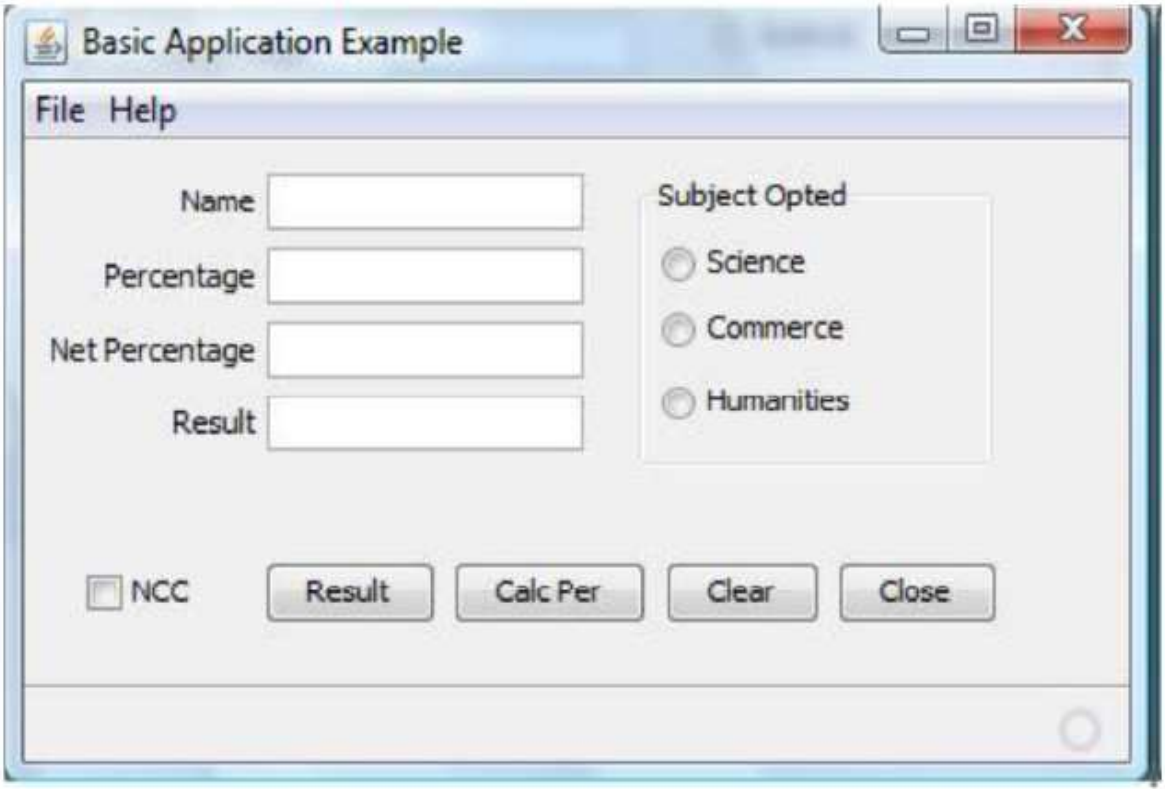
```
double bs=0,da=0,net=0,ded=0,gross=0,hra=0;
if (rdnon.isSelected( )==true)
{
        bs=12500;
        da=(31*bs)/100;
        hra=(30*bs)/100;
```

```
        ded=(12*bs)/100;
}
else if (rdpgt.isSelected( )==true)
{
        bs=14500;
        da=(30*bs)/100;
        hra=(30*bs)/100;
        ded=(12*bs)/100;
}
else if (rdtgt.isSelected( )==true)
{
        bs=12500;
        da=(21*bs)/100;
        hra=(30*bs)/100;
        ded=(12*bs)/100;
}
else if (rdprt.isSelected( )==true)
{
        bs=11500;
        da=(20*bs)/100;
        hra=(25*bs)/100;
        ded=(12*bs)/100;
}
gross=bs+da+hra;
net = gross – ded;
if(chk10.isSelected( )==true)
{
        net=net+3000;
}
tfded.setText(“ ”+ded);
tfgross.setText(“ ”+gross);
tfnet.setText(“ ”+net);
tfbs.setText(“ ”+bs);

Ans:(b)
        System.exit(0);
Ans:(c)
        tfgross.setEditable(false);
        tfded.setEditable(false);
        tfnet.setEditable(false);
```

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

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



Ans:

a.

```
private void jBtnCalcPerActionPerformed(java.awt.event.ActionEvent evt)
{
        int p;
        p=Integer.parseInt(jTextField2.getText( ));
```

```
if (jCheckBox1.isSelected( ))
        p=p+5;
        jTextField3.setText(Integer.toString(p));
}
```

b.

```
private void jBtnResultActionPerformed(java.awt.event.ActionEvent evt)
{
        int p;
        p=Integer.parseInt(jTextField3.getText( ));
        if( jRadioButton1.isSelected( ))
        {
                if ( p>=70)
                        jTextField4.setText("Eligible for all subject");
                else
                        jTextfield4.setText("Not Eligible for science");
        }
        else if( jRadioButton2.isSelected( ))
        {
                if ( p>=60 )
                        jTextField4.setText("Eligible for Commerce and Humanities");
                else
                        jTextfield4.setText("Not Eligible for Science and Commerce");
        }
        else
        {
                if ( p>=40 )
                        jTextField4.setText("Eligible for Humanities");
                else
                        jTextfield4.setText("Not Eligible for any subject ");
        }
}
```

c.

```
private void jBtnClearActionPerformed(java.awt.event.ActionEvent evt)
{
        jTextField1.setText(" ") OR jTextField1.setText(null)
        jTextField1.setText(" ") OR jTextField1.setText(null)
        jTextField1.setText(" ") OR jTextField1.setText(null)
        jTextField1.setText(" ") OR jTextField1.setText(null)
```

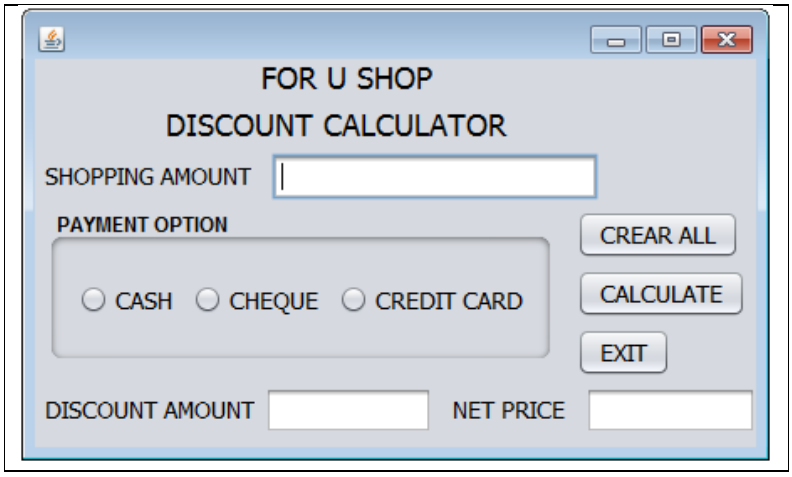
```
        jCheckbox1.setSelected(false);
}
```

d.

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

Unsolved Questions:

1. Describe the relationship between properties, methods and events.
2. What is container tag?
3. What does a getPassword( ) method of a password field returns?
4. What will be the contents of jTextArea1 after executing the following statement: 1
5. jTextArea1.setText("Object\nOriented\tProgramming");
6. What is difference between jRadioButton and jCheckBox?
7. What is Layout Manager? Discuss briefly about layout managers offered by NetBeans?
8. Name three commonly used properties and methods of the following controls.
9. (a) text field (b) text area (c) label (d) Check Box (e) button.
10. What is dispose( ) used for ?
11. What is the difference between-
    (a) Text field & Text area
    (b) List & Combo
    (c) Radio Button & Check Box
12. What is the significance of following properties of a text area?
    (a) lineWrap (b) wrapStyleword
13. What is the significance of a button group ? How do you create a button group?
14. Discuss about some commonly used properties of lists and a combo boxes.
15. What methods obtain the current selection of a combo box? Give a code example.
16. The FOR U SHOP has computerized its billing. A new bill is generated for each customer. The shop allows three different payment modes. The discount is given based on the payment mode.



Credit Card Type	Shopping Amount	Discount
Cash	< 10000 20 %	20 %
	>= 10000 25 %	25%
Cheque	< 15000	10 %
	>= 15000	15 %
Credit Card	< 10000	10 %
	>= 10000	12%

a) Write the code for the CmdClear Button to clear all the Text Fields.

b) Write the code for the CmdCalc Button to display the Discount Amount and Net Price in the TxtDisc and the TxtNet Text Fields respectively.

PROGRAMMING GUIDELINES :

Stylistic Guidelines:

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

Characteristics for a good program:

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

Stages of Program Development Process :

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

Stages are as follows

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

Types of Errors :

- **Compile Time error**-occurs during compile time .When a program compiles its source code is checked for rules of programming language.

Types of compile time error

(i) **Syntax error**: it occurs when a grammatical rule of java is violated. Formal set of rules defined for writing any statement in a language is known as syntax. Syntax errors occur when syntax rules of any programming language are violated. These errors occur during compilation of the application but Some of the common examples of syntax errors are missing semicolon, missing parenthesis and using incompatible data types

(ii) **Semantic error:** it occurs when statement are not meaningful

- **Run time error:** it occurs during the execution of the program. If an application is syntactically correct then it is compiled and translated into machine language and is ready to be executed. Run time errors occur during the execution of an application. These errors will result in abnormal termination of the application. Some common examples of runtime errors are Division by zero, trying to convert to number (int or double) from an empty

- **Logical error:** it occurs due to wrong logic of a program.

PROBLEM SOLVING METHODOLOGY AND TECHNIQUES

Steps to create a working program are:-

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

   Virtually all applications have defects in them called 'bugs' and these need to be eliminated. Bugs can arise from errors in the logic of the program specification or errors in the programming code created by a programmer. Testing means the process of executing the application with possible set of input data in order to find probable errors. **Debugging** means correction of those errors in the application. In the testing and debugging stage, we should try out all possible inputs in order to make our application error free.

6. Complete your documentation :- Documentation means the instructions and information about the usage of the application. Providing the documentation makes it easier for the end user to understand the functionality of the application.

For example, giving appropriate comments in all our applications is part of documentation as it clearly tells the user and the programmer about what a particular part of the code is doing

7. Maintain your program:- The maintenance involves the rectification of previously undetected errors and changes that are to be made for the enhancement of the functionality of the application. An updated version of the software with the reported bugs corrected and enhancements is then sent as a replacement to the end user.

<u>Questions and Answer on Programming Guidelines</u>

Q.1. Excessive use of comments increases the execution time 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 and they are non executable statement.(ignored by the compiler).

Q.2. differentiate between compile time and run time errors.

Ans. Compile time errors occur due to 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 the get error message corresponding to that which give an idea to correct it. Run time errors causes abnormal termination of program.

e.g. Compile time error A==B+C

Run time error divide by zero error

Q .3. Which error is harder to locate and why ?

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

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

Q.4. Explain the following terms:

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

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

c) Portability – portability means an application should run on different platform without doing any changes

d) Pretty printing :Pretty printing 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 easies to view, read and understand. Pretty printers for programming language source code are sometimes called code beautifiers or syntax highlighters .net beans supports pretty printing and the shortcut key to format any source code in net beans is Alt+Shift+F.

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

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

```
int a,b,c;
a = Integer.parseint(t1.getText( ));
 b = Integer.parseint(t2.getText( ));
c = a / b ;
```

Ans : The error is logical error .

```
    int a,b,c ;
    a = Integer.parseInt(t1.getText( ));
    b = Integer.parseInt(t2.getText( ));
     if (b!=0)
     c = a / b ;
   else{
   jOptionPane . showMessageDialog (null,"Denominator cann't be zero");
 t2.set Text(" ");
 t2.requestFocus( );
 }
```

Q .6. 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 .
- The 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 indention.
- 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 show that it can run no different platforms without doing any changes.

Q .7. What is the use of comments and indentation ?

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

Example –

```
/*This method calculates sum of two numbers .*/
int sum(int x , int y )// x , y are formal parameters
{ return ( x+y ) ; }
```

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

(i) The opning braces should properly match with a closing braces .

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

UNIT - 3
Relational Database Management System

KEY POINTS OF THE CHAPTER

- ★ **Database Management System(DBMS)** It is a computer based record keeping system that stores the data centrally and manages data efficiently.
- ★ **Relational Data Model** In this model the data is organized into tables called relations .The relationship is established between 2 tables on the basis of common column.
- ★ **Network Data Model** In this model the data is represented by collections of records and relationships among data are represented by links .
- ★ **Hierarchical Data Model** In this model records are organized in the form of parent-child trees.
- ★ **Object Oriented Data Model** in this model objects represent the data and associated operations where an object is identifiable entity with some characteristics and behavior.
- ★ **Normalization** Is a process of attaining good database design by removing/reducing data anomalies.
- ★ **DDL**: Data Definition Language
  - o Part of the SQL that facilitates defining creation/modification etc. of database object such as tables, indexes, sequences etc.
- ★ **DML**: Data Manipulation Language**.**
  - o Part of the SQL that facilitates manipulation (additions/deletions/modification) of data which residing in the database tables.
- ★ **Meta Data**
  - o Facts/data about the data stored in table.
- ★ **Data Dictionary**
  - o A file containing facts/data about the data stored in table
- ★ **Relational Data Model**
  - o In this model data is organized into tables i.e. rows and columns. These tables are called relations.
- ★ **The Network Data Model**
  - o In this model data are represented by collection of records & relationships among data. The collections of records are connected to one another by means of links.
- ★ **The Hierarchical Data Model**
  - o In this model records are organized as trees rather than arbitrary graphs.
- ★ **Object Oriented Data Model**
  - o Data and associated operations are represented by objects. An object is an identifiable entity with some characteristics and behavior.
- ★ **Relation:**
  - o Table in Database
- ★ **Domain**:
  - o Pool of values from which the actual values appearing

- ★ **Tuple:**
  - o Any single row of a relation
- ★ **Attribute:**
  - o Any column of relation
- ★ **Degree:**
  - o Number of attributes(fields) in a relation
- ★ **Cardinality:**
  - o Number of tuples(rows) in a relation
- ★ **View:**
  - o Virtual table that does not really exist in its own right but can be used to vies
- ★ **Primary Key:**
  - o Set of one or more attributes that can uniquely identify tuples with in the relation.
- ★ **Candidate Key:**
  - o A Candidate Key is the one that is capable of becoming Primary key i.e., a field or attribute that has unique value for each row in the relation.
- ★ **Alternate Key:**
  - o A candidate key that is not primary key is called alternate key.
- ★ **Foreign Key:**
  - o A non-key attribute, whose values are derived from the primary key of some other table.
- ★ **Integrity Constraints**
  - o Integrity Constraints are the rules that a database must comply all the times. It determines what all changes are permissible to a database.

DATA TYPES IN MySQL

Class	***Data Type***	***Description***	***Format***	***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.	CHAR(size)	'COMPUTER' 'CBSE'
	VARCHAR(size)	A variable-length string between 1 and 255 characters in length; for example VARCHAR(20).	VARCHAR (size)	'SCIENCE' 'Informatics'

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.	Number(p,s)	58.63
	INT	It is used for storing integer values	INT	164
Date	DATE	It represents the date including day, month and year between 1000-01-01 and 9999-12-31	**YYYY-MM-DD**	2014-08-27

Difference between CHAR and VARCHAR

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.

SQL Constraints/ Integrity Constraints

1-SQL Constraint is a condition or check applicable on a field or set of fields.

2- They can also be defined or modified after creating the tables.

3- When constraints are defined any data entering in the table is first checked to satisfy the condition specified in particular constraint if it is, only then table data set can be updated. If data updation/ insertion is violating the defined constraints, database rejects the data (entire record is rejected).

4- When a constraint is applied to a single column, it is called a column level constraint but if a constraint is applied on a combination of columns it is called a table constraint. Following constraints can be defined on a table in SQL:

Constraints name	**Description**
PRIMARY KEY	Used to create a primary key
UNIQUE	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.

- **Accessing Database in MySql :**
  Through USE keyword we can start any database Syntax:
  USE <database Name>;
  Example: USE ADDRESS;

- **CREATING TABLE IN MYSQL**
  Through Create table command we can define any table.
  CREATE TABLE <tablename>
  (<columnname><datatype>[(<Size>)], ...);
  CREATE TABLE ADDRESS(SNo integer, City char(25));

- **INSERTING DATA INTO TABLE**
  The rows are added to relations using INSERT command.
  INSERT INTO <tablename>[<columnname>]
  VALUES (<value>, <value>...);
  INSERT INTO ADDRESS (SNo, City)
  VALUES (100,'JAIPUR');

- **SELECT COMMAND:**
  The SELECT command is used to make queries on the database. A query is a command that is given to produce certain specified information from the database table(s). The SELECT command can be used to retrieve a subset of rows or columns from one or more tables. The syntax of Select Command is:
  SELECT <Column-list>
  FROM <table_name>
  [Where <condition>]
  [GROUP BY <column_list>]
  [Having <condition>]
  [ORDER BY <column_list [ASC|DESC]>]
  Example:
  SELECT * FROM ADDRESS WHERE SNo=100;

- **Eliminating Redundant Data**
- DISTINCT keyword eliminates redundant data
  SELECT DISTINCT City FROM ADDRESS;

- **Selecting from all the rows**
  SELECT * FROM ADDRESS;

- **Viewing structure of table:**
  DESCRIBE/DESC <tablename>;
  DESCRIBE ADDRESS;

- **Using column aliases:**
  SELECT <column name> AS [columnalias][,...]

FROM <tablename>;
SELECT SNo, City AS “STUDENTCITY”
FROM ADDRESS;

- **Condition based on a range:**
  Keyword BETWEEN used for making range checks in queries.
  SELECT SNo, CITY FROM ADDRESS WHERE SNo BETWEEN 10 AND 20;

- **Condition based on a list:**
  Keyword IN used for selecting values from a list of values.
  SELECT rno, sname FROM student WHERE rno IN (10, 20, 60);

- **Condition based on a pattern matches:**
  Keyword LIKE used for making character comparison using strings percent(%)
  matches any substring underscore(_) matches any character
  SELECT SNo, City FROM ADDRESS WHERE City LIKE ‘%ri’;

- **Searching for NULL**

The NULL value in a column is searched for in a table using IS NULL in the WHERE clause (Relational Operators like =,<> etc cannot be used with NULL).
For example, to list details of all employees whose departments contain NULL (i.e., novalue), you use the command:

```
SELECT empno, ename
FROM emp
Where Deptno IS NULL;
```

- **ORDER BY clause:**
  It is used to sort the results of a query.
  SELECT <column name> [, <column name>, .]
  FROM <table name>
  [WHERE <condition>] [ORDER BY <column name>];
  SELECT * FROM ADDRESS WHERE SNo>50 ORDER BY City;

- **<u>Creating tables with SQL Constraint :</u>**
  CREATE TABLE command is used to CREATE tables , the syntax is:
  CREATE TABLE <Table_name>
  (column_name 1 data_type1 [(size) column_constraints],
  column_name 1 data_type1 [(size) column_constraints],
  :
  :
  [<table_constraint> (column_names)]);

- **SQL Constraint:**
  A Constraint is a condition or check applicable on a field or set of fields.

■ NOT NULL/UNIQUE/DEFAULT/CHECK/PRIMARY KEY/FOREIGN KEY Constraint:

CREATE TABLE student (rollno integer NOT NULL);

CREATE TABLE student (rollno integer UNIQUE);

CREATE TABLE student (rollno integer NOT NULL, Sclass integer, Sname varchar(30), Sclass DEFAULT 12);

CREATE TABLE student (rollno integer CHECK (rollno>0), Sclass integer, Sname varchar(30));

CREATE TABLE student (rollno integer NOT NULL PRIMARY KEY, Sclass integer, Sname varchar(30));

CREATE TABLE teacher (Tid integer NOT NULL, FOREIGN KEY (Studentid) REFRENCES student (Sid));

■ **Modifying data in tables:**

Existing data in tables can be changed with UPDATE command.

The Update command is use to change the value in a table. The syntax of this command is:

UPDATE <table_name>
SET column_name1=new_value1 [,column_name2=new_value2,……]
WHERE <condition>;

UPDATE student SET Sclass=12 WHERE Sname='Rohan';

■ **Deleting data from tables:**

The DELETE command removes rows from a table. This removes the entire rows, not individual field values. The syntax of this command is

DELETE FROM <table_name>
[WHERE <condition>];

e.g., to delete the tuples from EMP that have salary less than 2000, the following command is used:

DELETE FROM emp WHERE sal<2000;

To delete all tuples from emp table:

DELETE FROM emp;

MySQL functions:

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

Single-row functions return a single result row for every row of a queried table. They are categorized into: Numeric functions, String functions, and Date and Time functions.

1) 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

- **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

2) <u>Character/String Functions</u>

- **LENGTH( )** : Returns the length of a string in bytes/no.of characters in string.

Example: LENGTH('INFORMATICS'); Result:11

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

Example : CHAR(65) ; Result : A

- **CONCAT( ):** Returns concatenated string i.e. it adds strings.

Example : CONCAT('Informatics',' ','Practices'); Result : Informatics Practices

- **INSTR( ):** Returns the index of the first occurrence of substring.

Example : INSTR('Informatics',' mat');
Result : 6(since '*m*' of '*mat*' is at 6th place)

- **LOWER( )/ LCASE( ):** Returns the argument after converting it in lowercase.

Example: LOWER('INFORMATICS'); Result : informatics

- **UPPER( )/ UCASE( )**: Returns the argument after converting it in uppercase.

Example: UCASE('informatics'); Result :INFORMATICS

- **LEFT( )** : Returns the given number of characters by extracting them from the left side of the given string.

Example : LEFT('INFORMATICS PRACTICES', 3); Result : INF

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

Example: MID('INFORMATICS PRACTICES',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'

3) Date/Time Functions

- **CURDATE( )** : Returns the current date
  Example: CURDATE( ); Result:'2014-07-21'

- **NOW( ):** Returns the current date and time
  Example: NOW( ); Result: '2014-07-21 13:58:11'

- **SYSDATE( )** : Return the time at which the function executes
  Example: SYSDATE( ); Result:'2014-07-21 13:59:23'

- **DATE( ):**Extracts the date part of a date or date time 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

- **Aggregate or Group functions:** MySQL provides Aggregate or Group functions which work on a number of values of a column/expression and return a single value as the result.

Some of the most frequently used Aggregate functions in MySQL are:

S.No	Name of the Function	Purpose
1	MAX()	Returns the MAXIMUM of the values under the specified column/expression.
2	MIN()	Returns the MINIMUM of the values under the specified column/expression.
3	AVG()	Returns the AVERAGE of the values under the specified column/expression.

4	SUM()	Returns the SUM of the values under the specified column/expression.
5	COUNT()	Returns the COUNT of the number of values under the specified column/expression.

- The **GROUP BY** clause groups the rows in the result by columns that have the same values. Grouping can be done by column name, or with aggregate functions in which case the aggregate produces a value for each group.
- The HAVING clause place conditions on groups in contrast to WHERE clause that place conditions on individual rows. While WHERE condition cannot include aggregate functions, HAVING conditions can do so.
- **ALTER TABLE COMMAND**:-

The ALTER Table command is used to change the definition (structure) of existing table. Usually , it can:

(i) Add columns to a table

(ii) Delete columns

(iii) Modify a column

The syntax of this command is:

For Add or modify column:

ALTER TABLE <Table_name> ADD/MODIFY <Column_defnition>;

For Delete column

ALTER TABLE <Table_name> DROP COLUMN <Column_name>;

Example :

- To add a new column address in EMP table command will be :
  ALTER TABLE EMP ADD (address char (30));
- To modify the size of sal column in EMP table, command will be:
  ALTER TABLE EMP MODIFY (sal number(9,2));
- To delete column Address from Table EMP the command will be:
  ALTER TABLE EMP DROP COLUMN address;

Solved Questions :

Q1. Consider the following tables ACTIVITY and COACH. Write SQL commands for the statements (i) to (iii) and give outputs for SQL queries (iv) to (vi).

Table: ACTIVITY

ACode	ActivityName	ParticipantsNum	PrizeMoney	ScheduleDate
1001	Relay 100x4	16	10000	23-Jan-2004
1002	High jump	10	12000	12-Dec-2003
1003	Shot Put	12	8000	14-Feb-2004
1005	Long Jump	12	9000	01-Jan-2004
1008	Discuss Throw	10	15000	19-Mar-2004

(i) To display the name of all activities with their Acodes in descending order.
(ii) To display sum of PrizeMoney for each of the Number of participants groupings (as shown in column ParticipantsNum 10,12,16).
(iii) To display the content of the GAMES table whose ScheduleDate earlier than 01/01/2004 in ascending order of ParticipantNum.
(iv) SELECT COUNT(DISTINCT ParticipantsNum) FROM ACTIVITY;
(v)SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM ACTIVITY;
(vi) SELECT SUM(PrizeMoney) FROM ACTIVITY;

Ans :

(i) SELECT ActivityName, ACode FROM ACTIVITY ORDER BY Acode DESC;
(ii) SELECT SUM(PrizeMoney),ParticipantsNum FROM ACTIVITY GROUP BY ParticipantsNum;
(iii) SELECT * FROM ACTIVITY WHERE ScheduleDate<'01-Jan-2004' ORDER BY ParticipantsNum;
(iv) 3
(v) 19-Mar-2004 12-Dec-2003
(vi) 54000

Q2. Consider the following tables GAMES and PLAYER. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (vii).

Table: GAMES

GCode	GameName	Number	PrizeMoney	ScheduleDate
101	Carom Board	2	5000	23-Jan-2004
102	Badminton	2	12000	12-Dec-2003
103	Table Tennis	4	8000	14-Feb-2004
105	Chess	2	9000	01-Jan-2004
108	Lawn Tennis	4	25000	19-Mar-2004

(i) To display the name of all Games with their Gcodes.
(ii) To display details of those games which are having PrizeMoney more than 7000.
(iii)To display the content of the GAMES table in ascending order of ScheduleDate.
(iv) To display sum of PrizeMoney for each of the Number of participation groupings (as shown in column Number 2 or 4).
(v) SELECT COUNT(DISTINCT Number) FROM GAMES;
(vi)SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM GAMES;

(vii) SELECT SUM(PrizeMoney) FROM GAMES;

Ans : (i) SELECT GameName,Gcode FROM GAMES;
(ii) SELECT * FROM GAMES WHERE PrizeMoney>7000;
(iii) SELECT * FROM GAMES ORDER BY ScheduleDate;
(iv) SELECT SUM(PrizeMoney),Number FROM GAMES GROUP BY Number;
(v) 2
(vi) 19-Mar-2004 12-Dec-2003
(vii) 59000

Q3. Consider the following tables HOSPITAL. Give outputs for SQL queries (i) to (iv) and write SQL commands for the statements (v) to (viii).

No	Name	Age	Department	Dateofadmin	Charge	Sex
1	Arpit	62	Surgery	21/01/06	300	M
2	Zayana	18	ENT	12/12/05	250	F
3	Kareem	68	Orthopedic	19/02/06	450	M
4	Abhilash	26	Surgery	24/11/06	300	M
5	Dhanya	24	ENT	20/10/06	350	F
6	Siju	23	Cardiology	10/10/06	800	M
7	Ankita	16	ENT	13/04/06	100	F
8	Divya	20	Cardiology	10/11/06	500	F
9	Nidhin	25	Orthopedic	12/05/06	700	M
10	Hari	28	Surgery	19/03/06	450	M

(i) Select SUM(Charge) from HOSPITAL where Sex='F';
(ii) Select COUNT(DISTINCT Department) from HOSPITAL;
(iii) Select SUM(Charge) from HOSPITAL group by Department;
(iv) Select Name from HOSPITAL where Sex='F' AND Age > 20;
(v) To show all information about the patients whose names are having four characters only.
(vi) To reduce Rs 200 from the charge of female patients who are in Cardiology department.
(vii) To insert a new row in the above table with the following data :
11, 'Rakesh', 45, 'ENT', {08/08/08}, 1200, 'M'
(viii) To remove the rows from the above table where age of the patient > 60.

Ans : (i) 1200
(ii) 4
(iii) 1050
700
1150
1300
(iv) Dhanya
(v) SELECT * FROM HOSPITAL WHERE NAME LIKE "_ _ _ _";
(vi) UPDATEHOSPITAL SET CHARGE = CHARGE – 200 WHERE (DEPARTMENT = 'CARDIOLOGY' AND SEX = 'F');
(vii) INSERT INTO HOSPITAL VALUES(11,'Rakesh',45,'ENT',{08/08/08}, 1200, 'M');

(viii) DELETE FROM HOSPITAL WHERE AGE > 60;

Q4. Consider the following tables BOOKS. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

Table : BOOKS

B_Id	Book_Name	Author_Name	Publisher	Price	Type	Quantity
C01	Fast Cook	Lata Kapoor	EPB	355	Cookery	5
F01	The Tears	William Hopkins	First	650	Fiction	20
T01	My C++	Brain & Brooke	FPB	350	Text	10
T02	C++ Brain	A.W.Rossaine	TDH	350	Text	15
F02	Thuderbolts	Anna Roberts	First	750	Fiction	50

i). To list the names from books of Text type.
ii). To display the names and price from books in ascending order of their price.
iii). To increase the price of all books of EPB publishers by 50.
iv). To display the Book_Name, Quantity and Price for all C++ books.
v). Select max(price) from books;
vi). Select count(DISTINCT Publishers) from books where Price >=400;
vii). Select Book_Name, Author_Name from books where Publishers = 'First';
viii). Select min(Price) from books where type = 'Text';

Ans : (i) SELECT Book_Name FROM BOOKS WHERE Type = 'Text';
(ii) SELECT Book_Name, Price FROM BOOKS ORDER BY Price;
(iii) UPDATE BOOKS SET Price = Price + 50 WHERE Publisher = 'EPB';
(iv) SELECT Book_Name, Quantity, Price FROM BOOKS WHERE Book_Name LIKE '%C++%';
(v) 750
(vi) 2
(vii) The Tears William Hopkins
Thuderbolts Anna Roberts
(viii) 350

Unsolved Problems :

1. Write the output of following SQL queries.
   i. SELECT ROUND(6.88,2) ;
   ii. SELECT MID('Discovery Channel',4,6) ;
   iii. SELECT DAYOFMONTH ('2011–03–30');
   iv. SELECT TRUNCATE (7.727,1);

2. Consider the table STUDENT given below, write SQL Commands for (i) to (iv) and output for (v) to (viii)

RollNo	Name	Class	DOB	Sex	City	Marks
1	Nanda	X	6/6/95	M	Agra	551
2	Saurabh	XII	7/5/93	M	Mumbai	462
3	Sanal	XI	6/5/94	F	Delhi	400
4	Trisla	XII	8/8/95	F	Mumbai	450
5	Store	XII	8/10/95	M	Delhi	369
6	Marisla	XI	12/12/94	F	Dubai	250
7	Neha	X	8/12/95	F	Moscow	377
8	Nishant	X	12/6/95	M	Moscow	489

(i) To Display all information about class XII students.
(ii) List the name of made student of class X.
(iii) List names all class of all students in descending order of DOB.
(iv) To count the number of student in XII Class of Mumbai city.
(v) SELECT DISTINCT(Sex) FROM Student.
(vi) SELECT AVERAGE(Marks) FROM Student GROUP BY Sex.
(vii) SELECT COUNT(*)FROM Student where Class = 'XI'
(viii) SELECT MAX(Marks) FROM Student.

3. Write an SQL query to create the table books with following structure.

Field	Type	Constraints
BookID	Varchar (5)	Primary Key
BookName	Varchar (20)	
Author	Varchar (20)	
Price	Decimal (5, 2)	

4. Write the SQL query commands based on following table

Table : SchoolBus

Rtno	Area_overed	Capacity	Noofstudents	Distance	Transporter	Charges
1	Vasant kunj	100	120	10	Shivamtravels	100000
2	Hauz Khas	80	80	10	Anand travels	85000
3	Pitampura	60	55	30	Anand travels	60000
4	Rohini	100	90	35	Anand travels	100000
5	Yamuna Vihar	50	60	20	Bhalla Co.	55000
6	Krishna Nagar	70	80	30	Yadav Co.	80000
7	Vasundhara	100	110	20	Yadav Co.	100000
8	Paschim Vihar	40	40	20	Speed travels	55000
9	Saket	120	120	10	Speed travels	100000
10	Jank Puri	100	100	20	Kisan Tours	95000

(b) To show all information of students where capacity is more than the no of student in order of rtno.
(c) To show area_covered for buses covering more than 20 km., but charges less than 80000.
(d) To show transporter wise total no. of students traveling.

(e) To show rtno, area_covered and average cost per student for all routes where average cost per student is - charges/noofstudents.

(f) Add a new record with following data:
(11, " Moti bagh",35,32,10," kisan tours ", 35000)

(g) Give the output considering the original relation as given:
(i) select sum(distance) from schoolbus where transporter= " Yadav travels";
(ii) select min(noofstudents) from schoolbus;
(iii) select avg(charges) from schoolbus where transporter= " Anand travels";
(iv) select distinct transporter from schoolbus;

5. Write the SQL query commands based on following table

TABLE : GRADUATE

S.NO	NAME	STIPEND	SUBJECT	AVERAGE	DIV.
1	KARAN	400	PHYSICS	68	I
2	DIWAKAR	450	COMP. Sc.	68	I
3	DIVYA	300	CHEMISTRY	62	I
4	REKHA	350	PHYSICS	63	I
5	ARJUN	500	MATHS	70	I
6	SABINA	400	CEHMISTRY	55	II
7	JOHN	250	PHYSICS	64	I
8	ROBERT	450	MATHS	68	I
9	RUBINA	500	COMP. Sc.	62	I
10	VIKAS	400	MATHS	57	II

(a) List the names of those students who have obtained DIV 1 sorted by NAME.

(b) Display a report, listing NAME, STIPEND, SUBJECT and amount of stipend received in a year assuming that the STIPEND is paid every month.

(c) To count the number of students who are either PHYSICS or COMPUTER SC graduates.

(d) To insert a new row in the GRADUATE table: 11,"KAJOL", 300, "computer sc", 75, 1

(e) Give the output of following sql statement based on table GRADUATE:

(i) Select MIN(AVERAGE) from GRADUATE where SUBJECT="PHYSICS";

(ii) Select SUM(STIPEND) from GRADUATE WHERE div=2;

(iii) Select AVG(STIPEND) from GRADUATE where AVERAGE>=65;

(iv) Select COUNT(distinct SUBDJECT) from GRADUATE;

(f) Assume that there is one more table GUIDE in the database as shown below:

Table: GUIDE

MAINAREA	ADVISOR
PHYSICS	VINOD
COMPUTER SC	ALOK
CHEMISTRY	RAJAN
MATHEMATICS	MAHESH

g) What will be the output of the following query:

```
SELECT NAME, ADVISOR      FROM  GRADUATE,  GUIDE
WHERE SUBJECT= MAINAREA;
```

6. Write SQL command for (i) to (vii) on the basis of the table SPORTS

Table: SPORTS

Student NO	Class	Name	Game1	Grade	Game2	Grade2
10	7	Sammer	Cricket	B	Swimming	A
11	8	Sujit	Tennis	A	Skating	C
12	7	Kamal	Swimming	B	Football	B
13	7	Venna	Tennis	C	Tennis	A
14	9	Archana	Basketball	A	Cricket	A
15	10	Arpit	Cricket	A	Atheletics	C

(a) Display the names of the students who have grade 'C' in either Game1 or Game2 or both.
(b) Display the number of students getting grade 'A' in Cricket.
(c) Display the names of the students who have same game for both Game1 and Game2.
(d) Display the games taken up by the students, whose name starts with 'A'.
(e) Assign a value 200 for Marks for all those who are getting grade 'B' or grade 'A' in both Game1 and Game2.
(f) Arrange the whole table in the alphabetical order of Name.
(g) Add a new column named 'Marks'.

Unit 4
IT Applications

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

Social impacts of E-Governance:

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

Some E-Governance websites are:

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.flipcart.com
It provide online purchase of various electronic items like mobiles, microwave ovens etc& is famous for online purchase of books.

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

On line store for Books, CD's, DVD's, MP3's etc.

www.yatra.com

On line 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 inpublishing 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.

VERY SHORT QUESTIONS-ANSWERS

1. Give some examples of input values, where Radio Button and Check Boxes should be used for efficiency in the application.

Answer : for selection criteria applying, Providing optional choices.

2. What are the important guidelines we should keep in mind while developing an efficient application?

Answer : It should be user friendly, reliable and should be maintained database with consistency and integrity with GUI.

3. Is it a good practice to take in the inputs using TextFields only? Justify your answer.

Answer : TextField is used to get small textual information like Name, RollNo, email address, quantity, etc. Disabled/Uneditable TextFields are also used to display such information so it is a good practice to take in the inputs using TextFields. But we may also use Dialog to take input.

Short Question-Answers

Q. Write Short Notes on : e-Governance, e-Business, e-Learning.

Answer : **e-Governance** involves applications which are used by government agencies/organizations to provide better governance.

e-Business applications use technology to effectively access and deliver business related services and perform various kinds of business transactions.

e-Learning applications use technology to effectively deliver and monitor learning and teaching processes. They help the trainer to organize and manage his/her lesson plans, present them to students/learners, evaluate and take the feedback to enhance & fine-tune this process in future.

Q. What are Front-end (The user interface) and back-end (The database) ?

Answer : An IT application has two major parts: Front-end (The user interface) and backend (The database) .The front-end of an IT application is usually a group of one or more forms through which the user enters the input values and is shown the corresponding output. A good front-end ensures the acceptance of the application in the first go. The back-end of an IT application is the database in which all the data is stored. This database resides in the server.
All the data which is requested by the front-end is supplied by back-end. A good back-end ensures sustainability, efficiency and easy modification of the application.

Q. What are the terms involved in Development of an IT application ?

Development of an IT application involves creation of front-end, back-end, and connecting these two. It also involves testing the application and then implementing it.

Q. What social and economic impacts are found of ICT. ?

Answer : Society is impacted as due to ICT people change their way of conducting the transactions and thus save their time, money, and energy. Economy is impacted as ICT leads to fast completion of data transfer and data processing jobs. ICT also brings transparency in the administration.

Q. What do you mean by Infomania ?

Answer : Infomania is the condition of reduced concentration caused by continually responding to electronic communications such as e-mail, SMSs, MMSs etc. ICT is making more and more people info maniac. This is making some people waste their productive time in the office, neglect their families and duties. Some people are also in a habit of frequently checking their e-mails even when they are on vacation with their families. We have to be careful in the use of ICT so that we use it constructively and not get obsessed with it and become info maniacs.

Q. What OS and fonts are used for Indic Language Support ?

Answer : Mac OS 10.5 supports Devanagari, Gujarati, Gurmukhi and Tamil. Linux based desktops support Bengali, Devnagari, Gujarati, Kannada, Malayalam, Oriya, Tamil, Telugu and Gurmukhi,

Q. Write the steps for enabling Indic Language Support in Windows.

Answer :Windows 7 and Windows Vista include all the necessary files to support Indic languages Complex(Indic) text support is automatically enabled. Therefore you just need to enable the keyboard for the language that you want to use by following the steps in the Enable a keyboard layout section. For Windows XP, some additional setup may be required to support Indic languages.

Therefore you first follow the steps given under Enabling International Language Support in Windows and then proceed with the steps given under the Enable a keyboard layout section.

Q. Write the steps for turning on the language bar .

If you do not see the language bar in the task bar (at the bottom of the desktop) or floating on the desktop please do the following:

Step 1: Click Start, click Control Panel, and then double-click Regional and Language Options.

Step 2: On the Languages tab, under Text services and input languages, click Details as shown in Figure 8.

Step 3: Under Preferences, click Language Bar.

Step 4: Select the Show the Language bar on the desktop check box.

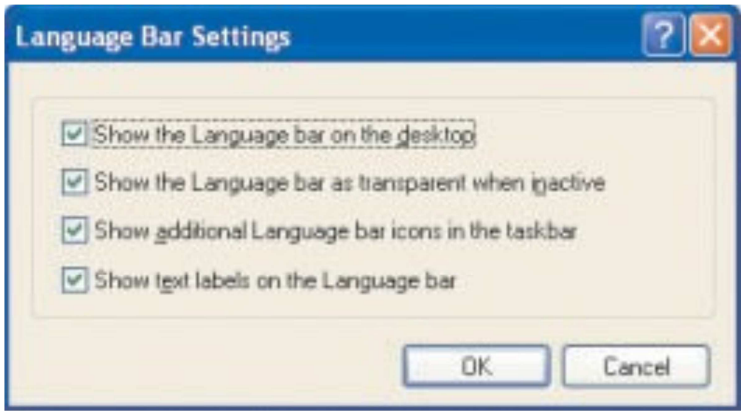


Figure 3 Language Bar Settings in Windows XP

Note: You can switch between different languages by clicking on the language bar and changing the language or by pressing the left ALT+SHIFT keys.

Q. How can be established Front-End and Database Connectivity ?

Answer:-A database application consists of Front-End and Database (Back-end). These two entities cannot work in isolation. Whatever data is entered by the user has to go to the database and whatever relevant data is extracted from the database is to be shown to the user through the Front-End. Therefore, the Front-End and the Database of an IT application must be connected. This connectivity is achieved as learnt in Chapter 6 (Database Connectivity). If the application is web based then the connectivity is achieved using some scripting language (like vbScript or JavaScript).

Q. Are there Websites in Indian languages ? Write about them ?

Ans: Yes,these days multiple Government and private organizations are providing their websites in Hindi and other regional languages also. The aim is to provide their services even to the common people in remote areas. Small towns where computers and internet have reached, information on the net should also be available in regional languages so that people not knowing English can also have access to the information. Language should not be a hinderance but a support to learning.

Understaning the importance of regional languages, many websites have also provided translation services so that the same page can be viewed in any language of user's choice.

Q. What do mean by Front-End Interface ?

Front-end and back-end are terms used to characterize program interfaces and services relative to the initial user of these interfaces and services. (The "user" may be a human being or a program.)

A "front-end" application is one that application users interact with directly.

A "back-end" application or program serves indirectly in support of the front-end services, usually by being closer to the required resource or having the capability to communicate with the required resource. The back-end application may interact directly with the front-end or, perhaps more typically, is a program called from an intermediate program that mediates front-end and back-end activities.

Q. What Components are used for creating Front-end of any software ?Give details about those components.

Ans: To create a front-end various components, like those studied in Java GUI application development, are used. Some of the most commonly used components are discussed below:

- TextField: TextField is used to get small textual information like Name, RollNo, email address, quantity, etc.
- TextArea: TextArea is used to get long textual information which may span multiple lines of text. E.g. to get Address, Complaint, Suggestion etc.
- Radio Button: Radio buttons are used to get an option out of several mutually exclusive (out of which only one can be selected) options. Examples of such options are Gender (Male or Female or Other), Type of Credit Card (Master or Visa or Other), Type of internet connection (DialUp or Broadband), etc.
- CheckBox: Check boxes are used to get one or more options out of several given options which are not mutually exclusive. Examples of such options are Hobbies (a user may have zero or more hobbies), Magazines to subscribe for (a user may subscribe to zero or more of the given magazines) etc.
- List: A list is used to get one or more options out of several given options which may or may not be mutually exclusive. This may seem to be the case where CheckBoxes are to be used, but the difference is in the number of options available. If the number of options

is small, then CheckBoxes can be used. In case of large number of options, using CheckBoxes may take up a lot of space on the form and it may also be inconvenient for the user to select the desired options. In such cases Lists are preferred over checkboxes. Examples of such cases are: To select cities out of a given list of cities, to select magazines out of a given list of magazines, etc.

- ComboBox: A ComboBox is used to get an option out of several given options which are mutually exclusive. This may seem to be the case where RadioButtons are to be used, but the difference is in the number of options available. If the number of options is small, then RadioButtons can be used. In case of large number of options, using RadioButtons may take up a lot of space on the form and it may also be inconvenient for the user to select the desired option. In such cases ComboBoxes are preferred over radio buttons. Examples of such cases are: To select a city out of a given list of cities, to select a train out of a given list of trains, etc.
- Password Field: A Password Field is used to get some secret textual information like Password, CVV number of a credit card etc.

Q. What do you understand by e-Business ? Give Examples.

To reach the customers and business associates in an effective and fast manner business houses (now a days many small shops like snacks corners and paan shops also) provide their services on the net.

These ICT enabled counters are used to get orders and feedbacks from the customers and also for inter-business transactions. This helps the businesses to widen their customer base. nafedindia.com/ebusiness.asp (e-business site of NAFED) -Through this URL NAFD (National Agricultural Cooperative Marketing Federation of India Ltd.) offers its e-business services to various corporates and customers.

1. Amazon.com (e-Business site of Amazon.com) - Amazon is the world's largest online store. Through this URL Amazon does its online business

e-Learning:

e-Learning has multiple goals. It is much more than having a net connection and/or CDs through which people learn. E-Learning is about giving freedom to people to learn whatever they want to learn and whenever they want to learn. This is irrespective of (except in exceptional cases) age, caste, gender, economical background, or qualification of the learner. The only requirement is the will to learn. E-learning is available on almost all the topics imaginable.

1. W3schools.com (Website Developers e-Learning site) - At w3schools.com you will learn how to make a website. It offers free tutorials in all web development Technologies.
2. 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 necessary for them to be successful in both work and life.

GCF believes that there's freedom in the ability to learn what you want, when you want, regardless of your circumstances.

3. educationportal.mp.gov.in/public/multimedia.aspx -This government of Madhya Pradesh portal provides multimedia tutorials on various topics of different subjects like maths, science, social sciences etc.
4. ncert.nic.in/html/learning_basket.htm - This NCERT portal provides interactive modules for students to learn various topics.

Q. What is ICT? Write Impact of ICT on society.

Ans: ICT stands for Information and Communication Technology. Like everything else that is used by common man, ICT (Information and Communication Technology) also has impacted the society. ICT has impacted the society in a much wider way than any other technology. Most of these impacts are positive, though there are some negative impacts also.

Social and Economic benefits of ICT:

- ☐ Social networking sites help people remain in touch with their near and dear ones even when they are staying on opposite sides of the globe.
- ☐ Social networking sites help like-minded people come together and work for some cause.
- ☐ E-Governance sites help people save their productive time by performing various government related jobs like getting some forms, depositing bills online.
- ☐ ICT helps economy grow at a faster rate as it provides transparency in the processes and helps the government to keep check on defaulters.
- ☐ Due to e-Banking and use of plastic money more money is put in circulation leading to faster growth of GDP.
- ☐ E-Learning sites make quality study material available even to the students staying at remote places.

Q. Write the steps for enabling International Language Support in Windows.

Step 1: Click Start and then go to Control Panel.

Step 2: Click on Date, Time, Language, and Regional Options and choose Add Other Languages from the task list.

Step 3: In the Regional and Language Options dialog box highlight the Languages tab.

Step 4: In the Regional and Language Options dialog box, under Supplemental Language Support, select the Install files for complex script and right-to-left languages check box.

Click OK or Apply.

Step 5: You will be prompted to insert the Windows CD-ROM or point to a network location where the files are located. After the files are installed, you must restart your computer.

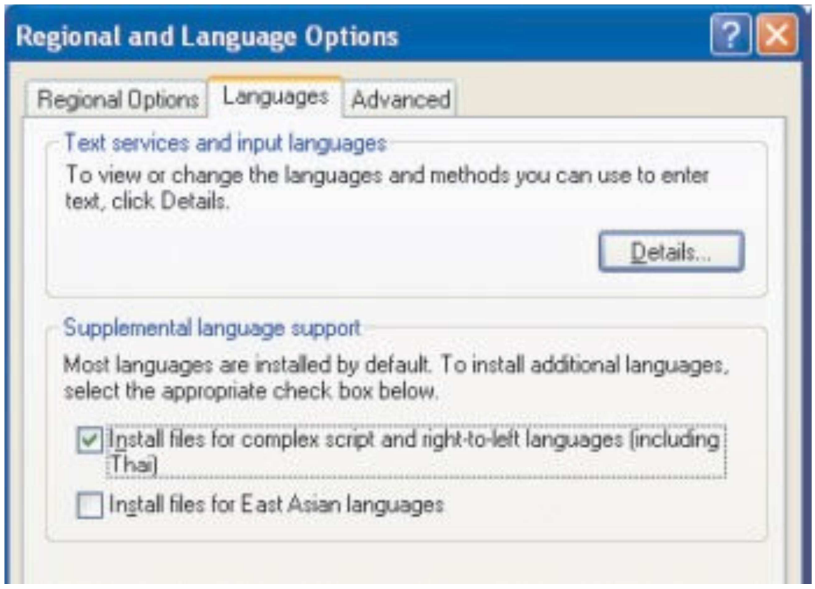


Figure 1 Languages tab in Regional and languages option in Windows XP

Q. What is cloud computing?

Ans: This means that cloud computing is a type of Internet-based computing, and it consists of every situation where the use of IT resources by an entity, including a person or an organization.

Q. What are the properties of cloud computing?

Ans: Properties of cloud computing are:

- Access to the resources is:
  - Controlled by the entity, and restricted by them to their authorized users.
  - Delivered via the Internet to all of these users.

- The resources are:
  - Hosted by a service provider on behalf of the entity.
  - Dedicated to their exclusive use.
- Data processed by the resources is:
  - Private to the entity and its associates.
  - Entered or collected by them, or automatically produced for them.

SAMPLE PAPER -1

Subject: Informatics Practices (065)

SESSION ENDING EXAMINATION

TIME: 3Hrs **CLASS:** XI **Max Marks**:- 70

SECTION A

Q.1 Answer the following questions

a. Draw a block diagram of functional units of a computer (2)

b. Identify only input devices from the given list of devices (1)
Bar Code Reader, Plotter, CRT Monitor, Dot Matrix Printer, Scanner

c. What is the difference between Interpreter and compiler? (2)

d. Name any two utility software. (1)

e. What is the difference between Virus and Worm. (2)

f. What is Firewall? (1)

g. For what purpose OMR is used? (1)

SECTION B

Q.2 Answer the following questions

a. Expand the term IDE and GUI. (2)

b. How Project, Forms and components are interrelated? Discuss (2)

c. What is the difference between Radio Button and Check Box? (2)

d. What is the most suitable swing component to accept input in multiple lines? (1)

e. Which property of jList is used to add items in the list box. (2)

f. What is the difference between While and Do While Loop. (2)

g. What are the various stages of simple GUI application development? (2)

h What do you mean by Run Time errors? (1)

Q.3. Answer the following questions

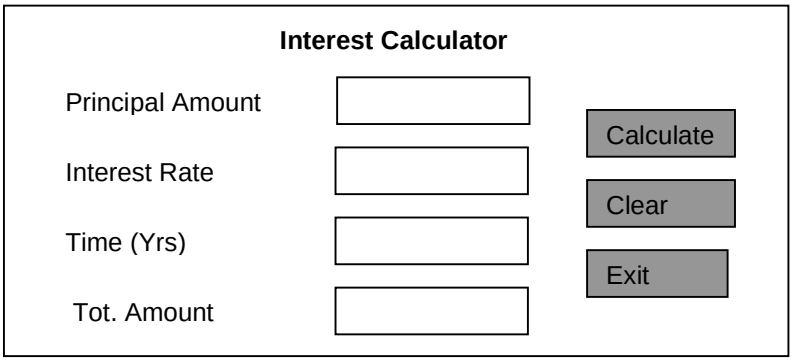
a. Identify error(s) in the following program and rewrite corrected code underlining the correction made. (2)

```
integer  a=15, b=20;
if(a>b)
{
jLabel1.setText("first number is big");
}
else
{
jLabel1.getText("second number is big");
}
```

b. What will be the output of the following program (2)

```
String s1="10"
String s2="20"
String s3=s1+s2;
jLabel1.setText("The sum of two numbers is" + s3);
```

c. Consider the following form in Interest Calculator application.



The List of controls on the form and their names are as follows:

Object Type	Object Name	Description
Frame	jFrame1	The Main Form Object
Text Box	jTxtPrincipal	To enter the principal amount
	jTxtRate	To enter the interest rate
	jTxtTime	To enter the time
	jTxtAmount	To display the amount due
Command Button	jButtonCalculate	To calculate the interest and amount
	jButtonClear	To clear all the entered data
	jButtonExit	To end the application

i. Write the code for jButtonClear Command Button to clear all the textboxes. (1)

ii. Write the code for the Click event of the command button jButtonCalculate to calculate the interest and amount depending on the principal, rate and time. The interest is calculated as (PxRxT)/100 and amount as (Principal + Interest). (3)

iii. Write code for the Click event of the jButtonExit to terminate the application (1)

d. How many times will the following loop get executed? (2)

```
int a=3, b=15;
while(a>b)
{
a=a+3;
}
```

SECTION-C

Q.4 Answer the following questions

a. What is DBMS? Name any two popular DBMS softwares? (2)

b. What is MySQL? (1)

c. Define the following terms (2)

(i) Tuple (ii) Attribute

d. Differentiate between Primary Key and Candidate Key (2)

e. What do you mean by DDL and DML? Name two SQL Commands of each category. (3)

Q.5 Consider the **STUDENT** table given below.

RollNo	RegNo	Name	class	stream	DOB	Gender	Income
12100	2976	Dinesh	11	Science	1985-03-25	M	20000
12101	4323	Manish	11	Arts	1985-07-13	M	25000
12102	5734	Sarita	11	Science	1986-11-12	F	30000
12103	5534	Amit	9	NULL	1989-02-15	M	25000
12104	8734	Pooja	12	Science	1984-04-11	F	70000
12105	8623	Prateek	12	Science	1984-12-12	M	45000
12106	9012	Maya	8	NULL	1990-10-10	F	12000
12105	7734	Himani	11	Arts	1987-08-27	F	47000
12106	8723	Raja	7	NULL	1989-09-19	M	32000
12107	5522	Pankaj	12	Arts	1986-05-23	M	15000

a. Write SQL queries for the following

(i) Display rollno, registration no and names of all student s (1)

(ii) Display all details of the students of class 11 (1)

(iii) Display all details of students of class 12 of science stream. (1)

(iv) Display names of students whose name ends with character 'a'. (1)

(v) Display details of students of class 7, 8 and 9 (1)

(vi) Display names of the students whose Father's Monthly Income(FAI) is between 40000 to 50000 (1)

(vii) Display total no of students in class 12 (1)

(viii) Display FMI column by multiplying with 12 and assign new name as 'Annual Income' (2)

(ix) Delete the record of student whose registration no is 4323 (2)

(x) Display names of the students who born after 1987-12-31 (2)

b. What will be the output of the following SQL commands (1 x 7 = 7)

(i) Select length("computer")

(ii) Select right("computer", 3)

(iii) Select mid('computer', 3,2)

(iv) Select power(5,2)

(v) Select round(143.562,1)

(vi) Select dayofmonth('2012-05-11');

(vii) Select month('2010-02-07');

Q.6 Answer the following questions

(a). Miss Meenaksi developed a GUI application STUDENDS REGISTRATION SYSTEM. This application accepts different information from the users. To develop this application Meenaksi used following various GUI components

list Frame, List Box, Combo Box, Text Field, Text Area, Password Field, Radio Button, ButtonGroup, CheckBox, Button, Label. (2)

Suggest the best suitable component(s) from the above given list to accept following information from the user

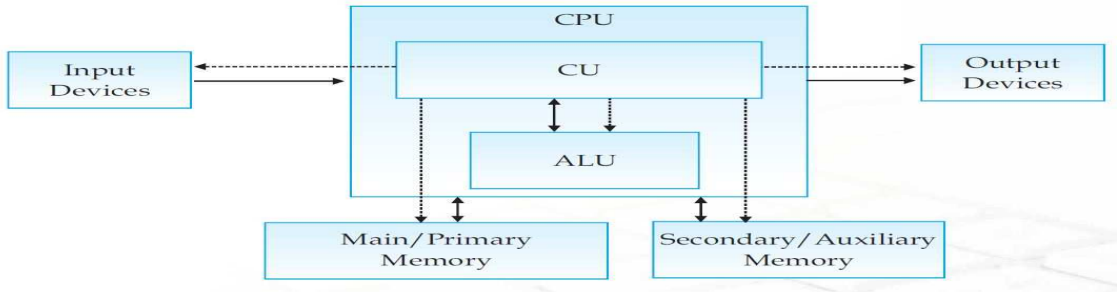
	Input to be accepted	Best Suitable component
i	To accept name of the student	
ii	To accept Gender of the student	
iii	To accept birth year of student	
iv	To select one or more hobbies from a given options	

b. What is e-Learning? Name any two Web Sites of e-Learning. (2)
c. What are the benefits of e-Governance? (1)

SOLUTION OF SAMPLE PAPER -1 (ANSWER KEY)

SECTION A

Ans.1 (a).



(b). Bar Code Reader, Scanner r

(c). Compiler converts High Level Program into machine language in one go whereas Interpreter converts line by line

(d). disk- defragmentation, Antivirus, backup (any two utility software)

(e). Virus is a program with malicious intention to corrupt important files and data whereas worm is self-replicating program that expands itself with every program run and eat up all the memory and make system crash

(f). It is a software and hardware both that inspects all incoming and outgoing information to and from your system or network

(g). To check multiple choice answer script

SECTION B

Ans. 2 (a). **IDE:-** Integrated Develop Environment **GUI** :- Graphical User Interface

(b). Project is a collection of Forms, Forms may contain many Components, and components and individual controls. r

(c). Radio button is used to select one option out of many whereas check box is used to select zero, many or all option out of many

(d). jTextArea

(e). Model

(f). While is entry control loop whereas do while is exit control loop.

Or

While checks condition before entering into loop whereas do while checks condition after entering into loop

(g). ANALYSIS, DESIGN, CODING, TESTING and DEBUGGING, DOCUMENTATION, DELIVERY and MAINTENANCE,

(h). Errors encountered during run time

Ans.3. (a).

```
int  a=15, b=20;
if(a>b)
 {
  jLabel1.setText("first number is big");
 }
else
 {
  jLabel1.setText("second number is big");       }
```

(b). The sum of two numbers is 1020

(c). (i).

```
jTxtPrincipal.setText(" ");
jTxtRate.setText(" ");
jTxtTime.setText(" ");
jTxtAmount.setText(" ")
```

(ii).

```
int a,b,c,d,e;
a=Integer.parseInt(jTxtPrincipal.getText());
b=Integer.parseInt(jTxtRate.getText());
c=Integer.parseInt(jTxtTime.getText());
d=(a*b*c)/100
e=a-d;
jTxtAmount.setText(Integer.toString(e));
```

(iii). System.exit(0);

(d). 0 times

SECTION-C

Ans. 4

(a). Data Base Management System is software that allows to create database and manipulate it. 1. ORACLE 2. MySQL or any other

(b). MySQL is a Relational Database Management Software.

(c). Tuple :- A record or a row of a table or relation
Attribute :- A column of a table or relation

(d). A key or combination of keys that can uniquely identify a record.
A key that can serve the purpose of primary key and can uniquely identify record.

(e). DDL : Data Definition Language
DML : Data Manipulation Language

DDL : Create Table, Alter Table or any other
DML: Insert into, Update

Ans..5 (a).

(i) Select rollno,regno,name from student ;
(ii) Select * from student where class=11;
(iii) Select * from student where class=12 and stream='science' ;
(iv) Select name from student where name like '%a' ;
(v) Select * from student where class in(7,8,9) ;
or
Select * from student where class=7 or class=8 or class=9 ;
(vi) Select name from student where FAI between 40000 and 50000 ;
(vii) Select count(*) from student where class=12 ;
(viii) Select FMI * 12 as 'Annual Income' from student ;
(ix) Delete from student where regno=4323 ;
(x) Select name from student where dob>'1987-12-31' ;
or
Select name from student where year(dob)>1987 ;

(b).

(i) 8
(ii) ter
(iii) mp
(iv) 25
(v) 143.6
(vi) 11
(vii) 2

Ans.6

(a)

	Input to be accepted	Best Suitable component
I	To accept name of the student	Text Field
ii	To accept Gender of the student	Radio Button
iii	To accept birth year of student	List Box
iv	To select one or more hobbies from given options	Check Box or List Box

(b). Learning through technology such as multimedia, Internet is called e-Learning.
w3schools.com, kvsecontents.in or any other

(c).. 1. Government and citizen interaction will increase
2. Citizen's participate in government working will increase or any other benefits

SAMPLE PAPER -2

Subject: Informatics Practices (065)

SESSION ENDING EXAMINATION

TIME: 3Hrs **CLASS:** XI **Max Marks**:- 70

SECTION A

Q.1 Answer the following questions

a. What do you mean by Bus? (1)
b. What is the difference between Interpreter and compiler? (2)
c. Discuss different types of Operating Systems (2)
d. What is Trojan? (2)
e. What are Cookies? (1)
f. Write short notes on the followings (1x2=2)
(i) MICR (ii) Bar Code Reader

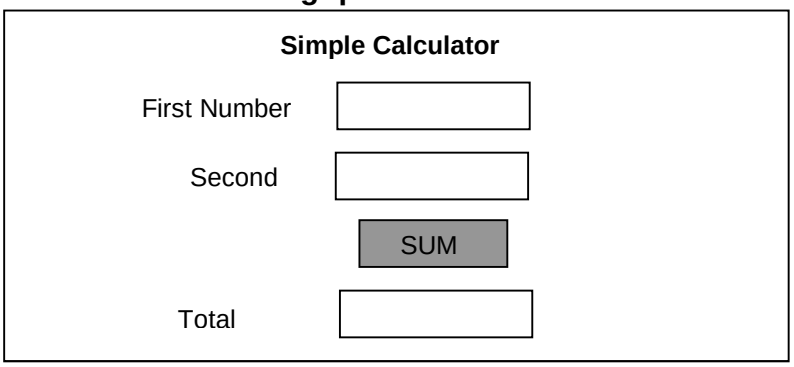
SECTION B

Q.2 Answer the following questions

a. What is Form? Explain (2)
b. Differentiate between parseInt() and parseDouble() methods. You may give suitable example to clear the difference (2)
c. Mr Jeevan used many radio button in his GUI application. When he runs the application more then one radio buttons are getting selected. What should he do so that only one radio button out of many can be selected. (2)
d. What is looping or iteration? Name any to iteration statement of Java. (2)
e. The selectionMode property of jList control provides three possible values. What are these three options (2)
f. Discuss the structure of switch statement (2)
h What is the difference between Run Time Error and Compile time errors. Which errors are harder to locate and why? (3)

Q.3. Answer the following questions

a.



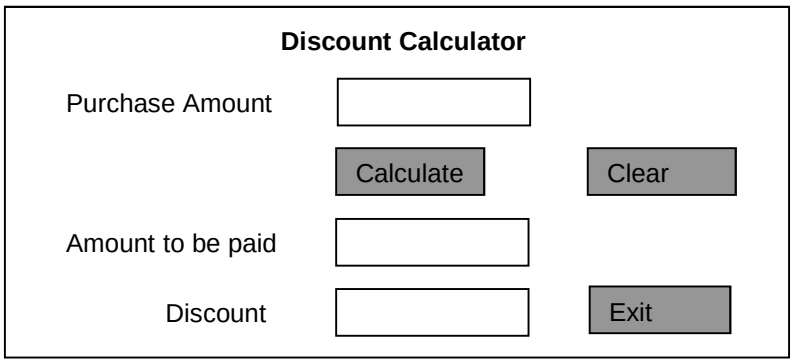
Consider the Simple Calculator application that accept two integer numbers from first two text fields and display total of two numbers in third text field when sum button is pressed.

i. Write code for the sum button. Names of the text fields are jTextField1, jTextField2 and jTextField3 respectively (2)

b. Identify error in the following code and correct it.

int a=jTextField1.getText(); (2)

c. Consider the following form in Discount Calculator application.



The List of controls on the form and their names are as follows:

Object Type	Object Name	Description
Frame	jFrame1	The Main Form Object
Text Field	jTextField1	To enter Purchase amount
	jTextField2	To Display amount after discount
	jTextField3	To Display discounted amount
Button	jButton1	To calculate discount ,amount to be paid and display in appropriate text fields
	jButton2	To clear all the entered data
	jButton3	To end the application

i. Write the code for jButton2 to clear all the textboxes. (1)

ii. Write the code for the jButton1 to calculate discount and amount to be paid and display in appropriate text boxes. 10% discount to be given if purchase amount is more then 10000 otherwise 5% discount is given

discount = purchase amount * discount rate / 100

amount to be paid = purchase amount - discount (4)

iii. Write code for the jButton3 to terminate the application (1)

SECTION-C

Q.4 Answer the following questions

a. Define following terms

i. Database ii. Relation iii Tuple (1x3=3)

c. What is MySQL? What are its important characteristics? (2)
d. How many primary key and candidate keys a table can have? (2)

Q.5 Consider the **EMPLOYEE** table given below.

empno	ename	job	mgr	hiredate	sal	comm	deptno
7369	SMITH	CLERK	7902	1980-12-17	800.00	*NULL*	20
7499	ALLEN	SALESMAN	7698	1981-02-20	1600.00	300.00	30
7521	WARD	SALESMAN	7698	1981-02-22	1250.00	500.00	30
7566	JONES	MANAGER	7839	1981-04-02	2975.00	*NULL*	20
7654	MARTIN	SALESMAN	7698	1981-09-28	1250.00	1400.00	30
7698	BLAKE	MANAGER	7839	1981-05-01	2850.00	*NULL*	30
7782	CLARK	MANAGER	7839	1981-06-09	2450.00	*NULL*	10
7788	SCOTT	ANALYST	7566	1982-12-09	3000.00	*NULL*	20
7839	KING	PRESIDENT	*NULL*	1981-11-17	5000.00	*NULL*	10
7844	TURNER	SALESMAN	7698	1981-09-08	1500.00	0.00	30
7876	ADAMS	CLERK	7788	1983-01-12	1100.00	*NULL*	20
7900	JAMES	CLERK	7698	1981-12-03	950.00	*NULL*	30
7902	FORD	ANALYST	7566	1981-12-03	3000.00	*NULL*	20
7934	MILLER	CLERK	7782	1982-01-23	1300.00	*NULL*	10

a. Write SQL queries for the following
   (i) Display complete details of all employees (1)
   (ii) Display details of employees working as MANAGER (1)
   (iii) Display department no of employee whose empno is 7788 (1)
   (iv) Display names of employees whose name starts with character ‘s’ and end with character ‘h’ (1)
   (v) Display details of employees working in department no 10 and 20 (1)
   (vi) Display details of employees whose salary ranges 2000 to 3000 (1)
   (vii) Display maximum salary paid to the employee (1)
   (viii) Display names of employee who are not getting commission(comm) (2)
   (ix) Increase the salary of all employees by 100 Rs (2)
   (x) Display details of employees who joined(hiredate) on MONDAY (2)
b. Miss neelam started working in MySQL. She want to start working in SCHOOL database which is already available. How can she make SCHOOL database as her currently working database (2)
c. While inserting values in a table Mr. Jeeven did not provide values for some columns. What values will be inserted into these columns. (1)
d. What will be the output of the following SQL commands (1 x 7 = 7)
   (i) Select concat(“information”, “technology”)
   (ii) Select instr(“computer”, “er”)

(iii) Select truncate(465.4323, 2)
(iv) Select mod(5,2)
(v) Select substr("information technology",-5)
(vi) Select dayofmonth('2012-05-11);
(vii) Select month('2010-02-07');

Q.6 Answer the following questions

a. Mr pankj is planning to develop a GUI application. Suggest him which GUI components should he use to do the followings

i. A GUI component which provide many options using minimum space
ii. A GUI component that never allow any one to understand what a user is typing
iii. A GUI component best suitable to accept Gender of user (1x3=3)

b. What is e-commerce? What are its advantages? (2)