COMPUTER APPLICATION
CLASS 9
ACCORDING TO ICSE 2022 SYLLABUS

BOOK : **ICSE UNDERSTANDING COMPUTER APPLICATION with Bluej from ARYA PUBLICATION**

FIRST TERM PORTION

Contents

1. Introduction to Object Oriented Programming and Introduction to Java

2. Elementary concepts of Objects and classes

3. Values and Data Types

4. Operators and Expression

5. Input in Java

6 Mathematical Library functions

7. Conditional constructs in Java

SECOND TERM PORTION

FIRST TERM PORTION   Plus

8. Iterative construct in Java

9. Nested for loop

10. Compiting and Ethics

CH 1: INTRODUCTION TO OBJECT ORIENTED PROGRAMMING CONCEPTS

1. What are the two types of programming languages?

Ans. Low level languages and high level languages.

2. What are the programming language generations?

Ans. First generation language (machine language), second generation language(assembly language), third generation language(BASIC, COBOL, C),fourth generation language (SQL, WAVE) and the fifth generation language (Prolog, Mercury).

3. What do you mean by programming paradigm?

Ans. It is an approach to solve a given problem by writing a set a instructions in a programming language. It refers to the organizing principles of a program.

4. What are the different programming paradigms?

Ans: Procedural or modular programming and Object oriented Programming.

5. What is Object Oriented Programming?

Ans: The object oriented programming approach focuses a problem in terms of classes and objects. The OOP determines the classes and objects needed for the solution of a problem and provides a full set of operations for each class.

6. List the concepts of OOPs.

Ans: The concepts of OOPs are:

*   Data Abstraction
*   Encapsulation
*   Modularity
*   Inheritance
*   Polymorphism

7. Write   the differences between Procedural Programming and Object Oriented Programming.

Ans: Procedural programming aims more at procedures. The emphasis is a doing things rather than the data being used. In procedural Programming paradigm data are shared among all the functions participating thereby risking data safety and security. Object Oriented Programming is based on principles of data hiding, abstraction, inheritance and polymorphism. It implements programs using classes and objects, In OOP's data and procedure both given equal importance. Data and functions are encapsulated to ensure data safety and security.

8. What is an abstraction?

Ans: The act of representing the essential features without including the background details or explanation. E.g. in a switchboard we press the switches according to our requirements without knowing the circuitry.

9. What is encapsulation?

Ans:The wrapping up of data and functions into a single unit called a class in known as encapsulation. E.g In a medicine capsule all the constituents are encapsulated inside the capsule. Doctor administers the intake of the entire capsule.

10. What is inheritance and how it is useful in Java. Give examples. [2008]

Ans: It is process by which objects of one class acquire the properties of objects of another class. Inheritance supports the concepts of hierarchical representation. In OOP the concepts of inheritance provides the idea of reusability.

e.g. A class CAR inherits some property from the class Automobiles, which in turn inherits properties from Vehicle class. The capability to pass down properties and so allows us to describe things efficiently.

11. What role does polymorphism play as java feature?

Ans: It means the ability for a message or data to take more than one form. For example, an operation, many types of data used in the operation.

E.g. a child behaves like a student in school, customer in a shopping mall, passenger in a bus and like a son/daughter at home. Same person behave differently in various circumstances

Ch 2: INTRODUCTION TO JAVA

1. What was Java originally known as? Who developed Java?

Ans. Java was originally known as OAK. It was developed by James Gosling .

2. What are the characteristics of Java?

Ans: The characteristics of Java as follows:

i) It is an object oriented language, simple and robust.
ii) Java program is both compiled and interpreted.
iii) Write once run anywhere (WORA). The java programs are written once, but can be run on different platform without making changes.
iv)Has enhanced security features.
v)Platform independent.

3. What is the difference between source code and object code?

Ans. The program code written by the programmer is called the source code.

The source code in translated into the machine understandable code called as object code or the native executable code.

4. How does ordinary compilation takes place?

Ans. The process of converting the source code into machine code is called compilation. The compilation produces the machine code. For different platforms different machine codes are produce.

e.g Windows compiler produces an object code that run in Windows computer only.

5. Sc iefly explain the compilation process of Java source code.

Ans. Compilation in java:

i. Java programs are written in ".java" files and are compiled by the compiler to produce the bytecode (.class file)

ii. The JVM is a virtual machine which reads the byte code and interprets into machine code(object code)

6. Explain the two types of Java programs.

Ans: Two types of Java programs are Applets and Stand alone applications.

   i. Applets – small programs that are embedded in web pages and are run on the viewer's machine by Java capable sc   owsers. Used for games and simulation programs.

   ii. Standalone application- includes the software applications that do not require low level operating system or hardware access. This includes most desktop applications like word processors and spreadsheets

7. What is a bytecode?

Ans: Bytecode is an intermediate code produce after compilation of Java source code. Bytecode is a set of pseudo machine language instructions that are understood by the JVM (Java Virtual Machine) and are independent of the underlying hardware (platform independent).

8. What do you understand by JVM?

Ans: JVM or Java Virtual Machine is an abstract machine designed to be implemented on top of existing processors. It hides the underlying OS from Java application. Programs written in Java are compiled into Java byte-code, which is then interpreted by a special java Interpreter for a specific platform. This Java interpreter is known as Java Virtual Machine (JVM).

9. What is JDK (Java Development Kit)?

Ans: The Java development kit comes with a collection of tools that are used for developing and running java programs.

10. What are Java APIs?

Ans: The Java APIs (Application Program Interface) consist of lisc   aries of pre-compiled code that programmers can use in their application.

11. What do you know about BlueJ?

Ans: BlueJ is a Java development environment. It is an IDE (Integrated Development Environment), which includes an editor a debugger and a viewer.

12. How you create, compile and execute a program in Java or BlueJ? Explain your answer?

Ans: Create: Click on New Class button from BlueJ editor, then type the class name a program icon will be created. Double click on it, a program editor will be open, erase the code and type your program coding.

Compile: click the Compile button on the left of the window or right click on the class icon and select compile from the menu options.

 Execute: Right click on the class icon and select new class name option. A dialogue box appears type the name of the object. An object icon will be created at the bottom. Right click on the object icon and select the method we want to execute.

13. Why do we use main( )?

Ans. In a Java standalone program the execution begins from the main( ). The main( ) is the entry point in Java and all other functions are called from this method.

CH 3: ELEMENTARY CONCEPT OF OBJECTS AND CLASSES

1.   Define the terms:

i.Object- an object is an identifiable entity with some characteristics/properties/attribute, state and behavior.

ii.Attributes- the properties defining an object are termed as attributes or characteristics of an object.

iii.State – the state of an object includes all the static properties plus the current values of these properties.

iv.Class- a class is a blueprint defining the structure(characteristics and behavior) of objects on which actual objects are created.

2.   How do objects communicate with each other?

Ans. Objects communicate with each other through message passing.

3.   How can you implement abstraction in programming terms?

Ans. To implement abstraction in software terms we define a class. There can be many classes for an entity.

4.   Classes are user defined type. Explain.

Ans. To represent an abstraction in programming terms, a user defined type is created based on which multiple objects of same type can be created. Thus in software terms, a class represents a type with certain specifications. Once a class in created, multiple objects of this class type can be created.

5.   How are classes and objects implemented in software terms?

Ans.   In   software   terms,   classes   and   objects   are   implemented   by   representing   the characteristics/properties/attributes as data members and behavior through methods/member-functions.

6.   "Object is an instance of a class", Explain

Ans: Object of a class contains data and functions provided in a class. It possesses all the features of a class. Hence object is termed as instance of a class.

7. State two differences between fundamental and user-defined data type. Ans.

Comparison of Fundamental & User defined data type.	
Fundamental data type	User defined data type
These are inbuilt data type provided by the Java Language.	These are data types created by the user using fundamental or user defined data type or both.
The size of it is fixed.	The size of different user-defined data type depends upon the size of the individual components of it.
These data types are available in all parts of a program within a class.	These data types are available only as specified by the access specifiers.

8. State two differences between a class and an object. Ans.

A class	An object
Class is a blueprint or template from which objects are created.	Object is an instance of a class.
Class is a group of similar objects.	Object is a real world entity such as pen, laptop, mobile, bed, keyboard, mouse, chair etc.
Class is a logical entity.	Object is a physical entity.

9. Why is a class called a user-defined data type?

Ans. Primitive data types are the general and fundamental data types that we have in Java and those are byte, short, int, long, float, double, char, boolean, etc., User defined data types are those that user / programmer himself defines.

10. What is an access specifier? Which two access specifier is used in a class declaration?

Ans. Access modifiers (or access specifiers) are keywords in object-oriented languages that set the accessibility of classes, methods, and other members. Access modifiers are a specific part of programming language syntax used to facilitate the encapsulation of components.

The public and default access specifier is used in a class declaration.

11. Why is a class called an object factory?

Ans. A class is called an object factory because objects are created from a class. An object is an instance of a class.

The following statements create two objects s1 and s2 of the class Student.

Student s1 = new Student();

Student s2 = new Student();

So, we have a single class Student but we can create as many objects as we want (like s1, s2, etc.) from that single class.

This is similar to what happens in a factory. Consider a factory which produces car. They have only a single design of a car but produce multiple cars from that single design.

Things are similar in the world of classes and objects. There is a single definition of a particular class (like Student) but we can produce many Student objects (like s1, s2) from that single class.

12.   State two rules you should follow for naming a class.

Ans. While using names for a class the following set of rules are to be kept in mind.

a.   It can have any alphabet (capital or small), digits, underscore and dollar sign characters. For example, *a, b, cat, mat123, cost_price, Topaz$* are all example of valid identifier.

b.   It should not begin with digits or should not contain any special character. For example *2ab, ab#c, top@, etc.*, are invalid identifiers as it either begins with a digit or contain special characters (like #, @).

c.   It cannot have a space between it. For example, *Simple Interest* or *Selling Price* are invalid class-names as it contains a space.

d.   It must not be a *keyword.* For example, *for, while, do* are invalid class-names as they are keywords and are assigned some special function for the language.

e.   It can be of any length. Even though Java gives you the flexibility to provide a huge length for an identifier a very long name is impractical and difficult to manage.

CH 4: VALUES AND DATA TYPES

1. What is Unicode?

Ans.Java uses the Unicode character set. It is a two-byte code set that has characters representing almost all characters in almost all human alphabets and writing systems around the world. Unicode is a superset of ASCII and the numbers 0 to 127 has the same meaning in both ASCII and Unicode formats.

2. State the differences between Syntax errors and Logical errors.

Ans: The compiler can only translate a program if the program is syntactically correct; otherwise the compilation fails and you will not be able to run your program. Syntax refers to the structure of your program and the rules about that structure.

The second type of error is a run-time error, so-called because the error does not appear until you run the program. In Java, run-time errors occur when the interpreter is running the byte code and something goes wrong.

3. Differentiate between Testing and Debugging.

Ans: Testing is the process of checking program logic manually to ensure whether it contains any error or not. Debugging is the process of removing errors from a program.

6.   What are tokens?

Ans: Tokens are the smallest individual units in a program. Also known as lexical units. The types of tokens: keywords, identifiers, literals , punctuators and operators.

7. What are keywords? Can keywords be used as a identifiers?

Ans: Keywords are the reserved words that convey a special meaning to the language compiler. No, keywords are reserved for special purpose and must not be used as identifiers.

8. What is an identifier? What is the identifier formatting rule of Java? OR What are the rules for naming a variable?

Ans: Identifiers are names given by the programmer to different parts of a program e.g. variables, functions, classes,packages etc. The rules of naming identifiers in Java.

(i) Can contain alphabets, digits, dollar sign and underscore.

(ii) Must not start with a digit.

(iii) Cannot be a Java keywords.

(iv) Can have any length and are case-sensitive.

9. State the difference between Token and Identifier.[2008]

Ans: The smallest individual unit of a program is known as Token.every unit that makes a statem is known as atoken. The following Tokens are available in Java: Keywords, Identifiers, Literals, Punctuations, Operators.

Identifiers are names given by the programmer to different parts of a program e.g. variables, functions, classes etc.

10. What are literals? How many types of integer literals are available in Java?

Ans: A literal is sequence of characters used in a program to represent a constant value. For example 'A' is a literal that represents the value A of type char, and 17L is a literal that represents the number 17 as value of type long. Different types of literals available in Java, they are: Integer literal, Float literal, Boolean literal, Character literal, String literal and null literal.

Integer literals are of three types – Decimal Integer literal (9) , Octal integer literal(09) and Hexadecimal integer literal (0X9)

11. What is an integer constant? Write integer forming rule of Java.

Ans: Integer constants are whole numbers without any decimal part. The rule for forming an integer constants is: An integer constant must have at least one digit and cannot contain a decimal point. It may contains + or – sign. A number with no sign is interpreted to be positive.

12. What do you mean by Escape sequence and name few escape sequences in Java?

Ans: Java has certain nongraphic characters (nongraphic characters are those characters that cannot be typed directly from keyboard e.g. backspace, tab, carriage return etc.). Those nongraphic characters can be represented by escape sequence. An escape sequence is represented by backslash followed by one or more character. The few escape sequence characters are: \n for new line, \t for Horizontal Tab, \v for Vertical Tab, \b for Backspace, \" for Double Quotes etc.

13. What is meant by a floating constant in Java? How many ways can a floating constant be represented into?

Ans: Floating constants are real numbers with fractional points. A floating constant can either be represented in fractional form (e.g. 0.00456) or in exponent form
(e.g. 4.56E-03)

14. Differentiate between Integer and Floating type constants.

Ans: Integer constants are the whole numbers (without decimal points). e.g. 1231. Floating point constants are fractional numbers (number with decimal points). e.g. 14.2356

15. Write the following real constants into fractional form: 0.113E04, 0.417E-04, 0.4E-05, 0.123E02

Ans: 0.113E04 becomes 1130, 0.417E-04 becomes .0000417, 0.4E-05 becomes .000004, 0.123E02 becomes 12.3

16. What is a type or 'Data Type'? How this term is related to programming?

Ans: A type or datatype represents a set of possible values. When we specify that a variable has certain type, we are saying what values the expression can have. For example to say that a variable is of type int says that integer values in a certain range can be stored in that variable.

Datatypes in programming are the means to identify the type of data and the associated operations of handling it.

17. What is primitive data type? Name its different types.

Ans: Primitive(fundamental) data types are those that are not composed of other data types. Numeric Integral, Fractional, character and boolean are different primitive data types.

18. Differentiate the two kinds of data types? [2006]

Ans: The two types of data types are: Primitive and non-primitive/composite/user define data types.

The primitive data types are the basic datatypes provided by the language. It is used to define and hold a value in a named variable. They are: byte, short, int, long, float, double, char and Boolean.

The non-primitive/reference data types are created using primitive datatypes. It is used to store the memory address of an object. The reference datatypes are: class, array and interface.

19. How many bytes occupied by the following data types: byte, short, int, long, float, double, char, boolean.

Ans: char-2 byte, byte-1 byte, short-2 bytes, int-4 bytes, long-8 bytes, float-4 bytes, double-8 bytes, boolean-Java reserve 8 bits but only use 1 bit.

20. What is the range of the following data types: byte, short, int, long, float, double, char, boolean.

Ans: byte $\rightarrow$ -2^7 to $+2^7-1$

short $\rightarrow$ -2^{15} to $2^{15}-1$

int $\rightarrow$ -2^{31} to $2^{31}-1$

long $\rightarrow$ -2^{63} to $2^{63}-1$

float $\rightarrow$ -3.4×10^{38} to 3.4×10^{38}

double $\rightarrow$ -1.7×10^{308} to 1.7×10^{308}

char $\rightarrow$ 0 to 65536

boolean → true or false

21. What do you mean by variables? [2006]

Ans: A variable is a named memory location, which holds a data value of a particular data types. E.g. double p;

22. What do you mean by variables? What do you mean by dynamic initialization of a variable?

Ans: A variable is a named memory location, which holds a data value of a particular data types. When a method or functions is called and the return value is initialized to a variable is called dynamic initialisation.

e.g. double p=Math.pow(2,3);

23. Differentiate between character and boolean data type.

Ans.

Character

i. stores Unicode character

ii. Size 2 bytes

iii. Range : 0 to 65,535

Boolean

i. used to represent a single true/false value

ii. Java reserves 8 bits but uses 1 bit

iii. Range : true or false

24. How can you change a variable to a constant? Give an example.

Ans. The keyword final makes a variable as constant , so that the its value cannot be changed during program execution.

e.g final double rate=5.5;

CH 5: OPERATORS AND EXPRESSIONS

1. What is the function of an operator? Name the types.

Ans: Operators are special symbols that represent operations that can be carried out on variables, constants or expressions. An operator is mostly an symbol and sometimes a keyword also.

The different types of operators are:
Arithmetic operator(unary operators, binary operators, increment/decrement operators)
Relational operators
Logical Operators
Assignment operators
Conditional operator ?:
New operator
Dot(.) operator

2. What are arithmetic operators?

Ans: Arithmetic operators are used for various mathematical calculations. The result of an arithmetical expression is numerical values. Arithmetical operators are of following types: Unary and Binary operators and increment/decrement operator.

3. Write major difference between the unary and binary operators?

Ans: The operators that acts on one operand are referred to as Unary Operator. There are two Unary operators Unary + operator and Unary – operator. The operators that acts upon two operands are referred to as Binary Operator. The Binary Operators are Addition (+), Subtraction (-), Multiplication (*), Division (/) and Modulus (%).

4. What is increment operator? What are postfix and prefix increment operators?

Ans: The '++' operator is called increment operator. The increment operators add 1 to its operand. These are two types (i) Prefix and (ii) Postfix The prefix version comes before the operand for e.g. ++a, where as postfix comes after the operand e.g. a++

5. Find the value of x after evaluating x += x++ + −x + 4 where x=3 before the evaluation. Explain your answer.

Ans: Result is 13, because x++ is 3, −x is 2 + 4 the answer is 9 add this with x that is 3 it becomes 12 and due to pre increment of x++ the result becomes 13.

6. What do you mean by Relational Operators?

Ans: Relational operators are used to determine the relationship between different operands. These are used in work of compression also. The relational expression (condition) returns 0 if the

relation is false and return 1 if the relation is true. < (less then), > (greater then), <= (less then equals to), >= (greater then equals to), == (equals to), != (not equals to).

7. What is Logical operators?

Ans: The logical operators combine the result of or more than two expressions. The mode of connecting relationship in these expressions refers as logical and the expressions are called logical expression. The logical expression returns 1 if the result is true otherwise it returns 0. The logical operators provided by Java are && Logical AND, || Logical OR, ! Logical NOT.

8. What do you mean by Assignment Statement or Assignment Operator?

Ans: Assignment operator is represent by symbol '='. It takes the value on the right and stores it. It assigns one value to the other.

9. Illustrate '?' operator with an example? [2009]

Ans: It is a conditional operator, that stores a value depending upon a condition. This operator is also known as ternary operator. The syntax for this operator is expression1?expression2:expression3 . and the example is bonus=sales>15000?250:50;

10. What is the purpose of new operator? [2006]

Ans: We can use new operator to create a new objects or new array.

Ex. myCar obj = new myCar();

int arr[] = new int[5];

11. What do you mean by precedence? Illustrate with the help of example.

Ans: Precedence is the order in which a program evaluates the operations in a formula or expression. All operators have precedence value. An operator with higher precedence value is evaluated first then the operator having lower precedence value. consider the following example

x = 5 + 4 *9;

The value of this expression is 29 not 54 or 34. Multiplication has been performed first in this expression.

12. What is operands?

Ans: An operator acts on different data items/entities called operands. The objects of the operation are referred as operands.

13. What do you mean by constant? How you declare a variable as constant variables.

Ans: The memory variables/locations whose values cannot be changed within the program is called constants. The keyword final makes a variable as constants.

e.g. final int x=203;

14. What do you mean by type conversion? What is the difference between implicit and explicit type conversion explain with example.

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

An implicit type conversion is a conversion performed by the compiler. The Java compiler converts all operands up to the type of the largest operand. This is also known as type promotion. e.g. 'c'-32 is converted to int type. Where as an explicit type conversion is user defined that forces an expression to be of specific type, this also known as type casting. e.g. (float)(x+y/2)

15. Explain the methods print() and println()?

Ans: A computer program is written to manipulate a given set of data and to display or print the results. Java supports two output methods that can be used to send the results to the screen. print() method println() method.

The print() method sends information into a buffer. This buffer is not flushed until a new line (or end-of-line) character is sent. As a result print() method prints output on one line.

The println() method by contrast takes the information provided and displays it on a line followed by a line feed.

16. What is an Expression? Explain its different types.

Ans: An Expression is any statement which is composed of one or more operands and which returns a value. It may be combination of operators, variables and constants. There are different types of expressions.

(1) Constant Expressions: 8 * 12 /2

(2) Integral Expressions: formed by connecting integer constants x = (a + b)/2

(3) Logical Expressions: a > b   or a!=b

(4) Boolean expression: (y+z) >= (x/z)

17. Mention two different styles of expressing a comment in a program. [2005]

Ans: The two ways of inserting a comments in a program are:

(i) using //   single line comments

(ii) using /*   */   multiple line comments

18. What is a compound Statement? Give an Example. [2005]

Ans: It is a block of code containing more then one executable statement. In Java the { } is called block and the statements written under {} is called compound statements or block statement. The { } opening and closing sc   aces indicates the start and end of a compound statement.

```
for(int i=1;i<=5;i++)
{
System.out.println("Hello");
System.out.println("How");
System.out.println("are you?");
}
```

CH-7: INPUT IN JAVA

1. What are the different types of variables? How are they initialized?

Ans. Local variables (declared within the methods) must be declared and initialized before they are used. Local variables are explicitly initialized and are not initialized to default values.

Class and instance variables (declare inside the class but outside the method) can only be declared and used but are assigned default values.

2. What are the default values of the following primitive types:

Ans. boolean- false

int-0

char='\u0000'

long=0

float=0.0

3. What is the default value of reference data type ?

Ans. The default value of reference datatype is a null value.

4. What are the different ways to input values in Java?

Ans. The various ways to input values in an operation are:

- By using assignment
- By using function argument
- By using Scanner class
- By using Input Stream Reader class

5. What are the advantages of input through Scanner class?

Ans. Program logic is simple and Scanner class has various methods to manipulate input data. String manipulation is easy as each word is obtained as a token and handled separately.

6. Differentiate between next ( ) and nextLine( ).

Ans. The next( ) accepts the next token from the Scanner object as a string.

nextline( ) accepts a line of text .

7. What is the function of a Scanner class? In which package does it belong?

Ans. The Scanner class is a class in java.util, which allows the user to read values of various types, from either keyboard or a file.

8. Name the functions of the Scanner that is used to:

a. Accept a number of long data type

b. Accept a group of

alphabets. Ans. a.

nextLong( )

b. nextLine()

9. What is a bug? What is debugging?

Ans. A bug is an error, flaw, failure or fault in a program or system that causes it to produce an incorrect or unexpected result, or to behave in unintended ways.

The process of removing a bug is called debugging.

10. What are the different type of errors that may occur in a Java program?

Ans. Errors in a program in Java can sc oadly be classified into three categories:

- Syntax errors
- Logical errors
- Run-time errors

11. What are syntax errors? Give two examples.

Ans. A syntax error is an error in the syntax of a sequence of characters or tokens that is intended to be written in a particular program.

The common syntax errors are:

- Missing semicolon
- Mismatched sc aces in classes and methods.

12. What are run-time errors? Give two examples.

Ans. An error that occurs during the execution of a program is called run time error.

The run-time errors are:

- Dividing an integer by zero.
- Accessing an element that is out of bounds of an array.

13. What are logical errors. Give examples.

Ans. These errors are due to the fact that the specifications are not respected. The program is compiled and executed without errors but does not generate the desired output.

The logical errors

public static int sum(int a,int b)

{return a-b;}//return wrong value i.e. difference instead of sum

14. Write the difference between close( ) and exit( ).

Ans. The close( ) of the Scanner class closes the scanner and allow Java to reclaim the Scanner's memory.

System. exit(0) stops the execution of the program immediately

CH 8: MATHEMATICAL LISC ARY FUNCTIONS

1. Name the class that is used for different mathematical functions. Give an example of a mathematical function.

Ans. Math class. E.g of mathematical functions are Math.pow( ) , Math.sqrt( )

2. Give the output of the following expressions.

    i. If x = -9.99, calculate Math.abs(x);

    ii. If x = 9.0, calculate Math.sqrt(x);

Ans.
   i.
9.99

  ii.
3.0

 A. Give the output of the following functions:

1. **Math.floor(-126.349)**

Ans. -127.0

2. **Math.max(45.6,17.3)**
Ans. 45.6

3. **Math.min(0.1,0.0)**
Ans. 0.0

4. **Math.**
pow(4,3)
Ans. 64.0

5. **Math.sqrt(625)**

Ans. 25.0

6. **Math.csc**
t(125)

Ans. 5.0

7.
    Math.max(11,1

1)

Ans. 11

8.   **Math.ceil(-**
12.56)

Ans. -12.0

   9. **Math.floor(15.3**
   6) Ans. 15.0

   10.   **Math.round(**
   146.5) Ans. 147.0

B.   **Write equivalent Java expressions for the following:**

$\sqrt[i]{a+b}$

Ans. Math,sqrt(a+b)

i. $\frac{1}{3}a^3 + \frac{1}{4}b^3$

Ans. 1/3.0*Math.pow(a,3)+1/4.0*Math.pow(b,3)

ii. $s = ut + 1/2at^2$

Ans. s=u*t+1/2.0*a*Math.pow(t,2);

iii. $\sqrt{d^2 + b^2}$

Ans. d=Math.sqrt(l*l+b*b);

v. $\dfrac{\sqrt[3]{5x^2+y}}{\sqrt[4]{x+11y^3}}$

Ans. Math.cbrt(5*x*x+y)/Math.pow(x+11*y*y*y, 1/4.0)

vi. $\dfrac{x+y}{\sqrt{|x-y|}}$

Ans.(x+y)/Math.sqrt(Math.abs(x-y))

CH 9: CONDITIONAL CONSTRUCTS IN JAVA

1.   What are the three constructs that govern statement flow?

Ans: The three constructs that governs statement flow are: Sequence, Selection and Iteration constructs.

2. What is a selection/conditional statement? Which selection statement does Java provides?

Ans: A selection statement is the one that is used to decide which statement should be executed next. This decision is based upon a test condition. The selection statements provided by Java are: if-else and switch. The conditional operator ?: can also be used to take simple decision.

3. What is an 'if' statement? Explain with an example.

Ans: The 'if' statement helps in selecting one alternative out of the two. The execution of 'if' statement starts with the evaluation of condition. The 'if' statement therefore helps the programmer to test for the condition. General form of 'if' statement.

```
if(expression) statement
if(marks>=80)
System.out.println("Grade A");
```

4. What is the significance of a test-condition in an *if* statement?

Ans: It is the test condition of an *if* statement that decides whether the code associated with the if part or the one associated with the else part should be executed. The former is executed if the test condition evaluates to true and the latter works if the condition evaluates to false.

5. Write one advantage and one disadvantage of using ?: in place of an if.

Ans: Advantage: It leads to a more compact program.

 Disadvantage: Nested ?: becomes difficult to understand or manage.

1. What do you understand by nested 'if' statements?

OR

1. Explain with an example the if-else-if construct. [2007]

Ans: A nested 'if' is an statement that has another 'if' in its body or in it's appearance. It takes the following general form.

```
if(ch>='A')
{
        if(ch<='Z')
        ++upcase;
        else
        ++other;
}
```

6. What is the problem of dangling-else? When does it arise? What is the default dangling-else matching and how it is overridden?

Ans: The nested if-else statement introduces a source of potential ambiguity referred to as dangling-else problem. This problem arises when in a nested if statement, number of if's is more than the number of else clause. The question then arises, with which if does the additional else clause property match. For Example

```
if(ch>='A')
if(ch<='Z')
++upcase;
else
++other;
```

The indentation in the above code fragment indicates that programmer wants the else to be with the outer if. However Java matches an else with the preceding unmatched if. One method for over-riding the default dangling-else matching is to place the last occurring unmatched if in a compound statement, as it is shown below.

```
if(ch>='A')
{
if(ch<='Z')
++upcase;
}
else
++other;
```

7. Compare IF with ?:(Ternary operator)?

Ans: (i) Compare to IF sequence, ?: offer more concise, clean and compact code, but it is less obvious as compared to IF. (ii) Another difference is that the conditional operator ?: produces an expression, and hence a single value can be assigned, for larger expression If is more flexible. (iii) When ?: operator is used in its nested form, it becomes complex and difficult to understand.

8. What is a switch statement? How is a switch statement executed?

Ans: Switch statement successively tests the value of an expression against a set of integers or character constants. When a match is found, the statements associated with the constants are executed. The syntax :

```
switch(expression)
{
case constants : statements; sc  eak;
case constants : statements; sc  eak;
default:
}
```

The expression is evaluated and its values are matched against the value of the constants specified in the case statements. When a match is found, the statements sequence associated with that case is executed until the sc eak statement or the end of switch statement is reached.

9. What is the significance of sc eak statement in a switch statement?

Ans: In switch statement when a match is found the statement sequence of that case is executed until a 'sc eak' statement is found or the end of switch is reached, when a 'sc eak' statement is found program execution jumps to the line of code following the switch statement.

10. What is a control variable in a switch case?

Ans: A control variable in switch case is one which guides the control to jump on a specified case. e.g. switch(x), here 'x' is the control variable.

11. What is a "fall through"?

Ans: The term "fall through" refers to the way the switch statement executes its various case sections. Every statement that follows the selected case section will be executed unless a sc eak statement is encountered.

12. What is the effect of absence of break in a switch statement?

Ans: Absence of break statement in a switch statement leads to situation called "fall through" where once a matching case is found the subsequence case blocks are executed unconditionally

13. Write one limitation and one advantage of switch statement?

Ans: Advantage: More efficient in case a value is to be tested against a set of constants. Disadvantage: switch can test only for quality, so for the rest of comparisons one needs to use if-else.

14. Discuss when does an if statement prove more advantageous then switch statement.

Ans: In the following case if statement proves to be more advantage over switch statement: (i) When a range of values need to be tested for. (ii) When relation between multiple variables needs to be tested. (iii) When multiple conditions need to be tested. (iv) When expressions having a data type other then integer or character need to be tested.

15. When does switch statement prove more advantageous over an if statement?

Ans: The switch statement is more advantageous then the if statement when the test expression whose data type is either of byte, short, character, integer or long is to be tested against a set of constants. The reason being that the switch statement evaluates the expression once whereas the equivalent if statement evaluates the expression repeatedly.

16. Explain, with the help of an example, the purpose of default in a switch statement. [2005]

Ans: The default section is an optional part of the switch statement and the statement written under default clause are executed when no matching case is found.

```
switch(n)

{

case 1: System.out.println("Sunday"); break;
case 2: System.out.println("Monday"); break;
case 3: System.out.println("Tuesday"); break;
case 4: System.out.println("Wednesday"); break;
case 5: System.out.println("Thursday"); break;
case 6: System.out.println("Friday"); break;
case 7: System.out.println("Saturday"); break;
```

default : System.out.println("Invalid Input");
}

     17. Differentiate between if and switch statements. [2006]

Ans: Both are used as selection statements, there is some difference in their operations. (i) switch can only test for equality, where as if can evaluate a relational or logical expression. (ii) it statement can handle ranges , where as switch case level must be a single value. (iii) if statement can handle floating point test also, where as the switch case labels must be an integer or character.

Chapter 10 : Iteration constructs in Java

1. What are iteration statements? Name the iteration statements provided by Java?
Ans: Iteration statements are statements that allow a set of instructions to be executed repeatedly till some condition is satisfied. The iteration statements provided by Java are: for loop, while loop, do-while loop.
2. Name the Elements that Control a Loop.

Ans. Every loop has elements that control its execution. These elements can be grouped under the following in general:

- Initialization Expression(s). Before entering a loop, the variable that controls the execution of it is called initialization. The initialization of a variable may be inside a loop or outside it. Whatever it may be it is executed only once before the iteration starts.
- Test Expression. The *test-expression* (*also called test-condition*) is a condition, which decides whether the *loop body* will be executed or not. Till the *test expression* evaluates to true, the *loop body* gets executed otherwise the loop is terminated.
- Update Expression(s). The *update expression*(s) change the value(s) of the control variable(s). The *update expression*(s) is usually made to be executed; before the next iteration.
The Body of the Loop. The statements that are executed repeatedly (as long as the, *test expression* is *true*) form the body of the loop
3. What is the difference between entry controlled and exit controlled loop? or
What is the difference between while and do-while loop?
Ans: While loop is known as entry controlled loop and do-while loop is known as exit-controlled loop. The differences between these two loops are: (1) In while loop the test expression is evaluated at the beginning where as in do-while loop test expression is evaluated at the end, after the body of the loop. (2) In while loop if the test expression is false loop does not continued but in do-while whatever the test expression may be the loop execute at least once.
4. Explain the difference between break and continue with an example. [2005] [2008]
Ans: Both statements are used as a jumped statement. But there is a difference between Break and Continue statement. The break statement terminate the loop, but the continue statement skip the rest of the loop statement and continues the next iteration of the loop.
e.g. of Break Statement

```
int i=0;
while(i<=10)
{
i++;
if(i==5)
break;
System.out.println(i);
}
```
e.g. of Continue Statement
```
int i=0;
while(i<=10)
{
i++;
if(i==5)
continue;
System.out.println(i);
}
```
5. Compare and discuss the suitability of three loops in different situation?

Ans: (i) The for loop should be preferred if number of iteration is known beforehand. (ii) The while loop should be preferred if the number iteration is dependent upon some control variable. (iii) The do-while loop should be preferred if the number of iterations is dependent upon user response.

6. Explain the term for loop with an example. [2005]

Ans: In Java the 'for' statement is the most common iterative statement. The general syntax of the for loop is,
```
for(initialization; test-expression; increment)
{
body of the loop
}
```
This loop is executed at initial value, condition and increment. Three statement separated by semi colons are placed within the parenthesis. For example:
```
for(int i=1;i<=10;i++)
{
System.out.println(i);
}
```
7. Give an example to show how multiple initialization and updation as performed in a for-loop.

Ans.
```
int i, j;
for(i=1, j=10 ; i<=10 ; j-- , i++)
{
System.out.println("i=" +i+ " "+ "j="+j);
}
```
8. What do you meant by an infinite loop? Give an example. [2008]

Ans: Infinite loop is an endless loop whose number of iterations is not fixed.
eg: for(;;)
System.out.println("School");
9. Differentiate Null loop and Infinite loop.
Ans: A Null loop does not contain any statement to repeat where as infinite loop repeats execution of the statements for endless iterations.
e.g. of null loops for(int i=1;i<=10;i++);
e.g. for infinite loop for(int i=10;i>=1;i++)

10. What do you mean by delay loop?
Ans: A null loop is also called delay loop which does not repeat the execution of any statement but keeps the control engaged until the iterations are completed.
11. Compare loops according to its usage.
Ans. The for loop is appropriate when you know in advance how many times the loop will be executed, *i.e.*, the first and the last limit is already known. The other two loops while and do-while loops are more suitable in situations when it is not known in advance when the loop will terminate. The while should be preferred when you may not want to execute the *loop-body* even once (in case the *test condition* is false), and the do-while loop should be preferred when you're sure you want to execute the *loop-body* at least once.
12. Give the general syntax of a do-while loop. How do you create infinite loops using do-while loop structure?
Ans. The syntax of the do-while loop is:

<initialization>
 do
{
   statement;
   <update expression>
} while (condition);
To create an infinite loop you need to make the condition always result to true. For

example,

do

{
System.out.println("Hello");;
}while (true);
13. Give the general syntax of a while-loop. How do you create infinite loops using a while-loop structure?
Ans. The syntax of a while loop is,
<initialization>

while (condition or test-expression)
{
body-of-the-loop;
<update expression>
}
To create an infinite loop you need to make the condition always result to true. For

example, do

```
while (true)
{
System.out.println("Hello");;
}
```

14. State one similarity and one difference between while and do-while loop. [2005]
Ans: Similarity: In both loops there is a chance to forget the increment statement inside the loop. Difference: In while loop the test expression is evaluated at the beginning where as in do-while loop test expression is evaluated at the bottom, after the body of the loop.
15. Name two jump statements and their use.
Ans. The 'break' statement is used to exit from a loop or switch block.
The 'continue' statement is used to skip the remaining statements in a loop and continue with the next iteration.

Chapter 11: Nested loops

1. What is nested loop?
Ans. When a loop construct lies inside the body of another loop, it is called nested loop
2. What is the use of labels in Java?
Ans. Java provides a mechanism for exiting nested loops. We can label any of the loops and switches with <label>: statement. Labelled blocks are useful with break and continue.
     We use break <label> to break out of statements
     We also use continue <label> to return to the next iteration in a labeled loop.
3. Write the syntax of label statement.
Ans. Syntax:
<label>: statement
We label a statement by placing a legal Java identifier followed by colon (:) before the statement.
4. Write an example of labeled break within nested for loop
Ans. Example of labeled break:

```
bk:
for ( i=0 ; i<5 ; i++ ) {
    for ( j =0, j<3 ; j++ ) {
    if ( a = b ){
        c=1; break bk;
        }
    }
}
```

5. What are Nested-loops? Give an example of a nested for-loop to show its functionality.
 Ans. A loop within another loop is called nested loop. For example,

```
int x , y;
    for(x=1;x<=3;x++) // outer loop
{
for(y=1; y<=3 ; y++) // inner loop
{
```

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

Chapter 12 : Computing and Ethics

Answer the following Questions.

1. What is Computer Ethics?

Ans. Computer ethics deals with the procedures, values and practices that govern the process of consuming computing technology and its related disciplines without damaging or violating the moral values and beliefs of any individual, organization or entity.

Computer ethics refer to the behavior and ways of thinking of computer users in situations where a choice can affect the dignity and well being of the other.

2. What is software ethics?

Ans. Software ethics refer to ensuring that the software being used is not pirated or unauthorized.

3. Why is unauthorized copying of software illegal?

Ans. Unauthorized copying of software is illegal because:

• It deprives the programmer of fair return of their work

• It harms the community indirectly as it results in price-rises and inhibits the development of new software products.

4. Name the two alternatives to unauthorized copying.

Ans. The two alternatives are to use public domain software or shareware.

5. Differentiate between public domain software and shareware.

Ans. The differences are as follows:

• Public Domain Software: the software that is dedicated to public domain which means that the software is not subjected to any copyright restrictions. It can be copied and shared freely.

• Shareware : the software that is encouraged by the developer to be copied and distributed freely for a nominal amount or free registration.

6. What is Software Piracy? How does shareware deal with software piracy?

Ans. Software piracy is used to describe the act of illegally using, copying or distributing software without ownership or legal rights.

Shareware is a good way to market software. It allows consumers to evaluate an application prior to making a purchase decision. They can easily determine if it meets their business or personal needs, which usually results to a satisfied customer.

7. List major ethical issues.

Ans. Major ethical issues are:

- Individual's right to privacy
- Intellectual property rights
- Accuracy to information

8. Why do you think in developing countries like India, it is difficult to stop software piracy?

Ans. Software piracy is hard to stop for several reasons:

a. It's not a violent crime, so eliminating the criminals by killing them is not really an option. As such, the only remaining option is a legal approach - charging them with a crime and threatening them with prison if they don't quickly agree to a guilty plea.
b. Sharing cracked software is easy and hard to detect.
c. People who can afford buying movies and games generally do so; people who cannot afford it will either pirate them or not get them at all.
d. The price tag associated with legal software is generally high.

9. What are the different ways of stopping Software Piracy?

Ans. The different ways to stop software piracy are:

- Educate young minds on the licensing requirements of software purchases
- Conduct a self-audit of your software licenses
- Acquire any licenses needed for full compliance
- The most widely used method is the license key; code that is built into an application to require a valid key to unlock the software.

10. What is Intellectual Property right?

Ans. The intellectual property rights are the rights of the owner of information to decide how much information is to be exchanged, shared or distributed. It gives the owner the right to decide the price to do so.

11. List two main areas of Industrial Property.

Ans. Copyright and Trademark.

12. What are the two major threats to security of software and information?
Ans. The two major threats are hacking (attempts to gain information from undisclosed areas) and piracy (unauthorized duplication of software).

13. How can spamming be reduced?
Ans. By using these precautions you can greatly mitigate what spam you do receive and prevent most spam from ever happening.

- Be careful where you enter your email at.
- Create or use disposable email addresses for websites you do not trust.
- Never open spam when you receive it.
- Keep your computer virus and malware free.
- If your friends are sending you emails sent to a large recipient list, request that they use BCC instead of TO or CC, so that other recipients cannot see your email address; or request they stop including you if you do not want to receive the emails.
- Do not list your email address on your website or anywhere the public can access it.

14. Name the common forms of software piracy.

Ans. The common forms of software piracy are:
- Softlifting - purchasing a single licensed copy and sharing contrary to the license terms
- Software counterfeiting – installing and selling copyrighted software

15. How is phishing and pharming performed to perform Cybercrime?
Ans. Phishing is a fraudulent practice of sending emails purporting to be from reputable companies in order to induce individuals to reveal personal information, such as passwords and credit card numbers.
Pharming is the fraudulent practice of directing Internet users to a bogus website that mimics the appearance of a legitimate one, in order to obtain personal information such as passwords, account numbers, etc.

16. What are the different types of Cybercrimes?

Ans. The different types of cyber crime are:
- Financial fraud crimes
- Cyberterrorism
- Cyberextortion
- Cyberwarfare
- Computer as a target
- Computer as a tool

17. How are Hackers different from Crackers?
Ans. Hackers are those computer experts which break into computers to check any vulnerably so that no one can misuse the services. These are really intelligent and smart persons who use their ability to protect the community from cyber crimes and computer thefts.

Whereas, Crackers are those people who use their knowledge to do computer crimes for gaining popularity among peoples and to earn fast money. They break into computer networks for their enjoyment and cause harm to them. These persons do not have real knowledge and know something about using the particular software to break into computers.

Answer as directed:
1. Convert the following segment into an equivalent do loop.

int x,c;

for(x=10, c=20; c>10 ; c=c-2)
x++;
Ans.
int x , c;
 x=10; c=20;
do
{
c = c - 2;

```
  x++;
} while ( c > 10 );
```

2. Analyze the following program segment and determine how many times the body of loop will be executed (show the working).

```
x=5;                            y=50;
while(x<=y)
{
y=y/x;
System.out.println(y);
}
```
Ans.

X	Y	x<=y	y=y/x
5	50	true	10
5	10	true	2
5	2	false	-

The loop executes twice.

3. Convert the following segment into equivalence for loop.

```
int i=0;

while(i<=20)
{
System.out.print(i+" "); i++;

}
```
Ans.

```
int i; for(i=0;i<=20;i++)

{
System.out.print(i+ "  ");
}
```

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

```
int m=2;

int n=15;
for(int i = 1; i<5; i++);
m++; –n;
System.out.println("m=" +m);

 System.out.println("n="+n);
```

 Ans. m=3 n=15

Sample Programs:

PROGRAMME   1:
```
/* to check and display whether a number is even or odd */
import   java.util.*;
 class   class9
{
      public   static   void   main(String   args[ ])
       {
              Scanner      sc  =new     Scanner (System.in);
               int   n;
               System.out.println("Enter a number");
               n=sc.nextInt();
              if(n%2==0)
              {
                      System.out.println("The number is EVEN");
              }
              else
              {
                      System.out.println("The number is ODD");
              }
       }
 }
```

PROGRAMME   2:
```
/* to check and display whether a number is divisible by 15 or not */
import   java.util.*;
 class   class9
{
      public   static   void   main(String   args[ ])
      {
              Scanner          sc  =new    Scanner       (new
InputStreamReader(System.in));
              int   n;
              System.out.println("Enter a number");
              n=sc .nextInt();
              if(n%15==0)
              {
                      System.out.println("The number is divisible by 15");
              }
              else
              {
                      System.out.println("The number is not divisible by 15");
              }
      }
}
```

PROGRAMME   3:
```java
/* to check and display whether the number has single digit or two digit or more */
import   java.util.*;
 class   class9
{
        public   static   void   main(String   args[ ])
        {
                 Scanner   sc   =new     Scanner (System.in);
                int   n,p;
                System.out.println("Enter a number");
                n=sc .nextInt();
                p=Math.abs(n);
                if(p>=0 && p<=9)
                {
                                System.out.println("The number has single digit");
                }
                else   if(p>=10 && p<=99)
                {
                                System.out.println("The number has two digits");
                }
                else
                {
                                System.out.println("The number has more than 2 digits");
                }
        }
 }
```

PROGRAMME   4:
```java
/* to check and display whether the number +ve or -ve or nutral */
import   java.util.*;
 class   class9
{
        public   static   void   main(String   args[ ])
        {
                 Scanner     sc   =new     Scanner(System.in);
                int  p;
                System.out.println("Enter a number");
                p=sc .nextInt();
                if(p>0 )
                {
                                System.out.println("The number POSITIVE");
                }
                else   if(p<0)
                {
                                System.out.println("The number is NEGATIVE");
                }
                else
                {
                                System.out.println("The number is NUTRAL");
                }
        }
 }
```

PROGRAMME   5:
/* to calculate and display the commission of a salesman (Flat Rate Based) */

```java
import   java.util.*;
 class   class9
{
        public   static   void   main(String   args[ ])
        {
             Scanner      sc  =new   Scanner(System.in);
           double   sales,comm;
            System.out.println("Enter the sales amount");
            sales=sc.nextDouble();
           if(sales >0 && sales <= 50000 )
           {
                    comm=sales*0.02;
                    System.out.println("The commission amount is : "+ comm);
           }
           else    if(sales >0 && sales <= 50000 )
           {
                    comm=sales*0.04;
                    System.out.println("The commission amount is : "+ comm);
           }
           else    if(sales >0 && sales <= 50000 )
           {
                    comm=sales*0.06;
                    System.out.println("The commission amount is : "+ comm);
           }
           else   if(sales >0 && sales <= 50000)
           {
                    comm=sales*0.08;
                    System.out.println("The commission amount is : "+ comm);
           }
           else
           {
                    System.out.println("The amount you have given is not a valid sales
      amount");
```

```
                }
        }
}


```

PROGRAMME   6:

```
/* to calculate and display the income tax (Slab Rate Based) */
import   java.util.*;
 class   class9
{
        public   static   void   main(String   args[ ])
        {
                 Scanner      sc  =new   Scanner (System.in);
                double  income,tax;
                System.out.println("Enter the yearly income");
                Income=sc.nextDouble();
                if(income>0 && income <= 200000 )
                {
                            tax=0;
                }
                else   if(income >200000 && income <= 500000 )
                {
                            tax=0+(income-200000)*0.1;
                }
                else  if(income >500000 && income <= 1000000 )
                {
                            tax=0+200000*0.1+300000*0.2+(income-500000)*0.3;
                }
                else
                {
                            tax=0+200000*0.1+300000*0.2+500000*0.3+(income-1000000)*0.4;
                }
                System.out.println("The Income tax to be paid is : "+ tax);


        }
 }
```

PROGRAMME   7:

```java
/* to calculate and display the FARE (Slab Rate Based) */
import   java.util.*;
 class   class9
{
        public   static   void   main(String   args[ ])
        {
                 Scanner    sc  =new   Scanner(System.in);
                double  dist,famt;
                System.out.println("Enter the distance covered");
                dist=sc.nextInt( );
                if(dist>0 && dist <=100 )
                {
                             famt=100;
                }
                else   if(dist >100 && dist <= 500 )
                {
                             famt=100+(dist-100)*2;
                }
                else  if(dist >500 && dist <= 1000 )
                {
                             famt=100+400*2+(dist-500)*3;
                }
                else
                {
                             famt=100+400*2+500*3+(dist-1000)*4;
                }
                if(dist>2000)
                {
                             famt=famt+famt*0.02;
                }
                System.out.println("The total fare to be collected is : "+ famt);
        }
}
```

PROGRAMME   8:

```java
/* to check either leap year or not or +ve or -ve as per user's choice(Option Based) */
import   java.util.*;
 class   class9
```

```java
{
    public  static  void  main(String  args[ ])
    {
        Scanner    sc =new      Scanner(System.in);
        int  n,ch;
        System.out.println("Press 1 to check leap year , 2 to check +ve or -ve");
        System.out.println("Enter your choice");
        ch=sc.nextInt( );
        if(ch==1 )
        {
            System.out.println("enter a year");
            n=sc.nextInt();
            if(n%100==0)
            {
                if(n%400==0)
                {
                    System.out.println("LEAP YEAR");
                }
                else
                {
                    System.out.println("NOT  A LEAP YEAR");
                }
            }
            else
            {
                if(n%4==0)
                    System.out.println("LEAP YEAR");
                else
                    System.out.println("NOT A LEAP YEAR");

            }
        }
        else if(ch==2)
        {
            System.out.println("enter a number");
            n=sc.nextInt();
            if(n>0)
            System.out.println("POSITIVE");
            else  if(n<0)
            System.out.println("NEGATIVE");
            else
            System.out.println("NUTRAL");
        }
        else
            System.out.println("WRONG CHOICE");
    }
}
```

PROGRAMME   9:

```java
/* to check and display the nature of the quadratic equation */
import  java.util.*;
 class  class9
{
        public  static  void  main(String  args[ ])
        {
                Scanner    sc  =new  Scanner(System.in);
                int   a,b,c,d;
                double   x1,x2;
                System.out.println("Enter the value of a,b and c");
                a=sc.nextInt( );
                b=sc  .nextInt();
                c=sc  .nextInt();
                d=b*b-4*a*c;
                if(d==0)
                {
                        System.out.println("The roots are real and equal");
                        x1=(-1*b)/(2*a);
                        System.out.println("The root is :"+x1);
                }
                else if(d>0)
                {
                        System.out.println("The roots are real but not equal");
                        x1=((-1*b)+Math.sqrt(d))/(2*a);
                        x2=((-1*b)-Math.sqrt(d))/(2*a);
                        System.out.println("The first root is :"+x1);
                        System.out.println("The second root is :"+x2);
                }
                else
                        System.out.println("The roots are imaginary");
        }
}
```

PROGRAMME   10:

```java
/* to take day number as input and it will dispaly the day name, assumed that Monday is the
starting day of the week */
import   java.util.*;//using  if….else  if……else
 class   class9
```

```java
{
    public  static  void  main(String  args[ ])
    {
        Scanner   sc  =new  Scanner (System.in);
        int   d;
        System.out.println("Enter a value from 1 to 7");
        d=sc.nextInt();
        if(d==1)
        {
            System.out.println("MONDAY");
        }
        else  if(d==2)
        {
            System.out.println("TUESDAY");
        }
        else  if(d==3)
        {
            System.out.println("WEDNESDAY");
        }
        else  if(d==4)
        {
            System.out.println("THURSDAY");
        }
        else  if(d==5)
        {
            System.out.println("FRIDAY");
        }
        else if(d==6)
        {
            System.out.println("SATURDAY");
        }
        else if(d==7)
        {
            System.out.println("SUNDAY");
        }
        else
        {
            System.out.println("INVALID CHOICE");
        }
    }
}
import   java.util.*;//using  switch….. case…..
class   class9
{
    public  static  void  main(String  args[ ])
    {
        Scanner    sc  =new   Scanner (System.in);
```

```java
        int   d;
        System.out.println("Enter a value from 1 to 7");
        d=sc.nextInt( );
        switch(d)
        {
                case  1:
                        System.out.println("MONDAY");
                        br eak;
                case  2:
                        System.out.println("TUESDAY");
                        br eak;
                case  3:
                        System.out.println("WEDNESDAY");
                        break;
                case  4:
                        System.out.println("THURSEDAY");
                        break;
                case  5:
                        System.out.println("FRIDAY");
                        break;
                case  6:
                        System.out.println("SATURDAY");
                        break;
                case  7:
                        System.out.println("SUNDAY");
                        break;
                default :
                        System.out.println("WRONG CHOICE");
        }
    }
}
```

PROGRAMME   11:

```java
/* to display the nature of a character */
import   java.util.*;
 class   class9
{
       public   static   void   main(String   args[ ])
       {
                Scanner    sc  =new    Scanner(System.in);
               char   c;
               System.out.println("Enter a character");
               c=sc .next( ).chatAt(0);
               if(c>='A' && c<='Z' )
```

```java
                {
                        System.out.println("CAPITAL LETTER");
                }
                else   if(c>='a' && c<='z' )
                {
                        System.out.println("SMALL LETTER");
                }
                else   if(c>='0' && c<='9' )
                {
                        System.out.println("DIGIT");
                }
                else   if(c==' ' )
                {
                        System.out.println("BLANK SPACE");
                }
                else
                {
                        System.out.println("SPECIAL CHARACTER");
                }
        }
}
```

PROGRAMME   12:

```java
/* to check the alphabet and then change it to its reverse */
import   java.util.*;
 class   class9
{
        public   static   void   main(String   args[ ])
        {
                Scanner   sc   =new   Scanner(System.in);
                char   c;
                System.out.println("Enter a character");
                c=sc .next( ).charAt(0);
                if(c>='A' && c<='Z' )
                {
                        System.out.println("CAPITAL LETTER");
                        System.out.println("ITS SMALL FORM IS : "+(char)(c+32));
```

```
                }
                else   if(c>='a' && c<='z' )
                {
                        System.out.println("SMALL LETTER");
                        System.out.println("ITS CAPITAL FORM IS : "+(char)(c-32));
                }
                else
                {
                        System.out.println("NOT AN ALPHABET");
                }
        }
}
```

<u>**PROGRAMME   13:**</u>

```
/* to dispaly male old or young OR female old or young*/
import   java.util.*;
class   class9
{
        public   static   void   main(String   args[ ])
        {
                Scanner    sc  =new   Scanner ( System.in);
                char   c;
                int   age;
                System.out.println("Enter your age");
                age=sc.nextInt( );
                System.out.println("Press M or m for male and F or f for female ");
                c=sc.next( ).charAt(0);
                if(c>='m' || c<='M' )
                {
                        if(age>50)
                                System.out.println("OLD MALE PERSON ");
                        else
                                System.out.println("YOUNG MALE PERSON");
                }
                else   if(c>='f' || c<='F' )
                {
                        if(age>50)
```

```java
                                System.out.println("OLD FEMALE PERSON ");
                    else
                                System.out.println("YOUNG FEMALE PERSON");
            }
            else
            {
                    System.out.println("NOT A VALID OPTION");
            }
        }
}
```

PROGRAMME   14:

```java
/* to display the nature of the triangle if three sides will be given as input*/
import   java.util.*;
class   class9
{
        public   static   void   main(String   args[ ])
        {
             Scanner    sc  =new   Scanner (System.in);
             int   a,b,c;
             System.out.println("Enter three sides of a Triangle");
             a=sc.nextInt( );
             b= sc.nextInt( );
             c=     sc.nextInt( );
             if(a+b>c && b+c>a && a+c>b)
             {
                    if(a==b && b==c )
                    {
                            System.out.println("EQUILATERAL");
                            }
                    else   if(a==b || b==c )
                     {
                            System.out.println("ISOCELEOUS");
                            }
                            else
                            {
                            System.out.println("NOT A VALID OPTION");
```

```java
                    }
            }
             else
             {
                             System.out.println("Triangle cannot be possible");
             }
        }
}
```

PROGRAMME   15:

```java
/*to check and display whether two numbers are amicable pair or not*/
import   java.util.*;
class    class9
{
        public   static  void   main(String   args[])
         {
                 Scanner       sc =new      Scanner(System.in);
                int    m,n,sfm=0,sfn=0,i;
                 System.out.println("enter two number");
                m=sc.nextInt( );
                 n=sc.nextInt( );
                 for(i=1;i<m;i++)
                {
                                if(m%i==0)
                                sfm+=i;
                }
                for(i=1;i<n;i++)
                {
                                if(n%i==0)
                                sfn+=i;
                }
                 if(sfm==m && sfn==n)
                        System.out.println("Amicable Pair");
                 else
                        System.out.println("Not Amicable Pair");
        }
}
```

PROGRAMME   16:

```java
/*to check and display whether a number is prime or not*/
import  java.util.*;
class   class9
{
        public   static  void  main(String   args[])
        {
                 Scanner       sc =new      Scanner(System.in);
                int    n,i,c=0;
                System.out.println("enter a number");
                n=sc.nextInt();
                for(i=1;i<=n;i++)
                {
                                if(n%i==0)
```

```
                          c++;
                }
                 if(c==2)
                {
                          System.out.println("prime number");
                }
                else
                {
                          System.out.println("Not prime number");
                }

        }
}
```

PROGRAMME   17:
```
/*to check and display whether a number is perfect number or not*/
import   java.util.*;
class   class9
{
   public  static  void  main(String   args[ ])
   {
      Scanner  sc  =new   Scanner (System.in);
     int   n,i,s=0;
     System.out.println("enter a number");
     n=sc.nextInt();
     for(i=1;i<n;i++)
      {
         if(n%i==0)
            s=s+i;
      }
    if(s==n)
    {
      System.out.println("perfect number");
    }
    else
    {
      System.out.println("Not perfect number");
    }

   }
}
```
PROGRAMME   18:
```
/*to display HCF and LCM of two numbers*/
import   java.util.*;
class   class9
{
        public  static  void   main(String   args[])
        {
                 Scanner     sc =new      Scanner(System.in);
                 int   m,n,i,min,hcf=0;
                System.out.println("enter two numbers");
                m= sc.nextInt( );
```

```java
            n= sc.nextInt( );
            min=Math.min(m,n);
            for(i=1;i<min;i++)
            {
                        if(m%i==0 && n%i==0)
                         hcf=i;
            }

            System.out.println("HCF of "+m+ " and "+n+" is : "+hcf);
            System.out.println("LCM of "+m+ " and "+n+" is : "+ ((m*n)/hcf));
        }
}
```

PROGRAMME   19:

```java
/*to check and display whether two numbers are co-prime or not*/
import   java.util.*;
class  class9
{
         public  static  void   main(String  args[])
         {
                 Scanner    sc  =new    Scanner (System.in);
                 int    m,n,i,min,hcf=0;
                 System.out.println("enter two numbers");
                 m= sc.nextInt( );
                 n= sc.nextInt( );
                 min=Math.min(m,n);
                 for(i=1;i<min;i++)
                 {
                             if(m%i==0 && n%i==0)
                             hcf=i;
                 }

                 if(hcf==1)
                 {
                         System.out.println("CO-PRIME ");
                 }
                 else
                 {
                         System.out.println("Not CO_PRIME");
                 }
         }
}
```

PROGRAMME   20:

```java
/*to check and display whether two numbers are TWIN PRIME or not*/
import   java.util.*;
class    class9
{
        public  static  void   main(String  args[])throws
        {
                 Scanner     sc  =new   Scanner(System.in);
                 int   m,n,nfm=0,nfn=0,i;
                 System.out.println("enter two number");
                 m= sc.nextInt( );
                 n= sc.nextInt( );
                 for(i=1;i<=m;i++)
```

```
                {
                                if(m%i==0)
                                nfm++;
                }
                for(i=1;i<=n;i++)
                {
                                if(n%i==0)
                                nfn++;
                }
                if(nfm==2 && nfn==2 && Math.abs(m-n)==2)
                {
                        System.out.println("TWIN PRIME");
                }
                else
                {
                        System.out.println("Not TWIN PRIME");
                }

        }
}
```

PROGRAMME   21:

```
/*to check and display whether a numbers is ARMSTRONG number or not*/
import   java.util.*;
class   class9
{
        public  static  void    main(String  args[])
        {
                 Scanner   sc =new  Scanner(System.in);
                int   n,i,d,s=0,dup;
                System.out.println("enter a numbers");
                n= sc.nextInt( );
                dup=n;
                while(n!=0)
                {
                                d=n%10;
                                s=s+d*d*d;
                                n=n/10;
                }
                if(s==dup)
                {
                        System.out.println("ARMSTRONG NUMBER ");
                }
                else
                {
                        System.out.println("Not ARMSTRONG NUMBER");
                }               }               }
```

PROGRAMME   22:

```
/*to check and display whether a numbers is PALINDROME number or not*/
import  java.util.*;
class  class9
{
        public static void  main(String args[])
        {
                 Scanner      sc =new  Scanner(System.in);
```

```java
        int  n,i,d,rev=0,dup;
        System.out.println("enter a numbers");
        n= sc.nextInt( );
        dup=n;
        while(n!=0)
        {
                        d=n%10;
                        rev=rev*10+d;
                        n=n/10;
        }
        if(rev==dup)
        {
                System.out.println("PALINDROME NUMBER ");
        }
        else
        {
                System.out.println("Not A PALINDROME NUMBER");
        }
    }
}
```

PROGRAMME   23:

```java
/*to check and display whether a numbers is NELSON number or not*/
import    java.util.*;
class  class9
{
        public static void  main(String args[])
        {
             Scanner    sc  =new   Scanner(System.in);
            int  n,i,d,ld,dup;
            System.out.println("enter a numbers");
            n= sc.nextInt( );
            dup=n;
            ld=n%10;
            n=Math.abs(n);
            if(n>=100)
            {
                        while(n!=0)
                        {
                        d=n%10;
                        if(d!=ld)
                             break;
                        n=n/10;
                        }
                        if(n==0)
                        {
                        System.out.println("NELSON NUMBER ");
                        }
                        else
                        {
                        System.out.println("Not A NELSON NUMBER");
                        }
            }
            else
```

```java
                {
                        System.out.println("Not A VALID number");
                }
        }
}
```

PROGRAMME   24:
```java
/*to display FACTORIAL of a number*/
import    java.util.*;
class   class9
{
        public  static void main(String   args[ ])
        {
                 Scanner     sc =new    Scanner(System.in);
                int  n,i,f=1;
                System.out.println("enter a number");
                n= sc.nextInt( );
                for(i=1;i<=n;i++)
                {
                                f=f*i;
                }
                System.out.println("THE FACTORIAL OF THE NUMBER IS : "+f);
                }
}
```

PROGRAMME   25:
```java
/*to display first 15 Fibonacci numbers */
class   class9
{
        public  static  void  main(String   args[])
        {
                int    a=0,b=1,c,i;
                System.out.println("First 15 Fibonacci numbers are :");
                System.out.print(a+"  "+b+"  ");
                for(i=3;i<=15;i++)
                {
                                c=a+b;
                        System.out.print(c+"   ");
                        a=b;
                        b=c;
                }
        }
}
```

PROGRAMME   26:
```java
/*to display  15th  Fibonaccii number */
class   class9
{
        public  static  void  main(String   args[])
        {
                int    a=0,b=1,c,i;
                for(i=3;i<=15;i++)
                {
                                c=a+b;
                        a=b;
                        b=c;
```

```
                }
                System.out.println("15th Fibonaccii number is  :  " +c);
        }
}
```

PROGRAMME   27:
```
/*to display 10th , 12th and 15th Fibonaccii numbers */
class  class9
{
        public  static  void  main(String  args[])
        {
                int    a=0,b=1,c,i;
                for(i=3;i<=15;i++)
                {
                                c=a+b;
                        if(i==10||i==12||i==15)
                                System.out.println(" The "+i+" th Fibonacci number is : "+ c);
                        a=b;
                        b=c;
                }
         }
}
```

PROGRAMME   28:
```
/*to check and display whether a numbers is ODIUS OR EVIOUS number*/
import    java.util.*;
class   class28
{
        public  static  void    main(String  args[])
        {
                 Scanner      sc =new    Scanner(System.in);
                int   n,i,d,s=0;
                System.out.println("enter a numbers");
                n= sc.nextInt( );
                while(n!=0)
                {
                                d=n%2;
                                if(d==1)
                            s++;
                                n=n/2;
                }
                if(s%2==1
                {
                        System.out.println("ODIOUS ");
                }
                else
                {
                        System.out.println("EVIOUS");
                }
        }
}
```

PROGRAMME   29:
```
/*to display  sum of any one of the following series  1-2+3-4……up to n terms  or 1!-2!+3!-4!……up
to n tetms*/
import    java.util.*;
```

```java
class   class28
{
        public  static  void    main(String  args[])
        {
                 Scanner       sc  =new    Scanner(System.in);
                int   n,i,d,s=0,v=1;
                System.out.println("enter the range");
                n= sc.nextInt( );
                System.out.pritnln("Press 1 to run first series or press 2 for second series");
                System.out.pritnln("Enter your choice");
                d= sc.nextInt( );
                switch(d)
                {
                        case  1:
                                for(i=1;i<=n;i++)
                                {
                                        if(i%2==0)
                                                s=s-i;
                                        else
                                                s=s+i;
                                }
                                System.out.println("The sum of the series is :"+s);
                                break;
                        case  2:
                                for(i=1;i<=n;i++)
                                {
                                        v=v*i;
                                        if(i%2==0)
                                                s=s-v;
                                        else
                                                s=s+v;
                                }
                                System.out.println("The sum of the series is :"+s);
                                break;
                        default:
                                System.out.println("WRONG  CHOICE");
                }       }       }
```

1. Write a program to input an integer and find its factorial. Factorial of a number is the product of all natural numbers till that number. For example factorial of 5 is 120 since 1×2×3×4×5=120.

Ans.   Ans.

```java
    import java.util.*;

class Q1

{
static void main()
{
Scanner sc=new Scanner(System.in);

 int i,f=1,n;

System.out.println("Enter a number:");
```

```java
        n=sc.nextInt();
        for(i=1;i<=n;i++)
        {
        f=f*i;
        }
        System.out.println("Factorial="+f);
        }
}
```

2. Write a program to input an integer and print its factors.

 For Example, **INPUT: Enter an integer:12**

OUTPUT: Factors: 1 2 3 4 6 12

Ans.

```java
import java.util.*;
class Q2
{
        static void main()
        {
        Scanner sc=new Scanner(System.in);
        int i,n;
        System.out.println("Enter an integer:");
        n=sc.nextInt();
         System.out.println("Factors:");
         for(i=1;i<=n;i++)
          {
             if (n%i==0)
              System.out.print(i+" ");
          }
          }
        }
```

3. To input an integer and count the number of factors.

Ans.

```java
import java.util.*;
 class Q3
{
static void main()
{
Scanner sc=new Scanner(System.in);
 int i,n,c=0;
System.out.println("Enter an integer:");
n=sc.nextInt();
for(i=1;i<=n;i++)
{
if (n%i==0) c++;
}
System.out.println("No. of Factors:"+c);
}
}
```

4. Write a program to input an integer and check whether it is a prime number or not.

Ans.

```java
import java.util.*;
 class Q4
{
static void main()
{
Scanner sc=new Scanner(System.in) ;  int i,n,c=0;
System.out.println("Enter an integer:") ;
n=sc.nextInt();
for(i=1;i<=n;i++)
{
if (n%i==0)
c++;
}
if(c==2)
System.out.println("Prime number");
else
System.out.println("Not a Prime number");
}
}
```

5. Write a program to input 10 integers and find their sum.

Ans.

```java
import java.util.*;
 class Q5
{
static void main()
{
Scanner sc=new Scanner(System.in); int i,n,s=0;
System.out.println("Enter 10 integers:"); for(i=1;i<=10;i++)
{
n=sc.nextInt(); s=s+n;
}
System.out.println("Sum of the numbers="+s);
}
}
```

1. Write a program to input 10 integers and find the sum of the prime numbers only.

Ans.

```java
import java.util.*;
class Q1
{
static void main()
{
int i,j,n,s=0,c;
Scanner sc=new Scanner(System.in);
System.out.println("Enter 10  integers:"); for(i=1;i<=10;i++)
{
n=sc.nextInt();
c=0;
for(j=1;j<=n;j++)
{
if(n%j==0) c++;
}
if(c==2)
 s=s+n;
}
System.out.println("Sum of prime numbers="+s);
}
}
```

2. Write a program to generate all perfect numbers between 1 to 100. Ans.

```java
class Q2
{
```

```
static void main()
{
int i,j,c;
 for(i=1;i<=100;i++)
{
c=0;
for(j=1;j<i;j++)
{
if(i%j==0)
 c+=j;
}
if(c==i)
 System.out.println(i);
}
}
}
```

3. Write a program to generate all 3 digit palindrome numbers.

 Ans.

```
class Q3
{
static void main()
{
int i,j,r,d;
 for(i=100;i<=999;i++)
{
r=0;
for(j=i;j>0;j=j/10)
{
d=j%10;
r=r*10+d;
}
if(r==i)
 System.out.println(i);
}
}
}
```

4. Input an integer and check whether it is a special number or not. A special number is such   a number whose sum of the factorials of each digit is the number itself. For example, 145 is a special number because 1! + 4! + 5! = 1 + 24 +120 = 145. **Special numbers are also called factorions.**

Ans.

class Q4

```
{
 public static void main()
    {
    int i,j,r,d; for(i=100;i<=999;i++)
    {
    r=0;
    for(j=i;j>0;j=j/10)
    {
    d=j%10;
    r=r*10+d;
    }
    if(r==i) System.out.println(i);
    }
}
```

5. Write a program to input a number and check whether it is a magic number or not. If you iterate the process of summing the squares of the decimal digits of the number, and if this process terminates in 1, then the original number is called a magic number. For example 55→ (5+5)=10→ (1 +0)=1.
Ans.

```
import java.util.*;
 class Q5
{
static void main()
{
Scanner sc=new Scanner(System.in);
 int n,i,s,d;
System.out.println("Enter a number:");
 n=sc.nextInt();
for(s=0;n>9;n=s,s=0)
{
for(i=n;i>0;i=i/10)
{
d=i%10;
s+=d;
}
}
if(n==1)
System.out.println("Magic Number");
 else
System.out.println("Not a magic number");
}
}
```

6. Write programs in Java to display the sum of the given series:

$$S = x^2 - \frac{x^3}{2!} + \frac{x^4}{3!} - \frac{x^5}{4!} + \ldots\ldots\ldots \pm \frac{x^{n+1}}{n!}$$

Ans.

```java
import java.util.*;
class Q6
{
static void main()
{
int i,j,x,n,f;
 double s=0;
Scanner sc=new Scanner(System.in);
 System.out.println("Enter the value of x:");
 x=sc.nextInt();
System.out.println("Enter the value of n:");
 n=sc.nextInt();
for(i=1;i<=n;i++)
{
f=1;
for(j=1;j<=i;j++)
 f*=j;
if(i%2==1) s=s+Math.pow(x,i+1)/f;
 else
s=s-Math.pow(x,i+1)/f;
}
System.out.println("Sum="+s);
}
}
```

7. Write programs to display the following patterns:

```
    1                              14444
    21                             Pattern (b)
   321
  4321
 54321
Pattern (a)
```

```
12345
12341
12322
12333
```

```
class Q7a
{
static void main()
{
int i,j;
 for(i=1;i<=5;i++)
{
for(j=1;j<=5;j++)
{
if(i+j>=6)
 System.out.print(6-j);
 else
 System.out.print(" ");
}
System.out.println();
}
}
}




class Q7b
{
static void main()
{
int i,j; for(i=1;i<=5;i++)
{
for(j=1;j<=6-i;j++)
 System.out.print(j);
 for(j=1;j<=i-1;j++)
 System.out.print(j);
 System.out.println();
}
}
}
```

8. Write a menu driven program to accept a number and check and display whether it is a Prime Number or not OR an Automorphic Number or not.

a.   Prime number : A number is said to be a prime number if it is divisible only by 1 and itself and not by any other number.   Example : 3,5,7,11,13 etc.

b.   Automorphic number : An automorphic number is the number which is contained in the last digit(s) of its square.

Example: 25 is an automorphic number as its square is 625 and 25 is present as the last two digits.

Ans.

```java
import java.util.*;
class Q8
{
static void main()
{
Scanner sc=new Scanner(System.in);
int ch,i,c=0,n;
 System.out.println("Enter a number:");
 n=sc.nextInt();
 System.out.println("MENU");
 System.out.println("1.Prime Number");
System.out.println("2.Automorphic Number");
 System.out.println("Enter your choice:");
 ch=sc.nextInt();
switch(ch)
{
case 1: for(i=1;i<=n;i++)
{
if(n%i==0)
 c++;
}
if(c==2)
System.out.println("Prime Number");
 else
System.out.println("Not a Prime Number");
break;

case 2:
for(i=n;i>0;i=i/10)
{
c++;
}
if((n*n)%(int)Math.pow(10,c)==n)
 System.out.println("Automorphic Number");
 else
System.out.println("Not an Automorphic Number");
break;
```

```
            default:
            System.out.println("Invalid choice");
            }
            }
            }
```

PROGRAMME   30:
```
/*to display  any one of the following structures
1                                                    *
12                                                  **
123                    or                          ***
1234                                              ****
12345                                            *****
*/
import    java.util.*;
class   class28
{
        public  static  void   main(String  args[])throws
        {
                 Scanner    sc  =new    Scanner(System.in);
                int   r,d,b,k;
                System.out.pritnln("Press 1 to show first structure or press 2 for second structure");
                System.out.pritnln("Enter your choice");
                d= sc.nextInt( );
                switch(d)
                {
                    case  1:
                        for(r=1;r<5;r++)
                        {
                                for(k=1;k<=r;k++)
                                    System.out.print(k);
                                System.out.println();

                        }
                        break;
                    case  2:
                        for(r=1,b=4;r<5;r++,b--)
                        {
                                for(k=1;k<=r;k++)
                                    System.out.print(" ");
                                for(k=1;k<=r;k++)
                                    System.out.print("*");
                                System.out.println();
                        }
                        break;
                    default:
                        System.out.println("WRONG  CHOICE");
                }
        }
}
```

Write programs for the following:

1. Write a program to input the area of a square and find its perimeter.

2. Write a program that outputs the results of the following evaluations based on the number entered by the user.
   - **i.** Cube root of the number
   - **ii.** Absolute value of the number
   - **iii.** Square root of the number
   - **iv.** Random numbers between 0 and 1.

3. Write a program to input three integers and find the sum of their cube roots

4. Write a program to input the principal, rate and time and find the compound interest.

   $$Compound\ Interest = Principal\ (1 + \frac{r}{100})^{2}$$

5. Write a program to input a real number(floating point number) and round it off to 2 places of decimal.

   For example,

   Input: 4.3678

   Output: 4.37

   Input: 24.3123

   Output: 24.31

Related Questions and Programs:

Programs:

Write Java Programs for the following:

    a. To swap two numbers using a temporary variable.
    b. Input the values of x and y. find y as a percent of x.
    c. To display the message this is my first Java program.
    d. To input the length and sc eadth and find the perimeter, area and lent of its diagonal.
    e. The wages of a man earning Rs.x per hour is given for t hours in given by the formula W=xt.
       Find his wages for working 45 hours at the rate of Rs. 125.25 per hour.
    f. The corresponding temperature in the Fahrenheit scale using the formula, if C=40°
    g. To swap two numbers without using a temporary variable.

h. Find the area of a triangle with sides 21cm, 17cm and 10 cm using Herons formula, given
as $Area = \sqrt{s(s-a)(s-b)(s-c)}$ where $= \frac{a+b+c}{2}$.

i. Find the surface area of 4 walls and the diagonal of a cuboid using the formulae

$$surface\ area\ of\ 4-walls = 2(l+b)h$$ and diagonal=$\sqrt{l^2 + b^2 + h^2}$

    j. Find the volume and total surface area of a cylinder using:

$$V = \pi r^2 h\ and\ TSA = 2\pi r(h+r)$$

Programs:

1. Wap a program that displays an amount in rupees in terms of notes of different Indian
denominations. E.g. if the amount is Rs. 3456, the output
   2000-notes   :1
   500- notes   :2
   100-notes   :4
   50-notes   :1
   20-notes   :0
   10-notes   :0
   5-notes   :1
   1-notes   :1
2. Wap to input a real number and display its integer and real part in separate lines.
   e.g   Input   :25.768
          Output
          integer   : 25
          fractional part : .768
3. A Computer manufacturing Company announces a special offer to their customer on purchasing
Laptops and the Printers accordingly:
   On Laptop: Discount - 15%

On Printers:　　Discount - 10%

Write a program to accept the purchase price of Laptop and Printer, calculate the discount and display the net amount the customer will pay on his purchase.

4. In an election, two candidates A and B contested. A got 60% of the votes. Write a program to accept the total number of votes and calculate the number of votes each candidate got and display the result.

5. Write a program to accept the basic pay of an employee, Compute and display the net pay of the employee based on following allowances and deductions:

Dearness Allowance　　　　25% of Basic Pay
House Rent Allowance　　　15% of Basic Pay
Provident Fund　　　　　　10% of Basic Pay
Gross Pay = Basic Pay + Dearness Allowance + House Rent Allowance
Net Pay = Gross Pay – Provident Fund

6. If a = 5 , b= 9 , calculate the value of:
a += a++ - ++b +a

7. Write Java expressions:

i.　$p = a^4 + bc$

ii. $\dfrac{(a+b)^n}{\sqrt{2}+b}$

8. Write in algesc aic form: $u * t + \dfrac{1}{2} * a * t * t$

9. State the value of n and ch when
char ch='A';
int n= ch+1;
char ch=(char)n;

10. Evaluate: $k += k + + - + + j + k; if\ k = 5\ and\ j = 9$

1.　　Using conditional operator write equivalent expressions for the following:

i.　　F=0.5 if x=30 otherwise 0.

Ans. F=(x==30)?0.5:0;

ii. Print "Even" if x is an even number otherwise print "Odd".

Ans. System.out.println((x%2==0)? "Even": "Odd";

2.Rewrite the following using Ternary operator

if (income < = 10000)

tax = 0;

else

tax = 12;

Ans. tax=(income<=10000)?0:12;

3.Find the output of the following program segment, when:

i. val = 500

ii. val = 1600

int val, sum, n 550;

sum = n + val > 750? 400 : 200; System.out.println(sum);

Ans. i. 200

ii. 400

4. Give the output of the following switch statement:

switch(num)
{
case 10:

case 100:

System.out.println("Ten and hundred"); break;

case 1000:

case 400:

System.out.println("Thousand and 4 hundred"); break;

default:

System.out.println("Invalid Input");

i. num=100   ii. num=1400
iii. num=1000   iv. num=400

ans.

i.   Ten and hundred
ii.   Invalid Input
iii.   Thousand and 4 hundred
iv.   Thousand and 4 hundred

5.Write a program to input the Selling Price and Cost Price of a commodity and find the Profit or Loss made upon selling the product.

For example,

INPUT:

Enter the Selling Price of the commodity: 456

 Enter the Cost Price of the commodity: 400

OUTPUT:

Profit: 56

INPUT:

Enter the Selling Price of the commodity: 300

Enter the Cost Price of the commodity: 310

OUTPUT:

Loss: 10

6. Write a program to input an integer and check whether it is a 2-digit or a 3-digit number   or not. In case it is not a 2-digit or a 3-digit number a relevant message ("Not 2 or 3 digit number") should be displayed.

Write a program to input 2 integers and check whether both the numbers are multiples of 7 or not.

7. Write a program to accept three sides of a triangle as parameter and check whether it can form a triangle or not. If it forms a triangle, check whether it is an acute angled, obtuse angled or right-angled triangle.

(Hint: To form a triangle, each side should be less the sum of the other two sides..

To form an acute angled triangle the square of every side should be less than the sum of the squares of the other two sides.

To form an obtuse angled triangle the square of any side should be greater than the sum of the squares of the other two sides.

To form a right angled triangle the square of any side should be equal to the sum of the squares of the other two sides.)

8. A cloth showroom has announced the following festival discounts on the purchase of items, based on the total cost of the items purchased:

Total Cost	Discount (in Percentage)
Less than 2000	5%
>= 2000 to <5000	25%
>= 5000 to <10000	35%
Above 10000	50%

Write a program to input the total cost and compute and display the amount to be paid by the customer after availing the discount.

 9. Write a program to calculate the Telephone bill according to the following rules:
    i. Minimum of Rs.250.00 is charged as rent.
    ii. First 80 calls FREE
    iii. Next 60 call @ Rs.0.60
    iv. Next 60 call @ Rs.0.50
    v. Above 200 call @ Rs.0.40

10. Write a program to calculate electricity bill for the number of units consumed given as input, following the rules given below:

Minimum Meter rent charges   Rs.100.00
        Up to 250 units   Rs.0.80 per unit
        Above 250 units   Rs.1.50 per unit

6. Write java programs for the following:

a. To print the following series: 1   -4   7   -10 …….. -40.

b. To print the LCM and GCD of two numbers

c. To find the sum of the series $S = 1 + x + x^2 + x^3 + \cdots \ldots \ldots \ldots + x^n$

d. To swap the first and last digit of a three digit number

e. To print place value of ten's and thousand's digit in a number.

e.g. number 72149

output= 2000 and 40

CLASS: IX/SET-1

COMPUTER APPLICATION

Time: 1/2 HRS.   Marks: 40

Attempt all questions

QUESTION 1:   [2 x 5 = 10]

    (a)   What is JIT? How it helps?
    (b)   Write few lines about GIGO.
    (c)   Write the symbol used for remark statements.
    (d)   What is OOPS? Write its principles.
    (e)   Write the use of Blue J.

QUESTION 2:   [2 x 5 = 10]

    (a)   Differentiate between Integer   and   int.
    (b)   What is the use of Loop? Write the syntax of for loop.
    (c)   What is the use of break statement in switch case. Explain with example
    (d)   What is operator? Write the example of unary operator.
    (e)   Write the suitable data type to store '\b'. How much bits it will occupy.

QUESTION 3:   Do as directed :   [2 x 10=20]

    (a) Give one word answer for the following :
        i)   It is a keyword which is used to proceed for the next iteration in a loop..
        ii) It is a class which carries print ( ) method.
    (b) Express the following in mathematical format also mention the data type of the resultant variable.
        i)   a=Math.abs(Math.sin(a)+(a+b));

ii) a=p+2*q/r*s;
(c) Write the range of the following data type : i)   byte   ii)   char
(d)   Find the error :
       int p=10,q==5;
       while(p>q)
       System.Out.println(p+q), system.out.printLn("p="+q);
(e)   Predict the output :
       int k;
       switch(k)
       {
              case 1:
              case 11:   System.out.printlln("A");
                              break;
              case 2:   Ststem.out.printlln("B");
              case 3:
              case 33:   System.out.printlln("C");
              default: Ststem.out.printlln("D");
       }
       Write output in a box for the following input : k=1, k=2 , k=33 & k=10
(f) Convert the following into if --- else.
       d=a+b>5?a+b:a!=5?5:6;
(g) Write the corresponding java expression for the following
       i) $m+5n^5+mn^3$
       ii) $(3a+4b+5/c)^{2/3}$
(h) Answer the below questions by choosing any one of the four given options:
              i. Which of the following is not a keyword?
                  (i) case   (ii) void   (iii) while   (iv) main
              ii. Which of the following removes the fall through problem.
                  (i) continue   (ii) switch   (iii) break   (iv) default
(i) Find the value in the following cases:
              i)   Math.rint(11.11)
              ii) Math.abs(Math.sqrt(16));
(j) Write java statements for the following.
              i)   Create an appropriate variable p in order to store the age of a person.
              ii) To store the value of $(p+q)^4$ in m which is double type.

CLASS: IX/SET-2

COMPUTER APPLICATION

Time: 1/2 HRS.   Marks: 40

Attempt all questions
QUESTION 1:   [2 x 5 = 10]

       (a)   Differentiate between data type and variable.
       (b)   What is encapsulation? How it is implemented in class?
       (c)   What is escape sequence? Write two examples.
       (d)   What is the use of default in switch case? In its absence what will happen?
       (e)   What is token? Write the type of token a case statement uses.
QUESTION 2:   [2 x 5 = 10]

       (f)   What is the use of String args[ ]?
       (a)   What is the use of abs( ) method. Explain with example
       (b)   What is String? Write syntax to store bbsr in a string variable s.

(c)   Differentiate between syntax error and logical error.

(d)   What is the use of import keyword? Write the package which is activated automatically?

QUESTION 3:   Do as directed :   [2 x 10=20]

(a) Give one word answer for the following :
  i. It is a method which is used to get the rounded value in double form.
  ii. It is a package which carries BufferedReader class.

(b) Express the following in mathematical format also mention the data type of the resultant variable.
  i. a=Math.pow(Math.sin(a)+(a+b),3);
  ii. a=2*p+(2*q/r)-s;

(c) Write the default value of the following data type : i)   boolean   ii)   float

(d)   Find the output :
```
int m=15,n=5;
while(m-->++n)
System.out.println(m+n),
System.out.println("m="+n);
```

(e) Convert to if else :
```
int k;
switch(k)
{
        case 1:
        case 11:        System.out.println("a");
                        break;
        case 2:         Ststem.out.println("b");
        case 3:
        case 33:        System.out.println("c");
        default:        Ststem.out.println("D");
}
```

(f) Find the output of the following .
  d=a+b>5?a+b:a!=5?5:6;   where i) a=2, b=4   ii) a=2 , b=2

(g) Write the corresponding java expression for the following
  a. $(m/5n^5)+mn^{3/5}$
  b. $(3ab+5c^4)^2$

(h) Answer the below questions by choosing any one of the four given options:
  ii. Which of the following is not an identifier?
  (i)new   (ii) Void   (iii) println   (iv) BufferedReader
  iii. Which of the following is not a constant.
  (i) 123f   (ii) "a12"   (iii) abc   (iv) '\\'

(i) Find the value in the following cases:
  a. Math.floor(Math.round(11.11)+.5)
  b. Math.max(Math.sqrt(16),Math.min(3,-3));

(j) Write java statements for the following.
  a. Create an appropriate variable m in order to store the compound interest.
  b. To store the value of Math.round(2.33)+Math.sqrt(64) in m which is double type.

<center>CLASS: IX/SET- 3</center>

<center>COMPUTER APPLICATION</center>

Time: 1/2 HRS.   Marks: 40

<center>**Attempt all questions**</center>

QUESTION 1:   [2 x 5 = 10]

(f)   What is byte code? How is it created?

(a)   Write two application areas of Java.
(b)   "Java is robust"- Explain the statement.
(c)   Write four important features of java.
(d)   Differentiate class and object.

QUESTION 2:   [2 x 5 = 10]

(a)   What is the use of do while loop. Give its syntax.
(b)   What is a control statement? Give some examples.
(c)   What operator precedence?
(d)   What is constant? Write an example of single precision constant?
(e)   What is non graphic character? How much bits \n will carry.

QUESTION 3:   Do as directed :   [2 x 10=20]

(a) Convert the following into switch case.

```
if(ch=='a' || ch=='A')
        System.out.printlln("A");
else if(ch=='B')
        System.out.printlln("B");
else if(ch=='c')
        System.out.printlln("C");
```

(b)   Predict the output:

```
int  x,y;
for (x=1;x++<5;x++);
System.out.println("x="+x++);
System.out.println(y=++x);
```

(c)   int m=1;

```
do
{
        System.out.println("PPT"+m+1); m+=2;
}while(m++ +2<10);
        System.out.println("PPT"+(m+1));
```

i) How many times PPT will appear on the screen?
ii) What will be the output?

(d) Differentiate :   m+1   and   m++

(e) Rewrite the following :

i. a=a+5;(using += operator)
ii. a+=1;(using ++postfix notation)

(f) write name of all the tokens used in the following statement and also count number of tokens in the instruction :   int m=(int)Math.pow(10,2);

(g) find the values in the following cases:

a. Math.abs(Math.sqrt(25)*-0.5);
b. Math.round(Math.pow(10,2)+0.75)
c. Math.ceil(Math.round(14.99));
d.   (char)Math.rint(64.99);

(h) Write java statements for the following.

a. To display highest out of three numbers present in a,b,c.
b. To store the integer part of a decimal number present in m;

(i) Write the corresponding java expression for the following

a. $(ax^5+by^3)^{1/2}$
b. $(a+5b/c)^5$

COMPUTER APPLICATION

Time: 1/2 HRS.   Marks: 40

Attempt all questions

QUESTION 1:   [2 x 5 = 10]

     (a)   What debugging?
     (b)   How java compilation is different from ordinary compilation.
     (c)   Differentiate between operator and operand.
     (d)   What is class? Write its elements.
     (e)   Why java is called as WORA language.

QUESTION 2:   [2 x 5 = 10]

     (a)   Explain the scope of a variable.
     (b)   What is if else ladder ? Give an example.
     (c)   Why parseInt( ) method is essential? In which class is it present?
     (d)   Write two lines about boolean data type.
     (e)   What is mixed expression? Give one example.

QUESTION 3:   Do as directed :   [2 x 10=20]

     (a) Write one word answer for the following :
         i. It is a package which carries the String class.
         ii. It is a data type which ranges within 0 to 65,535
     (b) Write the difference between   ab   and   a*b
     (c) Rectify the error if any, in the following instructions with appropriate reason:
         char e;   float d;
         d=3.55;
         e='9';
     (d)   Predict the output.
             int a,b;
             for (a=1;a<10;a+=3)
             for(b=1;b<a;b++);
             System.out.println(a+b);
             System.out.println("b="+a);
     (e) Write the type of variable needed to store following type of constants:
         i.   234L
         ii. true
         iii. "false"
         iv. 2+'2'
     (f)   Predict the output : 2+4*1/2%5-33+1/2/3*4
     (g) Answer the below questions by choosing any one of the four given options:
         i. Which of the following is not a separator?
           (i) ;   (ii) %   (iii) :   (iv) ""
         ii. Which of the following is a referential datatype.
           (i) Float   (ii) long   (iii) double   (iv) char
     (h) Find the value in the following cases:
         a. Math.ceil(Math.floor(11.11)+.5)
         b. Math.min(Math.sqrt(16),Math.min(-33,-3));
     (i) Write java statements for the following.
         a. Create an appropriate variable m in order to store the value of readLine().
         b. To store the value of (int)Math.sqrt(2.33)+Math.round(64) in m which is double type.

Do as directed:

1. State the java concept that is implemented through:
   a. A super class and a subclass.
   b. The act of representing essential features of a class without including the background details.

   Ans: a. Inheritance   b. Data abstraction

2. Mention two limitations of procedure oriented language ?

   Ans: i) The inability to reuse code throughout the **program**

      ii)Causes problem for the programmer while debugging.

3. Mention two benefits of object oriented language ?
   Ans: i) Data values are secured.
      ii) Mishandling of data is protected.
4. In object oriented programming, stress is given on:
   a. Procedure   b. Method   c. Class   d. Data

   Ans: d. Data

5. Which of the following principle does not allow to access directly from outside the class premises :
   a. Data hiding   b. Encapsulation   c. Abstraction   d. All of the above

   Ans: a. Data hiding

6. In procedural programming, the stress is laid on :
   a. Class   b. function   c. data   d. object

   Ans: b. function

7. A _____ is a set of objects that has common attributes and common behaviours.
   a. Abstractions   b. encapsulation   c. class   d. function

   Ans: c. class

8. What are the type of conversion shown in the following examples:

   double x=15.2;

   int a=12;

   i.   int y=(int)x;   iii. char c=(char)120;
   ii.   long b=a;   iv. int x= 'x';
   Ans: i. Explicit conversion   ii. Implicit conversion   iii. Explicit conversion   iv. Implicit conversion

9. Give the reason whether the following assignments are correct or not.
   i.   int m=155;   e. String b= "true";
   ii.   float   f=0.002654132;   f. char   ch= "apps";

iii.   String   str= 'computer';   g. String   st= "Application";
iv.   boolean   p=false;   h. double   n=455.29044125;
10. Distinguish between   (p!=q)   and   !(p==q)
11. What is null loop? Write one example.

12. Predict the output:
i.   If y=14, then find z=(++y*(y++ +5))
ii.   If a=8, find the value of a-=++a + a++ +4
iii.   If a=12,b=8 ,find the value of a*=++a/6 + b++ %3
iv.   If x=4, find the value of x+=x++ *++x%2
v.   If a=48,b=13 , then find the value of a+=b++*5/a++ +b
vi.   int k=5,j=9; k+=k++ - ++j+k; find the value of k and j.
vii.   if int y=10; then find the value of y and z, where z=(++y*(y++ +5));
viii.   a=7; find the value of a when a+=a++ + ++a+--a+a--;
ix.   y=8;find the value of y when y+=++y+y-- +--y ;
x.   a=5; a++;   a-=(a--)-(--a); find the value of a.
xi.   int c=(3<4)?3*4:3+4; find the value of c.
xii.   int x=90;
        char c=(x<=90)? 'Z': 'I';
        Find the value of c.
xiii.   int a=18,b=12;
        boolean t=(a>20 && b<15)? true:false;
        Find the value of t.
xiv.   c=(val+550<1700)?200:400;
        find the value of c for   a)val=1000   and   b)val=1500
13. Rewrite the following programme segment using