

Chapter 1 : ~ Object Oriented Programming

Q1) What do you mean by procedure oriented programming language? Give example.

Ans. Conventional programming such as BASIC, COBOL, FORTRAN and C where the emphasis is placed on the functions which shares global data is called Procedure Oriented Programming language ~~language P.O.P~~ (POP). POP doesn't have any access specifier and it follows top-down programming approach. It is an approach to standardize the programs by creating a partitioned memory area for both data and functions.

Example :- BASIC, COBOL, FORTRAN, C.

Q2) What do you mean by object oriented programming language? Give example.

Ans. Object Oriented Programming language is a modular approach to standardize the programs by allowing the data to be applied within the stipulated program area. Under this system, the stress is put on data to be used in specific program area. It has 3 types of access specifier, i.e., public, private, protected and it follows bottom-up programming approach.

Example :- C++, Java, SmallTalk, Simula - 67, eiffel

3) DEFINITIONS:-

1) CLASS :- A class is a blueprint or prototype (set of protocols) that defines the variables and the methods common to all objects of a certain kind.

2) OBJECT :- Object is a unique entity, a software bundle of variables and related methods, that contains data and functions together in an OOP language.

- 3) DATA ABSTRACTION :- Abstraction is to represent the essential features of the system without getting involved in the complexity of the system.
- 4) DATA ENCAPSULATION :- Wrapping of data and functions of a class together so that they can be applied as a unit to perform any operation is encapsulation.
- 5) DATA HIDING :- In OOP language, data is the fact of central attraction. In order to keep the data secured from the outer interference, they are grouped along with the functions in class. The variables of a class will be hidden from other classes, and can be accessed only through methods of current class. Such grouping does not allow the data to be accessed outside the class. This is data hiding.
- 6) POLYMORPHISM :- Polymorphism is the capability of the interface to do different things based on the data of different type. It is the process of using a function for more than one purpose. It allows the use of different internal structure of the object by keeping the same external surface. Overloading and overriding are 2 types of polymorphism.
- 7) ENCAPSULATION INHERITANCE :- Inheritance is the process in which objects of one class can link and share common properties from objects of another class.

8) INSTANCE VARIABLE :~ The variables which are declared at the beginning of the class as data members are known as instance variable.

9) INSTANCE METHOD :~ The functions or the methods declared inside the class are known as instance methods. They can work with the datamember of the class.

4) i) What is static variable or class variable?

Ans- Static variable is a special type of variable for which only one copy of variable is created in memory without depending on the no. of object created. It can only be accessed by static functions. Static variables are normally initialized to zero.

ii) What is static method or class method?

Ans- Static method or class method can be accessed without using any object. They can be called by the class or simply by their name. Static functions work with static data member.

5) What are the characteristics of OOP?

Ans-

- It has an object and a class.
- It provides polymorphism, encapsulation, inheritance.

6) What are the characteristics of JAVA?

Ans-

- Java language is both compiled & interpreted.
- Platform Independent and Portable
- Java is an object oriented language.
- Simple and easily understandable.
- Robust language
- Ensure extensive security

- Distributed language to create and share application across networks.
- Supports multithreading.
- Enables interactive programming through graphical applications.
- Dynamic and extensible language.
- Java architecture offers excellent performance.

7) What are the features of object oriented language?

Ans -

- Gives stress on data rather than functions.
- Makes the program simpler by dividing into no. of objects.
- Objects can be used as a bridge to have data flow from 1 function to another.
- Concept of data hiding enhances security in programs.
- Highly beneficial to write complex programs.

e) What do you mean by a block, an expression, a statement?

Ans -

BLOCK:- A block is a group of zero or more statements between balanced braces, which can be used anywhere.

EXPRESSION:- An expression in java is any valid combination of operators, constants, variables and method invocation which are constructed according to the syntax of that language, that evaluates to a single value. An expression can be mathematical or logical depending upon the result it produces.

STATEMENTS :- Statements are roughly equivalent to sentences in natural language. A statement forms a complete unit of execution. ~~The following~~

- 9) Why main function is declared as static?
- Ans. Java program execution begins from main function. Before main, we don't have ^{option to create} any object, so main is declared static as static function can be called without help of any object.

- 10) Why class is known as user defined types?
- Ans. In a java program, user can define his own class according to his own requirements. One class is comprised of different types of primitive datatypes. As user is creating different classes with different datatypes, so class is known as user defined types.

- 11) What are the attributes of a class?
- Ans. DATA MEMBER, MEMBER FUNCTION, CONST CONSTRUCTOR

- 12) What is static binding or compile time binding?
- Ans. It is a process to link the function called with the function signature, during compilation of program. During time of compilation, compiler knows which function is called (invoked) by which function.

- 13) What is dynamic binding or runtime binding?
- Ans. Dynamic binding is the process to link the function signature at run time, that is, during execution of the program, it will be

decided which function will be invoked by which object.

14) What are the drawbacks of procedure oriented programming language (POP)?

- Ans -
- As data values are global to all functions, you may require to make necessary changes in all functions due to any change in any data value.
 - It is not suitable to solve complex problems in real situations.

15) Difference between POP and OOP.

Ans -

POP

- Stress is put on function rather than data.
- Allows data to flow freely throughout the program.
- It doesn't have any access specifier.
- It follows top-down programming approach.

OOP

- Stress is put on data rather than function.
- Data is restricted to be used in a specific program.
- It has 3 diff. types of access specifier viz. public, private, protected.
- It follows bottom up programming approach.

16) Diff. bet class & object.

Ans:

Class

- Representation of an abstraction only.
- It is an object producer, hence called a blue print for a set of objects.
- It is known as "Object Factory".

Object

- Real and unique entity having some characteristics & behaviour.
- It is created with the use of 'new' operator.
- It is known as 'Instance of a Class'.

17) Why is class etc. called a composite data type?

Ans: A composite data type is one which is composed with various primitive data type. A class is defined with various

primitive data types such as int, double etc. so it is known as composite data type. and it is used to create objects which holds similar types of values and behaviours (functions).

Q8) Why is class known as abstract data type?

In OOP, abstraction is the absolute property of a class. The class encapsulates the data items and functions to promote abstraction. The data members are accessed only through the related functions. Since a class uses the property of abstraction, it is called abstract data type.

Chapter 2: Introduction to a Class

1) Define the following terms:

- i) Identifier:~ Identifier represent name which can be assigned to variables, methods and classes to identify them. e.g. int m
float p, q, r;
- ii) Keyword:~ Keywords are words reserved by java language that have some specific meaning to the compiler.
e.g. - boolean, void, while, for, int, if
- iii) Literals:~ literals are the constant in Java program. When we write a program in java, we come across quantities which remain fixed throughout the program. They are termed as literals or Constants.
e.g.: Integer literal, Character literal

- iv) Tokens:~ Token can be defined as each individual component of a Java statement

in such a way that it carries some meaning and takes part in effective execution of program.

Eg:- Literals, Identifiers

- 1) White Space :- White Space are separators. They are special characters in java, which are used to separate the variables & or the characters.
Eg:- Brackets (,), Curly Brackets {},

- 2) What is an operator and an expression?

Ans- Operators are those which help us to perform some arithmetic or logical operations. Thus, an operator is a symbol or token, which performs arithmetic and meaningful results.

An expression in java is any valid combination of operators, constants, variables and method invocations which are constructed according to the syntax of the language, that evaluates into a single value. An expression can be mathematical or logical depending upon the result it produces.

- 3) What is pure and mixed expression?

Ans- An arithmetic expression which contains same type of data types is pure expression.
Eg:- int a=10, b=20; int s=a+b;

An expression which includes different types of variables and values to yield a result.
For eg:- int a=5; double b=6.5;
double c=(a+@)+(b+a)

- 4) Different types of operators with egs.
- Ans:-
- Arithmetic Operators: +, -, *, / etc.
 - Relational Operators: <, >, ==, !=, <= etc.
 - Logical Operators: &&, ||, ! etc.
 - Bitwise (& |) • Compound Assignment (+=, *=), • Conditional (? :)

5) Diff. bet unary and binary operator

Ans:-

Binary

- Unary operators require only one operand to perform different kind of operations such as inc/ dec, negating an expression, inverting a boolean value
 - Associated with one operand
 - Has highest precedence
- The java programming language provides operators that perform addition, subtraction, multiplication, division, modulus on integer and floating point numbers.
 - Associated with 2 operands
 - Does not have highest precedence

6) What are the diff. types of commenting styles? Give eg. -

Ans:-

```
// Single line Comment //  
/* Multiline Comment - ; - ; */  
/* * Documentation  
- ;  
- ; * /
```

7) What is separators? - Give eg. and purpose

Ans:- They are special characters in java, which are used to separate variables or characters.

- Comma (,) in java program is applied to separate multiple variables under same declaration.
- Brackets () are used to enclose any arithmetic or relational expressions.
- Curly brackets {} are applied to enclose a group of statements under a compound statement.
- Square brackets [] are used to enclose subscript or cell no. of dimensional array

8) Details of Datatypes

A -

Datatype	Size	Range	Default Value
1) byte	8 bits	-2^7 to $2^7 - 1$	Zero (0)
2) short	2 bytes or 16 bits	-2^{15} to $2^{15} - 1$	Zero (0)
3) int	4 bytes or 32 bits	-2^{31} to $2^{31} - 1$	Zero (0)
4) long	8 bytes or 64 bits	-2^{63} to $2^{63} - 1$	Zero L
5) char	2 bytes or 16 bits	0 to $2^{16} - 1$ (65535)	' \U0000'
6) float	4 bytes or 32 bits	-3.4×10^{38} to 3.4×10^{38}	0.0f
7) double	8 bytes or 64 bits	-1.7×10^{308} to 1.7×10^{308}	0.0d
8) boolean	Reserves 8 bits but uses 1 bit		false

9)

A -

	Minimum range	Maximum Range
byte	-2^7	$2^7 - 1$
short	-2^{15}	$2^{15} - 1$
int	-2^{31}	$2^{31} - 1$
long	-2^{63}	$2^{63} - 1$
char	0	$2^{16} - 1$
float	-3.4×10^{38}	3.4×10^{38}
double	-1.7×10^{308}	1.7×10^{308}
boolean		

10) What do you mean by escape sequence?

Ans - Certain non graphic characters cannot be typed directly from the keyboard. They are typed with the help of backslash characters followed by one or more characters.

Eg :- \n → for new line

\t → tab

\'' → Single quotes will be printed

11) What is type conversion?

Ans - In java, conversion from one datatype to another datatype, it is called type conversion. It is of 2 types :-

i) Implicit Conversion

ii) Explicit Conversion.

12) What is implicit conversion or coercion?

Ans:- In a mixed expression, the data type of the result gets automatically converted into the higher most type available in the expression without any intervention of the user. This system of type conversion is known as Implicit type conversion or Coercion.
Eg:- char ch = 'A'; int n = ch;
 $\text{S.o.p.}(n) \rightarrow 65$.

13) What is explicit conversion or type casting?

Ans:- Conversion of 1 datatype to another datatype without user intervention is known as explicit type of conversion. When we convert higher datatypes to lower datatypes, explicit conversion is needed.
Eg:- double n = 5.95; int y = (int)n;
 $\text{S.o.p.}(y) \rightarrow [5]$

14) What is static and dynamic initialization?

Ans:- Static initialization is initializing the variable during the time of declaration. It is also known as compile time initialization.
Eg:- int a = 5;

Dynamic initialization is the initialization of value of variable during the execution of program.

Eg:- Calculating area and perimeter of rectangle after accepting length, breadth.

15) What is scope and lifetime of a variable?

Ans:- Part of program in which a variable's value can be accessed is called scope of that variable. The existence and visibility of a variable is known as lifetime of that variable.

16) Write scope and lifetime of static data member and global variable

Ans.	DATA MEMBER	STATIC DATA MEMBER	Scope Class	lifetime
	GLOBAL VARIABLE		Class	resolution of program
				Object of that class

17) What do you mean by local or global variable?

Ans. Local variables are declared inside a specific method or inside a loop.

Global variables are the data members and can be accessed by all other member functions of the class.

18) How to declare constant type of variable?

Ans. `Final int a = 10;`

19) What are characteristics of constant variable?

- Constant variables are declared with the help of final keyword.
- It has to be initialized during time of declaration.
- Value of constant variable cannot be changed in between a program.

20) What are the rules to name identifier?

- Method's names begin with a small letter and every continuing word starts with capital letter.
- Class names begin with capital letter, and every continuing name begins with capital letter.
- Variables are normally declared in small letter and constants in capital letter.

- Q1) What are the rule to name identifier?
- Ans.
- Variable name can be a sequence of any no. of letters, digits, underscore(_) and dollar \$.
 - Variable name must not be a keyword or reserved word.
 - Variable names are case sensitive.
 - There should not be any space in between or symbols like ; , - cannot be there.
 - It should begin with a letter or dollar or underscore but not with a digit.

Q2) Explain the term 'JAVA is a strongly typed language'.

Ans. In java, all the variables must be defined with proper datatypes. When we are calling different type of function, they are called with proper type of checking. Argument passed and parameter received must be typed compatible.

Q3) What is JVM?

Ans. JVM is java virtual machine. It acts as an interpreter of java. Once a java program is written and compiled successfully, it can be executed on any platform provided JVM is there. Part of runtime environment.

Q4) What is byte code?

Ans. Java program is known as the source code, having extension .java. After successful compilation, it is converted to machine language having extension .class known as byte code. This byte code is platform

independent and can be executed on any platform provided JVM is there.

25)

What is initial class?

Ans-

One java program may comprise of more than 1 classes. The class which has the main function in it is known as the initial class, as the program execution begins from that class.

26)

What do you mean by Java is ~~platform free form language~~ independent?

Ans

Java is free form language because variables can be declared anywhere. No special indentation is required. i.e., Java is called platform independent language.

27)

Why class is known as object factory?

Ans-

Class is the prototype of an object. Each object belonging to a specific class possesses the data and functions defined within the class. It also produces objects of similar type. Hence, class is termed as 'Object Factory'.

28)

Different types of literals with exs.

Ans-

- Integer literals - No. is represented without decimal point. e.g. 14, 348, -18 etc.
- Real literals - These are floating point constants representing nos. with decimal point. e.g. -24.6, -3.653, 1.0E-3 etc.
- Character literals - The constants, which are alphanumeric in nature are character literals.

Eg 1 - All alphabets, upper or lower case digits

special characters like 'A', 'd', '@', '#', '*' etc.

- String Literal → string is a set of alphanumeric characters. A group of characters enclosed within a pair of opening and closing double quotes is known as string literal.
e.g. "COMPUTER", "YEAR 2011", "10% per annum".
- Boolean Literals → Boolean constants are special literals. They represent true or false and can be applied in a java program to check whether a given logical condition is satisfied or not. Boolean constants (i.e. true or false) are never enclosed within quotes. This characteristic makes boolean constants different from string constants.
- Null Literal → This is another special purpose literal. It is represented as "0". It is applied in a java program as a string delimiter to mark the end of string.

01/17

29)

Explain new keyword.

Ans-

New is used for dynamic allocation of the object i.e., it allocates space in dynamic memory for storage of an object or data and functions belonging to an object.

30)

What is reusability feature?

Ans-

When a class inherits features from another class, then it may happen that some of the components used in the base class are applied to derived class for some operations. This feature is said to be the reusability feature which can be implemented through inheritance.

31)

Diff :- (Pg 114 of school book)

Primitive

- Independent of any other datatype.
- Predefined, built-in, size range fixed.
- Called by call by value method of function calling.

Reference

- Basically defined as derived datatype.
- Size depends on primitive datatype.
- Called by reference methods of function calling.

FUNCTIONS

Chapter 3

1) What are the different parts of function?

Ans. Different parts of function are

- ① function Header
- ② function body
- or function prototype

2) Explain the different parts of function with example.

Ans. Example :- `public int getPrice() {` function header

```
{ price = 6; // block starts
    return price; // function body
}
```

// block ends.

- ① The first line is the function header. It specifies the return type, the function name and the parameter list of function. It is also known as function signature.

Another eg:- `public static int add (int a, int b)`

Access ↑ Modifier ↑ return ↑ name ↑ parameter ↑
Specifier type of name list

function

- ② Function body is the remainder of the method after the header, enclosed by curly brackets.

- ③ Function prototype is a declaration of a function that omits the function body but it does specify the function's name, no. of arguments, argument types and return type.

3) Define function.

Ans. Function is a self content block of code which is written for some specific purpose. User can define his own function with his own requirement.

4) What are the advantages of function?

- Ans: Advantages of function are :-
- i) A big program can be divided into smaller module.
 - ii) Program debugging is much easier.
 - iii) It reduces code redundancy.
 - iv) Once a function is written, it can be used as many times it is required.

5) What are the different types of function?

- Ans: i). Pure defined Functions : These Functions are available within the java package and can be used by importing the required package.

Ex:- Math class provides predefend functions like `pow()`, `sqr()`; String class provides functions like `toUpperCase()`, `charAt()`;

- ii) User Defined Functions :- These are defined by the programmer within the program to use it for particular task

Eg:- `factorial()`, `perfect()` - made by user

These functions are divided into -

- Pure Function or Accessor Method
- Impure Function or Mutator Method

6) What is difference between actual & formal parameter?

Actual Parameter	Formal Parameter
• Parameter passed to function	• Parameter received by function
• It can be <u>value or variable</u> .	• It can be <u>variable only</u> .
• It is not preceded by <u>any datatype</u> !	• It is preceded by a <u>datatype</u> !

7) What difference between argument and parameter.

Ans - 10) A parameter is a variable in a method definition. When a method is called, the arguments are the data you pass into the method's parameters.

Parameter is a variable in the declaration of a function.

① Argument is the actual value of the variable that gets passed into the function.

② Parameter is part of function.

③ Argument is value supplied at runtime.

Some difference as Formal Parameter (Arguments) & Actual Parameter

8) What do you mean by function overloading?

Ans - Java language facilitates designing a no. of functions with the same function name. Thus, the process of having 2 or more methods or functions within a class, with same name, but different parameter to use them for more than one purpose is function overloading.

9) Difference bet. call by value and call by reference.

Call by value

Call by Reference

- Actual parameter is copied to formal parameter in such a way that any change in formal parameter has no effect on actual parameter.

- Original values of actual parameter goes to formal parameter. Any change in formal parameter affects actual parameter.

- All primitive datatype are passed to the method by using pass by value.

e.g.: int, float, double, long, char etc.

- All non primitive datatype are passed to function by using pass by reference system.

e.g.: array, object etc.

10) What is difference between static variable and instance variable?

Ans. Static Variable

- ① It is a special type of variable for which one copy of variable is created in memory without depending on no. of objects created.
- ② Accessed by static functions only.

Instance Variable

- Variables which are declared at the beginning of class as data members are instance variables.
- ③ Accessed by any member method or functions.

11) Explain significance of 'this' keyword with example.

Ans. 'this' → refers to the current object
 Used for creating instance of a class
 or making object
 'This' removes the conflict between
 data member and local variable.
 Eg:- public Box(double width, double height, double depth);
 {
 this.width = width;
 this.height = height;
 this.depth = depth;
 }

12) Diff. between pure and impure function.

Ans. Pure Function

- Returns value to its caller module.
- It does not change the state of an object so it is accessor method.
- Primitive Datatypes are used.

Impure Function

- May not return any value.
- It changes the state of an object everytime it is called, so it is mutator method.
- Reference Datatypes are used.

13) Name 3. inbuilt functions, their purpose and package names.

Maths class → language (Automatically imported)

String class → io package

Data/Time Operators → java.util.*

14) What are the features of return statement?

Ans. Features of return statement are-

- Always appears at the end of a function.
- Returns only one value.
- Causes immediate exit from the function.
- Returns value to the caller module (calling function)

15) Explain recursive functions with example.

Ans. When a function is called from inside that function itself, it is known as recursive function.

16) What is a procedure or procedural function?

Ans. The function that has no return type is called procedural function.

Eg:- `public void show()
{}
s.o.p.m("ABCD");`

17) Eg of evaluation with stack

```
int fact (int no)
{
    if (no == 1)
        return 1;
    else
        return no * fact (no - 1);
}
```

```
p. u. v. main (-)
{
    int n = 5;
    s.o.p.m (fact (n));
}
```

2 * fact(1)
3 * fact(2)
4 * fact(3)
5 * fact(4)
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CONSTRUCTOR

CHAPTER 4

1) Define constructor and give example.

Ans:- Constructor is a special type of member function where class name is same as function name. It is used to create object and initialize the data members with some default values. Constructors are called automatically during object creation.

Example :-

```
class XYZ
```

```
{
```

```
    XYZ()
```

```
    { cout << "Hello World"; }
```

```
}
```

2) What are the characteristics of constructor?

- Ans:-
- Name of constructor is same as class name.
 - Constructor called automatically during object creation.
 - Constructor can be overloaded.
 - Constructor can be inherited.

3) Difference between constructor and method.

Ans:-

Constructor

- Constructor name must be same as class name.
- Constructor called automatically during object creation.
- Constructor has no return type, not even void.

Method / Function

- Function name is different from class name.
- Function has to be called separately.
- Function has return type, if not, then void.

4) What is the need of constructor?

Ans:- When we create various objects of a class, data members are automatically allocated under each object. If we are allowed to initialize data members at the time of creating a class

then the data members corresponding to all objects will possess the same initial values. But in practice, we would like to have ^{separate} initial values for different objects. In case we use any member method to initialize the data members, we may need to call it separately after creating an object.

Hence, practically we require such a member method that can be called automatically while creating an object to initialize its elements. Thus, to do so, we need a constructor.

5) What are the different types of constructor? Give eg.

Ans: o Non argumented constructor →

It is a type of constructor which does not receive any arguments and initializes data members with some default value.

Example :- class Test

{ int a, b;

Test ()

{ a = 10; b = 20; }

o Argumented Constructor → It is a type of constructor which receives some arguments and initializes the data members with the received arguments.

Example :- class Abc

{ private int d;

Abc (int num)

{ d = num;

& o.p.ln(d);

}

3) Copy Constructor :- It is a type of constructor which is used to create one object with the help of another object i.e. It is used for creating duplicate objects.

Example :-

class Copy

{ // class using parameterized & copy constructor

int a, b;

Copy (int x, int y) // Parameterized constructor

{ a = x; b = y; }

Copy (Copy p) // copy constructor

{ a = p.a; b = p.b; }

Class abc

{ p.u.v.m (String args []) }

{ copy ob = new copy (5, 8);

copy ob1 = new copy (ob); // object ob is

{ passed to the constructor

}

4) Default Constructor :- It is a type of non argumented constructor. When no constructor is supplied in the program, compiler supplies the default constructor and it initializes the data members with some default values. For eg - Integer with 0, double with 0.0, string with null etc.

But if any constructor is mentioned in the program, then user has to supply his own default constructor

Example :- class dconst

{ int // class to use default constructor

int a, b;

dconst () // Default constructor

{ a = 5; b = 8; }

void display ()

{ cout << "a is " << a << " and b is " << b; }

}

6) What is constructor overloading?
Give example.

Ans A process of using a number of constructors with the same name but different types of parameter lists is known as Constructor Overloading.
Example:-

Class Constructor

{ int a, b;

Constructor()

{ a = 0; b = 0; }

Constructor (int x, int y)

{ a = x; b = y; }

Constructor (Constructor)

{ a = t.a;
b = t.b;

}

{

Overloaded Constructors

7) What is destructor?

Ans. Destructor is a special member function of a class where function name is same as class name preceded by the tild operator (~).

It is used to destroy an object when it is not in use and makes that memory available for other objects.

Java internally uses the destructor and we do not have any option to declare it.

8) What are the features of destructor?

Ans. ① It is invoked by the compiler to destroy objects
② Destructor is same ^{name} as that of its class but preceded by a tild operator or tild sign.

- When a destructor gets invoked, the object is deinitialized, that is, memory is freed to be released.
- It has no return type, not even void.

Q) What is garbage collector?

Ans - Garbage collector or GC is an internal thread or control used by Java to free the memory space when a variable is not in use. It is always run by the Java interpreter when a Java program is running.

CLASS AS USER DEFINED TYPESCh 5

1) Explain ternary operator with eg:-

- Ans:-
- ① The ternary operator has 3 different sections. It is ? ; ;
It checks a condition and the condition can return true or false.
 - ② General form of ternary operator :-
expression1 ? expression2 : expression3
Here, expression1 can be any expression that evaluates to a boolean value. If expression1 is true, then expression2 is evaluated else expression3 is evaluated. Neither expression2 nor expression3 can be void.
 - ③ Ternary Operator may return only one value and makes program simpler.
 - ④ Example :-

In If else :- if ($n \leq 40$)
 if ($n < 40$)
 Salary = $4 * n + 100$;

else Salary = 300 ;

else Salary = $4.5 * n$;

In ternary :- Salary = $(n \leq 40)? ((n < 40)? 4 * n + 100 : 300) : 4.5 * n$;

2) Define relational operator with example.

Ans:- Relational operators compares 2 operands and determines the relationship between them. The result is boolean value.

Example :- $>$ greater than

$!=$ Not equal to

$=$ Equal to

$<=$ less than equal to

3) What is conditional or logical operator?

Ans:- Logical operators return true or false in a given expression comparing two

or more boolean value. Java supports six logical operators, out of which five are binary and one is unary.

Example :-

OPERATOR	DESCRIPTION
&&	short - circuit or conditional AND
	short - circuit or conditional OR
!	logical NOT
&	logical AND
	logical OR
^	logical XOR (exclusive OR)

4) Difference between single ampersand (&) and double ampersand (&&)

Ans:-

- | | |
|---|---|
| <ul style="list-style-type: none"> Both conditions are checked and evaluated. Can be used as Bitwise Operator also. | <ul style="list-style-type: none"> First condition is checked, if satisfied, then only second condition is checked. Always used as logical or conditional operator. |
|---|---|

5) What is short hand operator?

Ans:- Compound Assignment Operator or shorthand operator act similar to arithmetic operator but this assignment operator has less precedence or priority in an expression.

Example :- $a += b$, $a *= 5$, $a /= 5$, $a -= 5$;

6) What do you mean by operator precedence and associativity?

Ans:- In a java expression which is comprised of different types of operators. Operator precedence rules determines the order in which the operators will be executed.

$\Rightarrow +, -, \times, \div, \%,$
 $\Rightarrow +, -, \times, \div, \%$.

In a java expression, when more than one operator having the same precedence is present in an expression, associativity rules determine which operator will be executed first.
 (Normally from left to right)

7) Create a vchart of precedence and associativity.

Ans. Precedence chart :-

- ++, --
- ×, ÷, %
- +, -

Associativity Chart :-

- (), []
- ++, --, ~
- new operator
- *, /, : /
- +, -

(Right to left associativity)

8) Define Wrapper Class. Give example.

Ans. Wrapper classes form a part of standard library of Java.lang package which provides many methods which help to manipulate primitive datatype in a program. A wrapper class does the following:-

- Determines nature of data of primitive datatype
- Converts them to object type
- Converts object data into data of primitive type

Example:- i) Integer Wrapper Class

Method	Return Type	Argument
parseInt()	int	String
valueOf()	int	String
toBinaryString	String	int
toOctalString	String	int
toHexString	String	int
toString()	String	int

ii) Character Wrapper Class

<u>Method</u>	<u>Return Type</u>	<u>Argument</u>
isLowerCase()	boolean	char
isUpperCase()	boolean	char
isDigit()	boolean	char
isLetter()	boolean	char
isWhitespace()	boolean	char
isLetterOrDigit()	boolean	char
toUpperCase()	char	char
toLowerCase()	char	char

9) What is bitwise operator?

Ans.

In java program, we can use some special type of operators which perform operations on bit level of operands. These operators use byte, short, int, long but not double or float. These special binary operators are called bitwise operators.

10) What is the difference between Bitwise and logical Operators?

Ans.

<u>Bitwise Operator</u>	<u>logical Operator</u>
<ul style="list-style-type: none"> Evaluates to a boolean value return type is false 	<ul style="list-style-type: none"> Evaluates to an integer value return type is byte, short, int, long

11) What is difference between equals function and double equals to

Ans.

<u>equals function</u>	<u>Double equals to</u>
<ul style="list-style-type: none"> Used to check 2 strings are equal or not Returns the boolean value String function that compares 2 strings Checks they are identical or not 	<ul style="list-style-type: none"> Used to check 2 nos. are equal or not Returns ^{in datatype that} what user wants Relational operator that compares 2 primitive datatype Checks they are same or not

Ch 6 Using Library Classes

- 1) Name some inbuilt classes with their purpose.

Ans. Some inbuilt classes with their purpose:-

Name of class	Purpose
i) <u>Math</u>	• Contains method to perform basic numeric operations such as elementary, exponential, logarithm, sq root, trigonometric functions.
ii) <u>System</u>	• Contains methods which provide facilities like standard input, output etc.
iii) <u>StringBuffer</u>	• Used to represent characters that can be modified.
iv) <u>String</u>	• Used to manipulate character strings that cannot be changed.
v) <u>Wrapper</u>	• To convert simple data types into object, i.e., to give object form to a data type using constructor. • To convert string to datatypes.
vi) <u>BufferedReader</u>	• Reads text from character input stream, buffering characters to provide efficient reading of characters, arrays, lines.
vii) <u>InputStreamReader</u>	• Acts as bridge from byte stream to character streams i.e. it reads bytes and decodes them to characters using a charset.
viii) <u>File Reader</u> (Character Oriented Class)	• Used for reading streams of characters from file • Return type is byte
ix) <u>File Writer</u>	• Used to write character oriented data to a file (file handling) • Provides method to write string directly
x) <u>PrintWriter</u>	• Prints formatted representations of objects to a text output stream.

Some library Classes with their Purpose :-

Library Classes	Purpose
i) Java.io	• Contains input / output function
ii) Java.lang	• Contains functions for character and string operations
iii) Java.awt	• Contains functions for windows interface
iv) Java.util	• Contains functions to develop utility programs
v) Java.applet	• Contains applets
vi) Java.net	• To provide communication on network
vii) Java.math	• To perform various mathematical calculations viz. power, square root etc

2)

Name the default packages of java.

Ans.

The default packages of java are Java.io, Java.lang, Java.awt, Java.util, Java.applet, Java.net, Java.math.

3)

Name classes of java.lang package.

Ans.

Math class, String class, StringBuffer class, System class, Wrapper class are present in java.lang package.

4)

Name classes of java.io package.

Ans.

BufferedReader, BufferedWriter, InputStreamReader, OutputStreamWriter are classes of java.io package.

5)

Write methods of String Class.

Ans.

Methods of String Class are length(), toLowerCase(), toUpperCase(), trim(), charAt(), indexOf(), equals(), equalsIgnoreCase(), compareTo(), substring(), valueOf(), replace(), startsWith(), ~~charAt()~~ to charAt()

6) Difference between charAt() & indexOf()

charAt()

- Returns a character of string from the specified position
- Return type is Character.

Example - String a = "computer";

a.charAt(5);

Output :- [t]

(Character 't' is at 5th position because character 'c' is at 0th position)

indexof()

- Used to return the index or actual position - 1 of character in a given string.

- Return type is integer.

Example - String a = "prime number";

a.indexOf('m', 5);

Output :- [8]

(Next occurrence of 'm' in string from 5th position is at 8th position)

7) Difference between equals() and compareTo() functions.

equals()

- Checks whether 2 strings are equal or not and it is case sensitive

- Return type is boolean

• Example :-

a1 = "Rajendranath Sam";

a2 = "Rajendranath SaM";

a1.equals(a2)

Output :- [False]

compareTo()

- Compares equality of 2 strings. Also checks whether a string is bigger, smaller, equal to other string or not. Returns difference of ascii values of first character mismatch

- Return type is integer

• Example :-

a1 = "Name";

a2 = "Name";

a1.compareTo(a2);

Output :- [0]

8) Explain function toCharArray();
 Ans. toCharArray() converts a string to a new Character Array.

Example:- string a[5] = "BAHUBALI";
 char a[] = ~~a~~ al.toCharArray();
 i.o.p.ln(a)

Output:-

B	A	H	U	B	A	L	I
---	---	---	---	---	---	---	---

9) What do you mean by Stream?
 Ans. Stream is an abstraction that either brings or sends data.

2 Types of Stream are:-

① InputStream ② OutputStream

- 1) InputStream is used for accepting data from file or user.
 2) ~~the~~ OutputStream is used for providing some data to the user or writing some file.

10) Name a stream class.

Ans. 2 stream classes are:-

• Byte Stream • Character Stream

11) Explain character stream class.

Ans. Character Stream Class provide the API (Application Programming Interface) to read and write 16 bit characters. It can work with any Character in the unicode character set! It has 2 classes:-
 • Reader • Writer

12) Explain byte stream class.

Ans. Byte stream class provides API to read and write 8 bits of characters. These streams are used to read and write binary data such as images and sound. It has 2 classes:- • InputStream • OutputStream

13) Differentiate between character stream and byte stream.

Ans-

Character Stream

- This class provides API to read and write 16 bit characters.
- Allows us to read / write data character by character.
- Its classes are Reader, Writer

Byte Stream

- This class provides API to read and write 8 bits of character.
- Allows us to process data byte by byte.
- Its classes are Input Stream, Output Stream.

14)

Explain System class.

Ans-

All java programs import the java.lang package. This defines a class System, which encapsulates several aspects of run-time environment. It also contains 3 pre defined stream variable:- in, out and err.

~~System.in~~

- Standard InputStream
- Keyboard by default

System.out

- Standard OutputStream
- Console by default

System.err

- Standard ErrorStream
- Console by default.

15) Explain getChars().

Ans- Format:-

```
void getChars(int startIndex, int endIndex,  
            char a[], int arrayIndex)
```

→ Copies characters from string into the destination character array i.e. a[]. The characters are copied into the subarray of a[] starting at index arrayIndex.

Example :-

```
class Test
```

```
{ public static void main()
```

```
{
```

```
String str = "St. Xavier's High School";
```

```
char a[3] = new char[20];
```

```
str.getChars(4, 13, a, 3); /* copies
```

characters from string str to character array a[3] at position 3 */

```
for (int i = 0; i < a.length; i++)
```

```
System.out.print(a[i]);
```

```
}
```

Output :- --- Xavier's -----

- 16) Differentiate between `getchar()` and `toCharArray()`.

Ans:

`getchar()`

- Copies character from a string to a character array from a specified position in that array.

`toCharArray()`

- Converts a string to a new character array.

Import
keyword
keywords

- 17) Import ^{keyword} is used to include a package in a program. Then, all the methods of that package becomes available in the class.

- 18) Name some methods of `StringBuffer` class.

Ans Some methods of `String Buffer` class are `append()`, `setCharAt()`, `insert()`, `delete()`, `length()`, `reverse()`

Example :- `StringBuffer sb = new StringBuffer("ABCD");`

```
sb.reverse();
```

```
sb.delete(int, int);
```

```
sb.setCharAt(int index, char ch);
```

Decision Making

Q) What are the different control statement available in java?

Ans: The different control statements available in java are selection, iteration, jump.

2) Explain selection statement with example.

Ans: A selection or decision making statement allows selective execution of statement. It enables decision & subsequent selection of some of the several possible actions.

Java ~~support~~ supports following selection statement

- if statement
- if - else statement
- nested if
- if - else - if
- switch case
- ?: (ternary operator)

3) Explain iteration statement

Ans: The process that repeats a set of instructions a no. of times is iteration. Thus, java provides such iteration statements like for, while, do-while to manipulate data and perform repetitive actions. These statements create loops which repeatedly executes the same set of instructions until a termination condition is met. Loops might be definite, or indefinite or entry controlled or exit controlled.

Q) Explain null reference in java.

A= It is a run time exception in java.

This exception is thrown when an application attempts to use an object reference that has a null value. When we call an instance method by the object which points to null, then this exception is thrown.

4) Explain jump statement.

Ans. Java supports jump statements
break, continue, return.

Break is used :-

- To terminate a statement sequence in switch statement
- To exit a loop.

When continue statement is used in java, it skips the rest of the statements for that value and resumes next iteration. Continue is a keyword which is used to send the control back to the beginning of nearest loop. Statement written after continue will not be executed.

Returns appears at the end of a function and returns only one value to the caller module causing immediate exit from the function.

5) What is Test expression?

Ans. Test expression is any expression that returns a boolean value.

Example :- if (test expression)
{ statement - block ; }
statement - n;

If test expression is true, then statement - block will be executed and then statement - n will be executed. If the test expression is false, the statement-block does not get executed, and only statement - n gets executed.

6) What is compound statement? Define example.

Ans. Multiple statements within curly brackets are compound statement.

Example:- if (condition)

{ statement 1; // statement 1 and statement 2
 statement 2; // are compound
}

Complex statement is a type of statement which is comprised of different types of operators and operands. It always returns value of highest datatype.

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7) What is complex statement? Give ex.

Ans. Multiple statements with having different operators and different datatypes and values within curly brackets make up a complex statement.

Example - `int t = 99;`

`if (t > 100)`

{ `double c = Math.pow(t, 2)`

`+ 99.0 * (double) 5;`

`c = int(c); // Complex Statement`

}

8) What is fall through situation?

Ans. In switch case statement, if break is not provided, after each case, the control automatically moves from the matched case to the next case until a break is encountered. This is known as fall through situation.

9) Difference between if-else and switch case

Ans. if-else

switch

① Supports all datatypes

① Supports integer, short, int, char, boolean, characters only.

② Multiple criteria can be checked.

② Single condition can be checked.

③ Logical expression can be used

④ Logical condition can't be used.

10) What do you mean by testing a program?

Ans. Execution of statements in accordance with the test satisfaction or dissatisfaction of test condition in a java program is called testing a program.

11)

What do you mean by debugging?

Ans: Debugging is the process of finding and removing of defects that prevent correct operation of computer software or a system.

Debugging involves :-

- Identifying a problem
- Isolating the source of problem
- Either correcting the problem or determining a way to work around it.

12) What are different types of errors?

Five examples.

- Ans.
- Logical Error → e.g.: Program of perfect is given but program of prime is done
 - Runtime Error → e.g.: Array Index Out of Bound
 - Syntan Error → e.g.: - Semi Colon Missing or Statement Missing

13)

What is dangling ~~else~~ else?

Ans: Pg 132
A nested - if statement that has more number of ~~else~~^{if} than the no. Of if's is called dangling else.

In a java program, if the number of if else statements do not match in a program and which else is for which if is not clear, then it is known as dangling if else.

Difference :- Testing

- Process in which program is validated.
- Positive activity that seeks to demonstrate that program is correct.
- Testing is complete when all desired verifications against specifications have been informed.
- Process in which errors in program are removed.
- Negative activity in the sense that it is centred around elimination of errors.
- Debugging is finished when there are no errors and program is ready for execution.

1) What are the different types of loops in java?

Ans. Different types of loops in java are:-

- for loop, while loop, do while loop
(entry controlled) (exit controlled)
- Definite loop, Indefinite loop,

2) Explain entry controlled loop and exit controlled loop.

Ans. While is entry controlled loop. It checks the condition first and then executes the block of statement. It does not execute if Condition is not true.

Do While is exit controlled loop. It executes the block of statements once and then checks for the conditions. It executes at least once even if the condition is false.

3) Similarity and difference between for Loop and while loop.

Ans. Similarity:-

- Both loops are entry controlled.
- Condition is checked first and then only, execution of block of statements occur.

Difference

For loop

- ① Used for counting loops, it enables us to place all relevant information in one place.

While loop

- ② Used when we do not know in advance how many times the loop will execute.

- | | |
|---|--|
| <ul style="list-style-type: none"> Condition in FOR is optional. If condition statement is omitted, FOR will give execute infinitely. Increment statement executes after all statements get executed. (Although increment statement in FOR can be skipped in brackets and inserted at a suitable place, but that degenerates the FOR loop to WHILE and modifies basic sense for FOR.) | <ul style="list-style-type: none"> Condition in WHILE is mandatory. If condition statement is missing, WHILE will give compilation error. We can insert the increment statement at any place. |
|---|--|

4)
Ans-

Difference between while and do-while.

While

- Entry Controlled loop
- It checks for the condition first and then executes the block of statements.
- It does not execute if condition is not true.

Do While

- Exit Controlled loop
- It executes the block of statements once and then checks for the condition.
- It executes atleast once even if condition is false.

5)
Ans-

Explain nested loop with example

Java allows loops to be nested. A nested loop means a loop within another loop. For each outer loop, the inner loop executes n number of times until the condition of inner loop is true.

```
class Nest {
```

```
void k()
```

```
{ for (int n = 0; n < 10; n++)
```

```
    { for (int y = 0; y < 10; y++) //Nested loop
```

```
        s.o.p.ln(" .");
```

```
        s.o.p.ln();
```

```
}
```

```
}
```

6) Ques. Give eg. of break and continue.

Ans. Break example

int a = 2;

for (int i = 1; i <= 10; i++)

{ if (a < 6)

 d.o.p.ln(a++);

else

 break;

}

Continue example

int num = 99;

for (int i = 1; i <= 10; i++)

{ ++num;

 if (num / 2 == 0)

 continue;

 else

 d.o.p.ln(num);

}

7) Explain labelled break and continue.

Ans. In switch case, the expression we give must be of byte, short, int, char. Each value should be constant & unique. It is called case label.

The value of the expression is compared with each of the literal values in case statements. Here, the break statement is used to terminate the ^{labelled} statement sequence. It does not transfer the flow of control to label. Control flow is transferred to the statement immediately following the labelled statement. Thus, it happens due to labelled break.

A labelled continue statement is used to skip the current iteration of an outer loop marked with label.

8) Write the syntax to create infinite loop using while, do while, for.

Ans: Creating infinite loops with WHILE LOOP

int i = 1; int s = 0;

while (i <= 10)

{ s = s + i; }

Creating infinite loops with FOR LOOP

int i = 1;

for (j = 10; j > 0; j++)

i.o.p(j + (i++));

Creating infinite loops with DO WHILE LOOP

int lot = 6;

do :

{ lot++; }

} while (lot > 5);

→ 7) Big program is divided into smaller blocks with some labels. Break and continue can work on individual blocks by denoting them with the help of their labels

Example- ab : ; for (int i = 1; i <= 5; i++)

 ;

 ;

 ;

 { if (i >= 2)

 continue ab;

cd : ; if (i >= 4)

 ;

 ;

 ;

 break cd;

}

1) What is an array? Give example

- Ans. • Array is a contiguous block of memory shared by the same name having different index numbers.
- It is a set of homogenous data elements or a group of like-typed variables that are referenced by a common name.

Example - Format :-

```
int a[3] = {10, 20, 30}; // Initializing
                           ^ an array
                           | with const
                           | value
                           |
                           a ← Same variable
                           | ← with different
                           |   Subscripts
                           |
                           a[0] a[1] a[2] ← Here a[0] = 10, a[1] = 20, a[2] = 30;
```

or

```
int a[5] = new int [5]; // Declaring
for (int i = 0; i < 5; i++)
{
    I.O.P.In ("Enter a no.");
    a[i] = Integer.parseInt(br.readline());
} // accepting integer values from
   . the user in a specified index
   in the array
```

```
for (int i = 0; i < 5; i++)
    I.O.P.In (a[i]);
// Printing the array elements.
```

2) Explain length related to array.

Ans. ① If an array is dynamically created during runtime, we may not know the size of the array for which java provides us with length property for all arrays.

② Format - arrayname.length

③ The length property returns the length of an array, i.e. no. of elements

of an array.

- Q) Example 1 int a = {2, 4, 6, 8, 10};
 L - a.length;
 Output - 5

Here 'a' is the name of the array.
 length is the property provided by java to find the no. of elements in an array.

3) What are the advantages of array?

Ans:-

- ① No need to remember lot of different types of variables.
- ② All the array elements can be arranged in either ascending order or descending order.
- ③ We can easily search an element from the array.
- ④ More than one variable can have same name but different index number.
- ⑤ Any element can be referred to by their index number.
- ⑥ In a single statement, we can define as many variables as we want.
- ⑦ Any program becomes short and therefore easy to compile and debug.

4) What are the disadvantages of array?

Ans:-

- ① There is always a chance of memory wastage.
- ② Only homogenous data elements can be stored.

5) Explain `arraycopy()` with example.

Ans:-

- ④ The `arraycopy()` of java is used to copy selected elements of one array to another array. It is a method of `System class`.

① Format :-

The `arraycopy()` requires 5 arguments:-
`System.arraycopy(source object, start index, destination object, index, length)`

→

- i) The 2 object arguments indicate the array to copy from and the array to copy to.
- ii) The 3 integer arguments indicate the starting location in each, the source and destination array, and the number of elements to copy.

② Example :-

```
int a[] = { 10, 20, 30, 40, 50, 60,  
           70, 80 };
```

```
int b[] = new int[5];
```

`System.arraycopy`
(a, 2, b, 0, 5);

~~Output~~ → b[] = { 30, 40, 50, 60, 70 };

6) Explain array of objects with example.

Ans:- Arrays can hold reference to objects as well as primitive types. For an array of objects, we have to create an array variable of class type whose object references we want to store in the array.

Example :- class Student

{

 void create()

```
{ Student s[] = new Student[5];  
    for (int i=0; i < s.length; i++)  
    { s[i] = new Student();  
        s[i].input; }
```

```
for (int i = 0; i < s.length; i++)
{
    s[i].display();
}
```

When we are ~~or~~ initializing the array of objects, space is created in the memory for the storage of 5 objects of class type.

- 7) Differentiate between selection sort and bubble sort.

Ans.

Selection Sort

- ① In selection sort, one element is selected and compared with the rest of the array.
- ② In ascending order sorting, biggest element goes to last and smallest element comes to the first position of array in Pass 1.
- ③ Swapping takes place with first element.
- ④ Loop ends swapping stop when the data is sorted.

Bubble Sort

- ① In bubble sort, every element is compared with its next element.
- ② In ascending order sorting, biggest element goes to the last of the array but smallest element does not go to first position after Pass 1.
- ③ Swapping takes place with the next element.
- ④ It goes through all loop cycles even if data elements are much sorted before.

- 8) Differentiate between linear search and binary search.

Ans.

Linear Search

- ① It searches no. from beginning to end till no. is found.
- ② It does not require sorted array.
- ③ It requires more time.
- ④ It checks for each element.

Binary Search

- ① Search element is compared with middle element and searched in either half of array.
- ② It requires sorted array.
- ③ It requires less time.
- ④ Most of the elements are skipped during this process.

i) Mechanism of Selection Sort

Ans. Selection Sort is a technique to arrange array elements in ascending/descending order by selecting a specific element from a set of data items. The maximum and minimum element in array is determined and is swapped with the first element and this same process is repeated for second element, third element and so on.

Example: 82 65 73 45 9
Pass 1 :- 9 65 73 45 82
Pass 2 :- 9 45 73 65 82
Pass 3 :- 9 45 65 73 82

ii) Mechanism of Bubble Sort

Ans. Bubble Sort is a technique widely used for sorting elements in a single dimensional array. In this process, adjacent elements are compared. To arrange data elements in ascending order, every element is compared with its next element, and if needed swapping takes place. After sorting, biggest element moves to the end of the array.

Example: 65 75 85 55 19

Pass 1 :- 65 75 85 55 19

Pass 2 :- 55 65 19 75 85

Pass 3 :- 55 19 65 75 85

Pass 4 :- 19 55 65 75 85

10) Mechanism of linear search

Ans. In this method, each element is compared with the value to be search in a sequential manner. ~~The~~ search is termed as sequential search. Since each element is checked, the searching speed becomes slow for arrays with large number of elements.

Example :- int a[] = {1, 2, 3, 4, 99, 100};

int n = 6;

for (int i = 0; i < a.length; i++)

{ if (a[i] == n)

{ S.o.p. ("No. found at " + (i+1))

break;

}

11) Mechanism of binary search

Ans. For this method, array element which is passed should be in sorted format. The middle element of the sorted array is found out, it is checked with the value to be searched,

a) If search value is greater than middle element, then left side elements are ignored in search process.

b) If search value is less than middle element, then right side elements are ignored from search process.

c) If search value is equal to middle element, then position of element we are searching is determined.

If element is not found, steps a), b), c) are repeated. In this process most of the elements are skipped while searching, so searching becomes fast when amount of day data is more.

Example :-

```

int arr[] = { 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 };
I. O. P. In ("Enter a no");
int no = Integer. ...
int fl = 0; lb = 0, ub = arr.length - 1;
while (lb <= ub)
{
    int mid = (lb + ub) / 2;
    if (no > arr[mid])
        ub = mid + 1;
    else if (no < arr[mid])
        lb = mid - 1;
    else {
        I. O. P. In (no + " found at " + (mid + 1));
        fl = 1; break;
    }
}
if (fl == 0)
    I. O. P. In ("not found");

```

Q 11) How many dimensions can array have?

Ans = An array can have multi dimension.

EXTRA QUESTIONS

1) Why JAVA is known as WORA?

Ans. WORA stands for WRITE ONCE READ ANYWHERE. So, when a java program is written and compiled, it can be executed on any platform provided JVM (Java Virtual Machine) is there as JAVA is platform independent language; i.e., it does not depend on operating system for execution. Thus, JAVA is known as WORA.

2) What are the 2 types of java program?

Ans. ① Application Program :~

- ① Can be executed in a single machine
- ② Cannot be executed in a web browser

② Applet Program :~

- ① Web based applications that can be executed on web browser.
- ② Name of java web browser is applet viewer. exe.

3) What are the reserved words in java?

Ans. The keywords in java which are restricted by the Java compiler from being used in later version are known as reserved words.

Example :~ Goto, concat

4) What are the advantages of 'if' over 'ternary'?

- Ans.
- ① 'if' can have more than one statement in a block but 'ternary' operator can return one value.
 - ② 'if' is not complex in nested form but 'ternary' is more complex in ~~not~~ nested form.
 - ③ Complex criteria can be checked in 'if' but not in 'ternary'.
 - ④ In 'ternary operator', expression has to be assigned to a variable which is not the case in 'if'.

5) What is object class and its method.

- Ans -
- ① Object class is the base of all predefined classes in java.
 - ② It resides at the top of inbuilt class hierarchy.
 - ③ It can store the instance of any other class of java.

Its methods are:-

- ④ • equals() → checks whether 2 objects are equal or not.
- ⑤ • clone() → create one object with the help of another object.

6) Differentiate between String and StringBuffer

- Ans -
- | <u>String</u> | <u>StringBuffer</u> |
|--|---|
| <ul style="list-style-type: none"> • String type object has fixed length. • New object is created to produce change. • General approach of programming. | <ul style="list-style-type: none"> • String Buffer type object has provisions to change the length. • Change is maintained in same object. • Advanced approach of programming. |

7) What is temporary instance of a class?

- Ans In a java program, we can create the temporary instance of a class to refer that class within another class. We can use the object of the class as reference but no separate object is created.

8) What are the benefits and drawbacks of temporary instance?

Ans:- Benefit :- No separate memory allocation for the objects

Drawbacks :- We cannot refer to it in future as no object is created.

9) How are primitive and reference datatypes passed?

Ans:- Primitive datatypes are passed by call by value method of function calling.

Reference Datatypes are passed by call by reference methods of function calling.

10) Explain different types of access specifier
Ans:- Access specifiers can be divided into 4 categories.

Public :- Class members (variables or methods) specified as public can even be used outside the visibility of a class i.e from any source even from external class functions.

Thus, it is used when a class in any package, wants to access a class's public members. In case, a class member is declared with no access specifier, it is declared public (by default).

Private :- When a function of a class is specified as private, a member of that class can use it as a function. Thus, the data members or member functions which are specified as private can be used only within the scope of a class. These members cannot be accessed outside the class. Private is the most restrictive access level.

Private is used to declare members that should only be used by the class and not by an outsider. If private class member is invoked by an outsider, it could jeopardize the state of object or program in which it is running.

Protected :- Protected members are used in class as private members which can only be used within the class but can be applied to another class during inheritance. Only the inherited class members can access the protected function.

Package :- The package access level is set if you do not explicitly set a member's access to one of the other levels. This access level allows classes in the same package as your class to access the members.

The table shows the access level permitted by each specifier

Specifier	class	subclass	package	outside
Private	✓			
Protected	✓	✓	✓	
Public	✓	✓	✓	
Package	✓		✓	✓

11) (a) What is the difference between prefin and postfin?

Ans:-

Prefin	Postfin
① The <code>++</code> , <code>--</code> operator appears before the operand or variable.	① The <code>++</code> , <code>--</code> operator appears after the operand or variable.
② Evaluates to a value of operand after increment / decrement operation.	② Evaluates to a value of operand <u>after</u> before increment / decrement operation.
③ First increments or decrements the value, then returns it.	③ First returns the value, then increments or decrements the value.

12) What is the benefit of private class?

Ans:- The benefit of private class is that data members and member methods specified as private can be accessed within the ^{extended} scope of a class and not by any other source or outsider.

13) What is L-value and R-value?

Ans:- L-value stands for left value or location value. It is always a variable. R-value stands for read value or constant value. It may be variable, literal or expression.
Eg :- `int a = 10;` Here `a` is L-value, `10` is R-value.

14) What is normal flow of control?

Ans: When we issue a command to execute a program in any programming language, the control reaches straightway to the first line of program. After executing the first line, the control moves to the next line and so on. The control keeps executing the lines sequentially one after the other unless it has reached the end of program. After executing the last line of program, the control gets terminated (i.e. passes back to system). The sequential flow of control from one statement to the other is termed as normal flow of control or sequential flow of control. This process of control flow takes place by default.

15) What is conditional flow of control?

Ans: Sometimes during execution of program, the user may need to transfer the control to a specified location in the program by skipping some lines. This can be done by conditional flow of control. We can perform this task by applying control statements like if, switch-case, loops etc.

16) What is bi directional flow of control?

Ans: The statement containing 'if' is referred to as bi-directional branching. It checks a given condition and transfers the flow of control to either of two blocks of statement.

This is bi directional flow of control.

- 17) What do you mean by boxing and unboxing?

Ans. Boxing and unboxing enables a unified view of the type system where a value of any type can ultimately be treated as an object. Converting a value type to reference type is boxing. Unboxing is the opposite operation and is an explicit operation.

(Q) What is unicode?

Ans. In java, the datatype used to store characters is char. Java uses Unicode to represent characters. Unicode defines a complete international character set that can represent all characters found in human language. Java char is 16-bit type. 65536 characters can be supported through unicode character set.

(Q) Example of call by reference with explanation.

Ans. When we pass an object as an argument to a function, it is passed by reference. In this method, a reference to an argument is passed as a parameter. The value of the argument is not passed. This method is called call by reference.

Example :-

class Abc

{ int a = 10; }

void change (Abc obref)

// obref points to memory allocation
for object obj

{ obref.a = obref.a + 10;
}

public void main ()

{ Abc obj = new Abc ();

obj.p ("Value of a:" + obj.a);

change (obj); //actual parameter
has object as parameter

obj.p ("Value of a:" + obj.a);

}

}

Encapsulation

1) Define interface. Give small ex.

Ans. Interface is a reference type in java similar to a class. It is a collection of abstract methods. A class implements an interface thereby inheriting abstract methods of interface. Along with abstract methods, an interface may also contain constants, default methods, static methods and nested class.

Eg:- interface MyInt 1

```
    { public void add(int a, int b);  
      public void subtract(int a, int b);  
    }
```

2) Which keyword is used for interface?

Ans. implements

3) What are the types of inheritance supported & not supported in java?

Ans. Java supports

- Single.
 - Multi level
 - Hierarchical type of inheritance.
- Java does not support
- Multiple
 - Hybrid type of inheritance

4) Differentiate between interface & inheritance

Interface

- Process of creating a new class from an existing base class.
- Methods and constructors may or may not have body.

Interface

- Collection of abstract methods implemented by a class
- All methods in interface are abstract

- Base class is extended by child class.
- Interface is implemented by a class.
- We can create object in a child class.
- We cannot create object of an interface.

6) What are characteristics of interface?

Ans.

- We cannot create any object of an interface.
- An interface does not contain any constructor.
- All methods in an interface are abstract.
- Variables declared inside the interface are by default static & final.
- An interface is not extended by a class, it is implemented by a class.
- A interface can extend multiple interface.
- Methods in an interface are implicitly public.

7) What is use of super keyword?

Ans.

- Used to call base class constructor
- Can be used to call any base class method.
- Must be the first statement inside child constructor or function.

8) Which keyword is used for inheritance?

Ans.

extends

9) What is method overriding?

Ans. More than one function may exist with the same name or prototype inside the base & child class. This is called method overriding.

10) Differentiate between method overloading & method overriding

Ans =

Method Overloading

- Occurs when 2 or more methods in one class have the same method name but different parameters.
- Compile-time concept
- Performed within one class.
- Return type must be same or different.

Method Overriding

- Occurs when 2 methods with same name & parameters is present in parent & child class.
- Run-time concept
- Performed with 2 classes
- Return type must be same or covariant.

Chapter 10 Errors in a Program

1) What are the different types of errors? Give eg.

Ans -

- Logical error
- Program of prime given, but perfect is done
- Runtime error
- Array index OutOfBound
- Syntax error
- Semi Colon Missing

2) What are the keywords used for exception handling in Java?

Ans - try, catch, throw, throws, finally

3) What is the significance of try catch block?

Ans - If any error occurs inside the try, catch block, control will come out from that block only. Rest of the program will be executed without any problem.

4) What is base of all predefined exceptions?

Ans - Exception Class

5) Define package.

Ans - Packages in Java is a mechanism to encapsulate a group of classes, interfaces & sub-packages.

It is a way of namespace management. Collection of related classes providing access protection & namespace management.

6) How to declare and use a package?

Ans - Create package with keyword package which includes classes.

Eg: package MyPack;

Use * the methods of this

package in a class by importing the package with the help of import keyword.
e.g.: - `import MyPack.*;`

7) Differentiate between throw & throws.

Ans:-

throw

throws

- ① Used inside the method ② Used with method header
- ③ Only one exception class can be used with throw clause. ④ More than one exception class can be mentioned using comma.

8) What is utility of finally block?

Ans:-

A try block cannot be exited without ~~executing~~ the corresponding finally clause.

The code in finally clause is executed whether or not an exception is caught. If a transfer of control & flow occurs in try block because of a break-continue or return, then the finally clause is executed before flow transfer occurs.

9) Name 2 inbuilt exception with their use.

Ans:-

IOException : ~ If JVM failed to open an I/O stream

ClassNotFoundException : ~ thrown if a program cannot find a class during execution

10) Explain use of Scanner class.

Ans:-

User may not need to mention set of data being input from the console.

○ End of data elements can be specified through special token.

- Provides an easier approach to read records from a data file.
- String manipulation is quite easier as each word can be obtained as a token and treated separately.

11) Explain 2 methods of Scanner class.

Ans: int nextInt() - returns next token as an int.

If next token is not an integer, InputMismatchException is thrown.

long nextLong() - returns next token as long.

If next token is not long, InputMismatchException is thrown.

12) Differentiate between Scanner and BufferedReader.

Ans:-

<u>Scanner</u>	<u>BufferedReader</u>
Does not throw exception	throws exception
Inputs everything as a separate token	Inputs everything as a string

13) What is default delimiter of Scanner class?

Ans:-

white space

14) How to change default delimiter?
 Ans: i.e. useDelimiter (",");

15) what is abstract class?
 Ans: A class for which no object can be created is abstract class.
 It acts as a place holder.
 We have to inherit the abstract class to use it.
 Eg:- abstract class A { }.

16) What is abstract method? Define eq.
 Ans: Abstract method is a method without a body. We ~~do~~ must have to over write the method to use it.
 Eg:- public abstract int MyMethod(int n);

17) What are uses of final keyword.
 Ans: ① final class cannot be inherited.
 ② final methods cannot be overridden.
 ③ final variables value cannot be changed.

18) What is user defined exception?
 Ans: Exception created by user according to his requirement is called user defined exception. (User defined exception class must be inherited from inbuilt exception class.)

19) Name some common exception class & their use.
 Ans:

- ArithmeticException - thrown if program attempts to perform division by 0.
- ArrayIndexOutOfBoundsException - thrown if program attempts to access an index of an array that does not exist.

- String Index OutOf Bound Exception - thrown if program attempts to access character at a non-existent index in an array String
- NullPointerException - thrown if JVM attempts to perform an operation of an object that points to no data or null,
- NumberFormatException - thrown if a program attempts to convert from String to numeric data type and if string contains inappropriate characters

★ Tent File, Binary File

Need of Wrapper Class :~

- i) Primitive values can be stored in objects.
- ii) To provide conversion system from character\stream type to other primitive types.

★ Boolean. parseBoolean(br. readLine()) → used to accept boolean-value (i.e. True or False)

✓ ★ Static Data Member :

Visibility : class

Lifetime : entire Program

★ We can pass some arguments to the main () during execution of a program.
eg:~

C : ➤ Save Test abc xyz

I. O. P. M (args [0]) ➤ abc

" " (args [1]) ➤ xyz

" abc ", " xyz "