DON BOSCO SCHOOL, RANCHI

COMPUTER APPLICATIONS

CLASS – 10

CONSTRUCTOR

What is a Constructor?

A Constructor is a special function which having same name as the class name used for automatic initialization of data members. The constructor is called automatically on object creation.

Characteristics of a Constructor:

(i) It has same name as the class name.
(ii) It is used for automatic initialization of data members.
(iii) No return data type is used.
(iv) It may have some parameters.
(v) It can be overload.
(vi) It is called automatically on object creation.

Need for Constructors:

Constructors have one purpose in life: to create an instance of a class.

e.g., **Student s1 = new Student( );**

The purpose of other methods, by contrast, is much more general. A method's basic function is to execute Java code.

How to define a constructor:

Consider the following class having a constructor:

```
class Student
{
        int rollno;
        float marks;
        Student( )                //constructor
        {
                rollno = 0 ;
                marks = 0.0 ;
        }
        ……
}
```

What is the difference between constructor and methods?

Constructor	Methods
1. It has same name as the class name.	1. It has different name than class name
2. It creates an instance of a class.	2. It groups java statements.
3. It has no return data type, not even void also	3. It has void or a valid return type.
4. It is called automatically on object creation.	4. It doesn't called automatically. It need to called using object of the class.

Types of Constructors:

1. **Default Constructor**
2. **Parameterized Constructor**
3. **Copy Constructor**

1. **Default Constructor**: It is a type of constructor which having same name as the class name and it does not contain any arguments or parameters and used for automatic initialization of data members.
2. **Parameterized Constructor**: It is a type of constructor which having same name as the class name and it contains some arguments or parameters used for automatic initialization of data members.
3. **Copy Constructor**: It is a type of constructor which having same name as the class name and it contains objects of same class as arguments or parameters used for automatic initialization of data members.

What is Constructor Overloading?

The process of defining multiple constructors within a class with same name as the class name but difference in number of parameters and their data types used for automatic initialization of data members.

Following example shows the **types of Constructor** and **Constructor Overloading**:

```
class Circle
{
    int r ;
    Circle( )              //default constructor
    {
        r = 0 ;
    }
    Circle( int x )        //parameterized constructor
    {
        r = x ;
    }
    Circle( Circle m )     //copy constructor
    {
        r = m.r ;
    }
    ….. ……… ………… //other codes.
}
```

What is 'this' keyword?

It is a self-referenced object of same class inside which it is being used. It represents the object of same class and used to access the data members and the member functions inside a class. It is used to access data members when the data members and the parameter variables having the same name.

e.g.,

```
class Rectangle
{
    int x ;
    int y ;
    Rectangle( int x , int y )
    {
        this.x = x ;
        this.y = y ;
        }
    }
```

In this example, data member variables and constructor parameters having the same name so proper assignment to member is accomplished using ‘this’ keyword to represent the data members.

Simple Example Questions related with Constructor:

1. **Write a Java Program to define a class Rectangle which has following descriptions:**

   Data Members/Instance Variables: length, breadth

   Member Functions/Methods:

   (i) Rectangle( ) – default constructor to initialize length and breadth with 0.
   (ii) Rectangle(int, int) – parameterized constructor to initialize data members.
   (iii) input( ) – function to accept the values from user.
   (iv) display( ) – function to display the values of length and breadth.
   (v) area( ) – function to calculate the area of rectangle.

   Write a main( ) method where user will create an object of the class and call all the member functions.

Ans :

```
import java.io.*;
import java.util.*;

class Rectangle
{
        int length;
        int breadth;
        Rectangle( )                            //default constructor
        {
                length = 0 ;
                breadth = 0 ;
        }
        Rectangle( int x, int y )               //parameterized constructor
        {
                length = x ;
                breadth = y ;
        }
        void input( )                           //input function
        {
                Scanner sc = new Scanner(System.in) ;
                System.out.println(“Enter length = ”);
                length = sc.nextInt( );
                System.out.println(“Enter breadth = ”);
                breadth = sc.nextInt( );
        }
        void display( )                         //display function
        {
                System.out.println(“Length =” + length);
                System.out.println(“Breadth =” +breadth);
        }
        void area( )                            //area function
        {
                int Ar = length * breadth ;
                System.out.println(“Area of Rectangle = ” + Ar);
        }
        public static void main (String arg [ ])
        {
                Rectangle ob = new Rectangle( );
                ob.input( );
                ob.display( );
                ob.area( );

                Rectangle pm = new Rectangle( 8, 4 );
                pm.display( );
                pm.area( );
        }
}
```

Questions based of Class and Objects:

1. Define a class called **Cuboid** with the following description:
   Instance variables/Data members: length, breadth, height
   Member methods:
   (i) Cuboid( ) - default constructor to initialize the data members with zero.
   (ii) input( ) - to input the data members values
   (iii) display( ) - to display the values of data members
   (iv) volume( ) - to calculate the volume of the Cuboid
   Write a **main( )** method where user will create an object of the class and call all the member functions.

   Ans : Please refer the link: https://bit.ly/2ZscKpm

2. Define a class called **FruitJuice** with the following description:
   Instance variables/Data members:
   int product_code - stores the product code number.
   String flavor - stores the flavor of the juice. (orange, apple etc.)
   String pack_type - stores the type of packaging (tetra-pack, bottle etc.)
   int pack_size - stores package size (200ml, 400ml etc.)
   int product_price - stores the price of the product.
   Member methods:
   (i) **FruitJuice**( ) - default constructor to initialize data members to zero and string data members to " ".
   (ii) void input( ) - to input and store the product code, flavor, pack type, pack size and product price.
   (iii) void discount( ) - to reduce the product price by 10.
   (iv) void display( ) - to display the product code, flavor, pack type, pack size and product price.
   Write a **main( )** method where user will create an object of the class and call all the member functions.

   Ans : Please refer the link: https://bit.ly/3bUfrCS

3. Define a class called **MovieMagic** with the following description:
   Instance variables/Data members:
   int year - to stores the year of release of the movie.
   String title - to stores the title of the movie.
   float rating - to stores the popularity rating of the movie. (minimum = 0.0 and maximum = 5.0)
   Member methods:
   (i) **MovieMagic**( ) - default constructor to initialize data members to zero and string data members to " ".
   (ii) void accept( ) - to input and store the year, title and rating.
   (iii) void display( ) - to display the title of the movie and a message based on the rating as per the table below.

Rating	Message to be displayed
0.0 to 2.0	Flop
2.1 to 3.4	Semi-Hit
3.5 to 4.5	Hit
4.6 to 5.0	Super-Hit

   Write a **main( )** method where user will create an object of the class and call all the member functions.
   Ans : Please refer the link: https://bit.ly/2ZpHg3c