User-defined method

1. How are private members of a class different from public members?

   (2018)

   Answer:
   Scope of the private members is within the class whereas the scope of the public members is global.

2. State a difference between call by value and call by reference.

   (2019)

   Answer:

call by value	call by reference
In call by value the method creates its new set of variables (formal parameters) to copy the value of actual parameters and works with them.	In call by reference, reference of the actual parameters is passed on to the method. No new set of variables is created.
Any change made in the formal parameter is not reflected in the actual parameter.	Any change made in the formal parameter is always reflected in the actual parameters.
Primitive data types are passed by call by value.	Reference types like (objects, array etc.) are passed by call by reference.

3. Rewrite the following using ternary operator:
   ```
   if(bill > 10000)
       discount = bill * 10.0/100;
   else
       discount = bill * 5.0/100;
   ```

   (2018)

   Answer:
   discount = bill > 100 ? bill * 10.0 /100 : bill * 5.0 /100;

4. Give the output of the following program segment and also mention how many times the loop is executed :

```
int i;
for (i=5 ; i>10 ; i++)
     System.out.println(i);
System.out.println(i*4);
```

(2018)

Answer:
20
Loop will be executed for 0 times.

5. Design a class to overload a function series() as follows:
   (a) void series (int x, int n) – To display the sum of the series given below:
   $$x1 + x2 + x3 + ……………. xn \text{ terms}$$
   (b) void series (int p) – To display the following series: 0, 7, 26, 63 p terms.
   (c) void series ( ) – To display the sum of the series given below:

   $$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + ……….. + \frac{1}{10}$$

(2019)

Answer:
```java
import java.io.*;
import java.util.*;
class OverloadSeries
{ void series(int x, int n)
    { int i; .
      double a;
      double sum = 0;
      for (i = 1; i < = n; i++)
        { a = Math.pow(x, i);
          sum = sum + a;
        }
     System.out.println("Sum::" +sum);
     }

  void series(int p)
  { int i;
    for (i=1 ; i<=p ; i++)
       { System.out.println((i * i * i) – 1 + " ");
       }
   }

  void series( )
```

```
    { double i;
      double s = 0;
      for (i =-2; i < = 10; i+ +)
         {s = s + 1/i;
         }
      System.out.println("Sum:" +s);
      }
    }
```

6. Design a class to overload a function volume() as follows:
   (i) double volume (double R) — with radius (R) as an argument, returns the volume of the sphere using the formula.
   V = 4/3 × 22/7 × R3
   (ii) double volume (double H, double R) – with height(H) and radius(R) as the arguments, returns the volume of a cylinder using the formula.
   V = 22/7 × R2 × H
   (iii) double volume (double L, double B, double H) – with length(L), breadth(B) and Height(H) as the arguments, returns the volume of a cuboid using the formula.

   (2018)

   Answer:
```
   class ShapesVolume
   {public static double volume (double R)
     {double V = 4.0 / 3 * 22.0 / 7 * Math.pow(R, 3);
      return V;
      }
    public static double volume(double H, double R)
     {double V = 22.0 / 7 * R * R * H ;
      return V;
      }
    public static double volume (double L, double B, double H)
     {double V = L * B * H;
      return V;
      }
    }
```

7. What are the two ways of invoking functions?

   (2017)

   Answer:

By Value and By Reference

8. Differentiate between constructor and function.

(2017)

Answer:
Constructors must be named with the same name as the class name. They cannot return anything, even void (the object itself is the implicit return). Functions must be declared to return something, although it can be void.

9. Differentiate between formal parameter and actual parameter.

(2016)

Answer:

Formal parameter	Actual parameter
They are variables defined in the function signature.	They are values given to the function at the time of function call.
They receive value from actual parameters.	They give values to formal parameter

10. Write a function prototype of the following:
A function PosChar which takes a string argument and a character argument and returns an integer value.

(2016)

Answer:
int PosChar (String str, char ch)

11. Design a class to overload a function check ( ) as follows :
(i) void check (String str, char ch) – to find and print the frequency of a character in a string.
Example : *
Input: str = "success"
      ch = 's' .
Output: number of s present is = 3

(ii) void check(String si) – to display only vowels from string si, after converting it to lowercase.
Example:

Input: s1 = "computer"
Output: o u e

Answer:
```
class CharacterVowel
{ public void checkering str, char ch)
  { int c = 0, code,i,s;
    str = str.toLowerCase( );
    int len = str.length( );
    for (code=97 ; code<122 ; code++)
       { c = 0;
        for (i = 0; i < len; i+ +)
            { ch = str.charAt(i);
               s = (int) ch;
               if(s = = code)
               c = c + 1;
             }
         ch = (char)code;
         if(c ! = 0)
           System.out.println("Frequency of "+ch+ "is" +c);
       }
  }
  public void check(String si)
  { int i;
    char ch=0, chr=0;
    for(i=0 ; i<s1.length() ; i++)
      { ch = s1.charAt(i);
        if(Character.isUpperCase(ch))
          chr = Character. toLo werCase(ch);
        if((s1 .charAt(i)=='a') 11 (s1 .charAt(i) = 'u') | j(s1 .charAt(i) = = 'o')| | (s1
        .charAt(i)=='i') 11 (s1 .charAt(i) = = 'e'))
           System.out.println(s1 .charAt(i));
      }
  }
}
```

12. Define a class named BookFair with the following description:
    Instance variables/Data members :
        String Bname — stores the name of the book

double price — stores the price of the book

Member methods :

(i) BookFair() — Default constructor to initialise data members

(ii) void Input() — To input and store the name and the price of the book.

(iii) void calculate() — To calculate the price after discount. Discount is calculated based on the following criteria.

Price	Discount
Less than or equal to Rs. 1000	2% of price
More than Rs. 1000 and less than or equal to Rs. 3000	10% of price
More than Rs. 3000	15% of price

(iv) void display() — To display the name and price of the book after discount. Write a main method to create an object of the class and call the above member methods.

(2016)

Answer:

```
import java.util.Scanner;
class BookFair
{ String Bname;
  double price;
  BookFair()
     { Bname =" ";
       Price = 0;
     }
void input()
   { Scanner S = new Scanner(System.in);
     System.out.println ("Enter Book name");
     Bname=S.nextLine();
     System.out.println ("Enter Price");
     price = S.nextDouble();
    }
void calculate ()
   { double d;
     if (price <= 1000)
         d=2.0/100* price;
```

```
    else if (price <= 3000)
        d=10.0/100* price;
    else
        d=15.0/100* price;
    price=price-d;
  }
void display ( )
  { System.out.println ("Book Name" + Bname);
   System.out.println ("Price" + price);
  }
public static void main ()
   { BookFair b= new BookFair ();
    b.input ();
    b.calculate ();
    b.display();
   }
}
```

13. What are the values of a and b after the following function is executed, if the values passed are 30 and 50:

```
void paws(int a, int b)
{ a=a + b;
 b=a − b;
 a=a − b;
 System.out.println (a+ "," +b);
}
```
(2015)

Answer:
The value of a will be 50 and
The value of b will be 30.

14. What is the function of catch block in exception handling ? Where does it appear in a program ?
(2015)

Answer:

Catch block is used as exception handler in exception handling. We can put the code to deal with the execution that might arise, in this block. Catch block must appear just below the tiy block.

15. List the variables from those given below that are composite data types:
    (i) static int x;
    (ii) arr[i]=10;
    (iii) obj.display();
    (iv) boolean b;
    (v) private char chr;
    (vi) String str;

(2014)

Answer:
The composite data types are:
(ii) arr[i] = 10;
(iii) obj.display();
(vi) String str;

16. Define a class named movieMagic with the following description:
    Instance variables/data members:
        int year — to store the year of release of a movie.
        String title — to-store the title of the movie
        float rating — to store the popularity rating of the movie
        (minimum rating=0.0 and maximum rating=5.0)
    Member methods:
        (i) movieMagic() - Default constructor to initialize numeric data members to 0 and String datamember to " ".
        (ii) void accept() - To input and store year, title and rating.
        (iii) void display() - To display the title of a 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 to create an object of the class and call the above member methods.

(2014)

Answer:
```java
import java.io.*;
class movieMagic
{ int year;
  String title;
  float rating:
  public movieMagic()
    { year=0;
      title=" ";
      rating=0.0;
    }
void accept()throws IOException
    { InputStreamReader IR = new InputStreamReader (System.in);
      BufferedReader br=new BufferedReader(IR);
      System.out.println("Enter the year of release :");
      year=Integer.parseInt(br.readLine());
      System.out.println ("Enter the title of movie:");
      title=br.readLine();
      System.out.println ("Enter the popularity rating :");
      rating=Float.parseFloat(br.readLine());
    }
void display()
    { System.out.println ("The title of movie is :" + title);
      System.out.print("The film is a ");
      if(rating>=0.0 && rating <=2.0)
          { System.out.println("Flop");
          }
    else if(rating>=2.1 && rating <=3.4)
          { System.out.println("Semi-hit");
          }
    else if(rating>=3.5 && rating <=4.5)
```

```java
                { System.out.println("Hit");
                }
            else if (rating >= 4.6 && rating <= 5.0)
                {System.out.println("Super Hit");
                }
        }
    public static void main()throwsIOException
      { movieMagic obj=new movieMagic();
        obj.accept();
        obj.display();
      }
}
```

Variable Description:

S.No	Variable name	Datatype	Purpose
1.	year	int	to store the year of release of the movie.
2.	title	String	to store the title of movie
3.	rating	float	to store popularity rating of the movie
4.	IR	-	for input stream reader
5.	br	-	for buffered reader
6.	obj	-	for object of the class

17. Design a class to overload a function Joystring( ) as follows :
    (i) void Joystring (String s, char ch1 char ch2) with one string argument and two character arguments that replaces the character argument ch1 with the character argument ch2 in the given string s and prints the new string.
    Example:
    Input value of s = "TECHNALAGY"
    ch1='A',
    ch2='O'
    Output: TECHNOLOGY

(ii) void Joystring (String s) with one string argument that prints the position of the first space and the last space of the given string s.
Example:
Input value of = "Cloud computing means Internet based computing"
Output: First index : 5
Last index : 36

(iii) void Joystring (String s1, String s2) with two string arguments that combines the two string with a space between them and prints the resultant string.
Example :
Input value of s1 ="COMMON WEALTH"
Input value of s2 ="GAMES"
Output: COMMON WEALTH GAMES
(use library functions)

(2015)

Answer:

```
class Overload
 { void Joystring (string s, char ch1, char ch2)
     { S = S.replace (ch1, ch2);
       System.out.println ("New String" +S);
     }
  void joystring (String S)
    { int i1=S.indexOf(");
      int i2=S.last IndexOf(");
      System.out.println ("Position of 1st space" +i1);
      System.out.println ("Position of last space" +i2);
    }
  void Joystring (string s1, string s2)
    { String s3=s1.concat(" ");
      s3=s3.concat(s2);
     System.out.println("new string" +s3);
    }
}
```

18. Design a class to overload a function area( ) as follows:
(i) double area (double a, double b, double c) with three double arguments, returns the area of a scalene triangle using the formula:
area = $\sqrt{(s(s-a)(s-b)(s-c))}$

where s=(a+b+c)/2

(ii) double area (int a, int b, int height) with three integer arguments, returns the area of a trapezium using the formula:
area = ½ height (a + b)

(iii) double area (double diagonal 1, double diagonal 2) with two double arguments, returns the area of a rhombus using the formula :
area = ½ (diagonal 1 x diagonal 2)

(2014)

Answer:
```
class Overload
{ double area(double a, double b, double c)
    { double s, r;
      s=(a+b+c)/2;
      r=s*(s-a)* (s-b)*(s-c);
      double ar = Math.sqrt (r);
      return ar;
    }
  double area(int a, int b, int height)
    { double area=(height*(a+b))/2;
      return area;
    }
  double area(double diagonal 1,double diagonal2)
    { double area=(diagonal1*diagonal2)/2;
      return area;
    }
}
```

The variable description is as follows:

S.No	Variable Name	Datatype	Purpose
1.	a	double	to enter side of the triangle
2.	b	double	to enter side of the triangle
3.	c	double	to enter side of the triangle
4.	s	double	to store the value of s in the area formula used.

5.	r	double	to store the value of r in area formula used
6.	area	double	to store area of various shapes
7.	a	int	to enter side of trapezium
8.	b	int	to enter side of trapezium
9.	height	int	to enter height of trapezium
10.	diagonal 1	double	to enter diagonal of rhombus
11.	diagonal 2	double	to enter diagonal of rhombus

19. Give one example each of a primitive data type and a composite data type.

(2012)

Answer:
Primitive data type: int
Composite data type: Class

20. Design a class to overload a function series ( ) as follows :
(i) double series (double n) with one double argument and returns the sum of the series,
sum= $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+........+\frac{1}{n}$
(ii) double series (double a, double n) with two double arguments and returns the sum of the series.
sum= $\frac{1}{a^2} +\frac{4}{a^5}+\frac{7}{a^8}+\frac{10}{a11}+......+$ to n terms

(2013)

Answer :
public class series
{ public double series(double n)
   { int a;
     double s=0;
     for (a = 1; a < = n; a ++)
     s= s+1/a;
     return s;
   }
 public double series (double a, double n)
    { int a, i;

```
        double sum= 0,. b = 1;
        double c=1/(a*a);
        sum=sum+c;
        for(i=5;i<=n;i+=3)
        sum=sum+((b+3)/Math.pow(a,i));
        return s;
    }
}
```

21. Differentiate between call by value or pass by value and call by reference or pass by reference.

<div align="right">(2012)</div>

Answer:
Call by Value: Actual parameters are copied into the formal parameters and the called method works with the formal parameters. Any change in the formal parameter is not reflected back in the actual parameter.

Call by reference: When a method is called, the reference/address on which the data is stored is sent to the formal parameters. Any change in formal parameters is reflected in the actual parameters.

22. What are the two ways of invoking functions ?

<div align="right">(2011)</div>

Answer:
Two ways to call a function are :
1. Call by value
2. Call by reference.

23. What is the role of keyword void in declaring functions ?

<div align="right">(2011)</div>

Answer:
At the time of function declaration void signifies that function has no return type, that means function will not return any value

24. Give the prototype of a function search which receives a sentence sentnc and a word wrd and returns 1 or 0 ?

<div align="right">(2011)</div>

Answer:
int search (String sentnc, String wrd)

25. In the program given below, state the name and the value of the
    (i) method argument or argument variable
    (ii) class variable
    (iii) local variable
    (iv) instance variable

```
class myClass
{ static int x=7;
  int y=2;
  public static void main(String args[])
   { myClass obj= new myClass();
     System.out.println(x);
     obj.sampleMethod(5);
     int a=6;
     System.out.println(a);
   }
 void sampleMethod(int n)
  { System.out.println(n);
    System.out.println(y);
  }
}
```

(2012)

Answer:
(i) n
(ii) x
(iii) a
(iv) y

26. Define a class called Library with the following description :
    Instance variables/data members :
        int acc_num — stores the accession number of the book
        String title — stores the title of the book
        String author — stores the name of the author
    Member methods:
        (i) void input ( ) — To input and store the accession number, title and author.

(ii) void compute ( ) — To accept the number of days late, calculate the display the fine charged at the rate of Rs. 2 per day.
(iii) void display( ) — To display the details in the following format:
Accession   Number   Title Author

Write a main method to create an object of the class and call the above member methods.

(2012)

Answer:
```
import java.io.*;
class library
{ int acc_num;
   String title;
   String author;
   void input()throws IOException
     { BufferedReader br = new Bufferedreader (new inputStreamReader
(System.in));
         System.out.println ("Enter accession number");
         acc_num= Integer.parseInt(br. readLine());
         System.out.println("Enter title of the book");
         title= br. readLine();
         System.out.println ("Enter author of the book");
         author = br.readLine();
       }
     void compute(int days)
       { int Fine;
         fine = 2*days;
         System.out.println("fine charged=" +fine);
       }
     void display()
       { System.out.println("Accession Number"+"\t" + "Title"+"\t" + "Author");
          System.out.println(acc_num +"\t" + title + "\t" + author);
         }
     public static void main()throws IOException
      { Library obj = new Library ();
        obj.input ()
        obj.compute (4);
        obj.display();
      }
```

}

27. Give the prototype of a function check which receives a character ch and an integer n and returns true or false.

(2010)

Answer:
boolean check (char ch, int n)