Assignment 06

Q1] code:-

```java
/*//Define a class of type Student that has rollno, name and age as private data members.
Define SetData() and GetData() as public member functions with appropriate functionality. Write
a program that declares 2 student objects, initializes the first at run-time and second by reading
from console, and then displays both student's data.*/
public class Student{

  private String name;
  private int rollno;
  private int age;

  public Student(){

  }
  public Student(String name, int rollno, int age){
     this.name = name;
      this.rollno = rollno;
      this.age = age;
  }
    public void getdata(String name, int rollno, int age){

      this.name = name;
      this.rollno = rollno;
      this.age = age;
      System.out.println("Name   : "+name);
      System.out.print("Roll No: "+rollno+"\n");
      System.out.println("Age    : "+age);

  }

}
```

Student2.java

```java
import java.util.*;
public class Student2 extends Student{
    Scanner sc = new Scanner(System.in);

    public void setdata(){
        System.out.print("Name   : ");
        String name = sc.nextLine();
        System.out.print("Roll no: ");
        int rollno = sc.nextInt();
        System.out.print("Age    : ");
        int age = sc.nextInt();
    }
    public void getdata(){
          System.out.println("Name   : "+name);
        System.out.print("Roll No: "+rollno+"\n");
        System.out.println("Age    : "+age);
    }

}
```

Output:

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java Main.java
Name    : Yash
Roll No: 1
Age     : 22
-----------------------------------
Name    : Ram
Roll no: 2
Age     : 23
```

Q2] Code:

```java
/*Create a class Person with attributes name, age and country. Implement methods to set
and get these attributes. Create an object of this class, set its attributes, and print out the
details.*/
public class MainPerson{
    public static void main(String[] args) {
        Person p = new Person();
        p.setdata("YASH",22,"India");
        p.getdata();
    }
}
```

```java
/*Constructor Overloading: Extend the Person class from the previous problem and add
multiple constructors (default, parameterized, etc.) to initialize the attributes. Also, include a
method to display the details.
*/
public class Person2 extends Person {

    public Person2(){
        System.out.println(" I am Default");
    }

    public Person2(String name, int age, String country){
        setdata( name,  age,  country);
    }
    public int Sum(int a ,int b){

        return  a +b;
    }
    public void view(){
        getdata();
    }

}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java MainPerson.java
Name : YASH Age :22 countryIndia
```

Q3]

```java
public class PersonCmp extends Person {

  private String name;
  private String country;
  private int age;

    public void setdata(String name, int age, String country){
    this.name = name;
    this.age = age;
    this.country = country;
   }
   public void getdata(){
   System.out.println("Name : "+name+" Age :"+age+" country"+country);
   }
```

```java
public class MainCmp{
    public static void main(String[] args) {

        Person p = new Person();
        PersonCmp p1 = new PersonCmp();
        p1.setdata("YASH",21,"INDIA");
        p.setdata("RAM",23,"INDIA");
        p1.getdata();
        p.getdata();
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java MainCmp.java
Name : YASH Age :21 countryINDIA
Name : RAM Age :23 countryINDIA
```

Q4]

Main.java | Person.java | MainCmp.java | PersonCmp.java

```java
/*Create a class Person with attributes name, age and country. Implement methods to set
and get these attributes. Create an object of this class, set its attributes, and print out the
details.*/
public class Person {

    private String name;
    private String country;
    private int age;


   public void setdata(String name, int age, String country){
    this.name = name;
    this.age = age;
    this.country = country;
   }
   public void getdata(){
   System.out.println("Name : "+name+" Age :"+age+" country"+country);
   }
   public int getAge(){
    return this.age;
  }
  public void setAge(){
    System.out.println(name+" is Elder");
  }

  }
```

```java
/*Using this: Modify the Person class to include a method that displays the name and age
of the object. Use this keyword to differentiate between class variables and method parameters.
Implement a method to compare two Person objects based on their age.*/

public class PersonCmp extends Person {

    private String name;
    private String country;
    private int age;

    public void setdata(String name, int age, String country){
    this.name = name;
    this.age = age;
    this.country = country;
   }
   public void getdata(){
   System.out.println("Name : "+name+" Age :"+age+" country"+country);
   }
    public int getAge(){
    return this.age;
  }
    public void setAge(){
    System.out.println(name+" is Elder");
  }
  }
```

```java
public class MainCmp{
    public static void main(String[] args) {

        Person p = new Person();
        PersonCmp p1 = new PersonCmp();
        p1.setdata("YASH",21,"INDIA");
        p.setdata("RAM",23,"INDIA");
        p1.getdata();
        p.getdata();
        if (p.getAge() > p1.getAge()) {
           p.setAge();
        }
        else {
          p1.setAge();
        }

        System.out.println("-----------------------------------");



    }
}
```

Output:

```
D:\CDAC Hydrabad\JAVA\Assignment 06>javac *.java

D:\CDAC Hydrabad\JAVA\Assignment 06>java MainCmp.java
Name : YASH Age :21 countryINDIA
Name : RAM Age :23 countryINDIA
RAM is Elder
-----------------------------------

D:\CDAC Hydrabad\JAVA\Assignment 06>
```

Q5]

```java
/*Static Variable: Create a class BankAccount with  accno, accType, Balance and static
variable interestRate. Initialize it using a static block. Implement methods to deposit and
withdraw funds. Create objects and display details.*/
public class BankAccount{
        protected int accno;
        protected String accType;
        protected double balance = 50000;
        public static double interestRate;
         protected double amount;
         static{
             interestRate = 5.0;
                 }
        //other static method
        public static double intrest(double balance){
            return (balance * interestRate / 100);
        }


        public BankAccount (int accno, String accType){
            this.accno = accno;
            this.accType = accType;
        }
        public void Deposite(double amount){
            this.balance += amount;
                }
        public void Withdraw(double amount){
            if (balance < amount) {
                System.out.println("Insufficent Balance!!!");
            }
            else{
                this.balance -= amount ;
            }
        }
        public void display(){
            System.out.println("Account No: " + accno);
            System.out.println("Account Type: " + accType);
            System.out.println("Balance: " + balance);
            System.out.println("Interest Rate: " + interestRate);
            }
        public void setdata(double amount){
            System.out.println(" Amount is "+amount);
                }
            }
```

Main.java | *Transfer.java*

```java
import java.util.*;
public class Transfer{
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        int n;
        double amt;

        System.out.println("");
        System.out.println("Hello BANK OF INDIA");
        System.out.println("**************************");

        BankAccount b = new BankAccount(324565,"Fixed");
        System.out.println("Intrest is :"+ BankAccount.intrest(40));
        System.out.println("Rate Intrest is:"+BankAccount.interestRate);
        System.out.println("Enter \n1.Deposite Money \n2.Withdraw Money");
        n = sc.nextInt();
        switch (n) {
            case 1:
            System.out.println("Enter Amount to Deposite : ");
            amt = sc.nextDouble();
            if(amt>0){
            b.setdata(amt);
            b.Deposite(amt);
        }
        else System.out.println("Invalid Amount");
            break;

        case 2:
            System.out.println("Enter Amount to Withdraw : ");
            amt = sc.nextDouble();
            if(amt>0){
            b.setdata(amt);
            b.Withdraw(amt);
        }
        else System.out.println("Invalid Amount");
        break;
         default:
            System.out.println("Invalid Input!!!!");
            break;
        }
        System.out.println("********Account Details**********");
        b.display();

    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java Transfer.java

Hello BANK OF INDIA
****************************
Intrest is :2.0
Rate Intrest is:5.0
Enter
1.Deposite Money
2.Withdraw Money
2
Enter Amount to Withdraw :
40000
 Amount is 40000.0
********Account Details**********
Account No: 324565
Account Type: Fixed
Balance: 10000.0
Interest Rate: 5.0

D:\CDAC Hydrabad\JAVA\Assignment 06>java Transfer.java

Hello BANK OF INDIA
****************************
Intrest is :2.0
Rate Intrest is:5.0
Enter
1.Deposite Money
2.Withdraw Money
2
Enter Amount to Withdraw :
50000000
 Amount is 5.0E7
Insufficent Balance!!!
********Account Details**********
Account No: 324565
Account Type: Fixed
Balance: 50000.0
Interest Rate: 5.0

D:\CDAC Hydrabad\JAVA\Assignment 06>
```

Q6]

```java
/*Static Variable: Create a class BankAccount with  accno, accType, Balance and static
variable interestRate. Initialize it using a static block. Implement methods to deposit and
withdraw funds. Create objects and display details.*/
public class BankAccount{
        protected int accno;
        protected String accType;
        protected double balance = 50000;
        public static double interestRate;
         protected double amount;
         static{
             interestRate = 5.0;
                }
        //other static method
        public static double intrest(double balance){
            return (balance * interestRate / 100);
        }


        public BankAccount (int accno, String accType){
            this.accno = accno;
            this.accType = accType;
        }
        public void Deposite(double amount){
            this.balance += amount;
                }
        public void Withdraw(double amount){
            if (balance < amount) {
                System.out.println("Insufficent Balance!!!");
            }
            else{
                this.balance -= amount ;
            }
        }
        public void display(){
            System.out.println("Account No: " + accno);
            System.out.println("Account Type: " + accType);
            System.out.println("Balance: " + balance);
            System.out.println("Interest Rate: " + interestRate);
            }
        public void setdata(double amount){
            System.out.println(" Amount is "+amount);
                }
            }
```

```java
import java.util.*;
public class Transfer{
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        int n;
        double amt;

        System.out.println("");
        System.out.println("Hello BANK OF INDIA");
        System.out.println("**************************");

        BankAccount b = new BankAccount(324565,"Fixed");
        System.out.println("Intrest is :"+ BankAccount.intrest(40));
        System.out.println("Rate Intrest is:"+BankAccount.interestRate);
        System.out.println("Enter \n1.Deposite Money \n2.Withdraw Money");
        n = sc.nextInt();
        switch (n) {
            case 1:
            System.out.println("Enter Amount to Deposite : ");
            amt = sc.nextDouble();
            if(amt>0){
            b.setdata(amt);
            b.Deposite(amt);
        }
        else System.out.println("Invalid Amount");
            break;

        case 2:
            System.out.println("Enter Amount to Withdraw : ");
            amt = sc.nextDouble();
            if(amt>0){
            b.setdata(amt);
            b.Withdraw(amt);
        }
        else System.out.println("Invalid Amount");
        break;
         default:
            System.out.println("Invalid Input!!!!");
            break;
        }
        System.out.println("********Account Details**********");
        b.display();

    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java Transfer.java

Hello BANK OF INDIA
****************************
Intrest is :2.0
Rate Intrest is:5.0
Enter
1.Deposite Money
2.Withdraw Money
2
Enter Amount to Withdraw :
40000
 Amount is 40000.0
********Account Details**********
Account No: 324565
Account Type: Fixed
Balance: 10000.0
Interest Rate: 5.0

D:\CDAC Hydrabad\JAVA\Assignment 06>java Transfer.java

Hello BANK OF INDIA
****************************
Intrest is :2.0
Rate Intrest is:5.0
Enter
1.Deposite Money
2.Withdraw Money
2
Enter Amount to Withdraw :
50000000
 Amount is 5.0E7
Insufficent Balance!!!
********Account Details**********
Account No: 324565
Account Type: Fixed
Balance: 50000.0
Interest Rate: 5.0

D:\CDAC Hydrabad\JAVA\Assignment 06>
```

Q7]

```java
/*Using this in Constructors: Create a class Rectangle with attributes length and width
Implement a parameterized constructor that initializes these attributes.
 Use this to differentiate between class variables and constructor parameters.
 Include methods to calculate the area and
perimeter.*/
import java.util.*;
public class Rectangle{

        protected double length;
        protected double width;

        public Rectangle(double length, double width){
           this.length = length;
           this.width = width;
        }
        public double areaRec(){
           return length * width;
        }
        public double perimeter(){
           return 2 * (length + width);
        }
        public void disp(){
           System.out.println("Length is : "+length);
           System.out.println("Width is  : "+width);
```

```java
import java.util.*;
 public class RectMain{
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter length");
        double l = sc.nextDouble();
        System.out.println("Enter Width");
        double w = sc.nextDouble();
        Rectangle r = new Rectangle(l,w);
        r.disp();
        System.out.println("Area of Rectangle is      : "+r.areaRec());
        System.out.println("Perimeter of Rectsngle is : "+r.perimeter());
    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java RectMain.java
Enter length
6
Enter Width
5
Length is : 6.0
Width is  : 5.0
Area of Rectangle is      : 30.0
Perimeter of Rectsngle is : 22.0

D:\CDAC Hydrabad\JAVA\Assignment 06>
```

Q8]

Main.java | Person.java | MainPerson2.java | *Calculator.java*

```java
/*Class and methods: Create a class Calculator with relevant data members and a
constructor. Implement methods for basic arithmetic operations (addition, subtraction,
multiplication, division, modulus) and demonstrate their usage.
*/
public class Calculator{
 protected  double a;
 protected  double b;

    public Calculator(double a, double b){
        this.a = a;
        this.b = b;
    }
    public double add(){
        return a +b;
    }
    public double sub(){
        return a - b;
    }
    public double mul(){
        return a * b;
    }
    public void div(double a, double b){
        if (b<=0) {
            System.out.println("Invalid input");

        }
        else{
            double res =  a / b;
            System.out.println("Divison of two Number is :      "+res);
        }
    }
    public void mod(double a, double b){
        if (b<=0) {
            System.out.println("Invalid input");

        }
        else{
            double res =  a % b;
            System.out.println("Modules of two Number is :      "+res);
        }
    }
    public void disp(){
        System.out.println(" Your inputs are : "+a+" And "+b);
    }
}
```

Main.java | Person.java | MainPerson2.java | CalMain.java | MainCmp.java | PersonCmp.java

```java
import java.util.*;
class CalMain{
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Your inputs");
        System.out.println("First number :");
        double x = sc.nextDouble();
        System.out.println("Second Number");
        double y = sc.nextDouble();
        Calculator c = new Calculator(x,y);

        System.out.println("Addition of two Number is       "+c.add());
        System.out.println("Subtraction of two Number is    "+c.sub());
        System.out.println("Multiplication of two Number is "+c.mul());
        c.div(x,y);
        c.mod(x,y);

    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java CalMain.java
Enter Your inputs
First number :
45
Second Number
5
Addition of two Number is       50.0
Subtraction of two Number is    40.0
Multiplication of two Number is 225.0
Divison of two Number is :      9.0
Modules of two Number is :      0.0

D:\CDAC Hydrabad\JAVA\Assignment 06>java CalMain.java
Enter Your inputs
First number :
5
Second Number
0
Addition of two Number is       5.0
Subtraction of two Number is    5.0
Multiplication of two Number is 0.0
Invalid input
Invalid input

D:\CDAC Hydrabad\JAVA\Assignment 06>
```

Q9]

```java
public class PersonAddrees{

    protected String name;
    protected Address address;

     public PersonAddrees(String name, Address address){
        this.name = name;
        this.address = address;
     }
    public void disp(){
        System.out.print("Adress of "+name+ " is ");
        address.disp();
    }
    }
```

```java
class AdreessMain{
    public static void main(String[] args) {


        Address a = new Address("NO.7","Hydrbad","India");
        PersonAddrees p = new PersonAddrees("Yash",a);
        p.disp();
    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java AdreessMain.java
Adress of Yash is : Street NO.7,Hydrbad,India
D:\CDAC Hydrabad\JAVA\Assignment 06>
```

Q9]

```java
age, and grade point average (GPA) with private access modifiers. Provide gett
methods to access and modify these attributes position to model the relationsh
person and their address*/
public class StudentGPA {
    private String name;
    private int age;
    private double gpa;

    public void setName(String name) {
        this.name = name;
    }
    public void setAge(int age) {
        this.age = age;
    }
    public void setGpa(double gpa) {
        this.gpa = gpa;
    }


    public String getName() {
        return name;
    }
    public int getAge() {
        return age;
    }
    public double getGpa() {
        return gpa;
    }
}
```

```java
public class GPA{
    public static void main(String[] args) {
        StudentGPA g = new StudentGPA();
        g.setName("Yash");
        g.setAge(21);
        g.setGpa(8.9);

        System.out.println("Name: " + g.getName());
        System.out.println("Age: " + g.getAge());
        System.out.println("GPA: " + g.getGpa());

    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>java GPA.java
Name: Yash
Age: 21
GPA: 8.9

D:\CDAC Hydrabad\JAVA\Assignment 06>
```

\

Q10]

```java
/*Implement a Java program that models a Library. Create class
Author. Ensure that the Library class aggregates a collection
object has an aggregation relationship with an Author object.
*/
public class Author{
    protected String authName;
    protected String nat;

    public void setdata (String authName, String nat){
        this.authName = authName;
        this.nat = nat;
    }
    public void getdata(){
        System.out.print(" "+authName+","+nat);
    }

}
```

```java
// Library.java
public class Library {
    Book[] books = new Book[5];
    int count = 0;

    public void addBook(Book b) {
        if (count < books.length) {
            books[count] = b;
            count++;
        } else {
            System.out.println("Library is full!");
        }
    }

    public void getdata() {
        for (int i = 0; i < count; i++) {
            books[i].getdata();
            System.out.println("-----------------");
        }
    }
}
```

Main.java | Person.java | BookMain.java | Book.java | /*Implement a Java program that models a Library. | Library.java | Author.java | MainPerson2.java

```java
public class Book{
    private String bname;
    private double price;
    Author  author;

    public void setdata(String bname, double price, Author author){
        this.bname = bname;
        this.price = price;
        this.author = author;
    }

    public void getdata(){
        System.out.println("Book : "+bname+" Price : "+price);
        author.getdata();
    }

}
```

Main.java | Person.java | BookMain.java | Book.java | /*Implement a Java program that models a Library. | Library.java | Author.java

```java
// BookMain.java
public class BookMain {
    public static void main(String[] args) {
        Library l = new Library();

        Author a1 = new Author();
        a1.setdata("J.K. Rowling", "British");

        Book b1 = new Book();
        b1.setdata("Harry Potter", 600, a1);

        Author a2 = new Author();
        a2.setdata("Dan Brown", "American");

        Book b2 = new Book();
        b2.setdata("The Da Vinci Code", 450, a2);

        l.addBook(b1);
        l.addBook(b2);

        l.getdata();
    }
}
```

```
D:\CDAC Hydrabad\JAVA\Assignment 06>javac *.java

D:\CDAC Hydrabad\JAVA\Assignment 06>java BookMain.java
Book : Baki Price : 600.0
 J.K. Rowling,British
------------------
Book : Demon Slayer Price : 950.0
 Dan Brown,American
------------------

D:\CDAC Hydrabad\JAVA\Assignment 06>
```