ASSIGNMENT – 06

Q1)

```java
import java.util.Scanner;
class Student1 {
    // Private data members
    private int rollno;
    private String name;
    private int age;

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

    public void getData() {
        System.out.println("Roll No: " + this.rollno);
        System.out.println("Name: " + this.name);
        System.out.println("Age: " + this.age);
    }
}
```

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

        Student student1 = new Student();
        Student student2 = new Student();

        System.out.println("Initializing Student 1 data...");
        student1.setData(101, "Alice", 20);
        System.out.println("Student 1 data initialized.");


        Scanner scanner = new Scanner(System.in);
        System.out.println("\nEnter data for Student 2:");

        System.out.print("Enter Roll No: ");
        int rollno2 = scanner.nextInt();
        scanner.nextLine(); // Consume the newline character

        System.out.print("Enter Name: ");
        String name2 = scanner.nextLine();

        System.out.print("Enter Age: ");
        int age2 = scanner.nextInt();

        student2.setData(rollno2, name2, age2);

        scanner.close();

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


        System.out.println("Displaying Student 1 Data:");
        student1.getData();

        System.out.println("\nDisplaying Student 2 Data:");
        student2.getData();
    }
}
```

```
C:\Users\KULDE\OneDrive\Desktop\Java>javac Main.java

C:\Users\KULDE\OneDrive\Desktop\Java>java Main
Initializing Student 1 data...
Student 1 data initialized.

Enter data for Student 2:
Enter Roll No: 52
Enter Name: Harry
Enter Age: 50

------------------------------
Displaying Student 1 Data:
Roll No: 101
Name: Alice
Age: 20

Displaying Student 2 Data:
Roll No: 52
Name: Harry
Age: 50
```

Q2)

```java
class Person{
    String name;
    int age;
    String country;

    Person(String n , int a, String c){
        name=n;
        age=a;
        country=c;
    }

    void displayPerson(){
        System.out.println(name+" "+age+" "+country);
    }
}
```

```java
class Main{
    public static void main(String[] args) {
        Person p1 = new Person("Harsh",23,"India");
        p1.displayPerson();
        Person p2 = new Person("Harshaa",53,"Ecuador");
        p2.displayPerson();
    }

}
```

```
C:\Users\hp\Desktop\MPHC>javac Person.java

C:\Users\hp\Desktop\MPHC>javac Main.java

C:\Users\hp\Desktop\MPHC>java Main
Harsh 23 India
Harshaa 53 Ecuador

C:\Users\hp\Desktop\MPHC>
```

Q3)

```java
class Per{
    String Name;
    int age;
    String Country;

    Per(String Name, int age, String Country){
        this.Name = Name;
        this.age = age;
        this.Country = Country;

    }
    void getPer(){
        System.out.println("Name: "+Name+ " Age: " +age+" Country: "+Country);
    }

}
```

```java
class Main{
    public static void main(String[] args) {
        Per p1= new Per("Harsh",22, "Bharat");
        p1.getPer();
    }
}
```

```
C:\Users\hp\Desktop\MPHC>javac Per.java

C:\Users\hp\Desktop\MPHC>javac Main.java

C:\Users\hp\Desktop\MPHC>java Main
Name: MangeshAge: 22Country: Bharat

C:\Users\hp\Desktop\MPHC>javac Main.java

C:\Users\hp\Desktop\MPHC>java Main
Name: Harsh Age: 22 Country: Bharat

C:\Users\hp\Desktop\MPHC>
```

Q4)

```java
class Methods{
   int age;
   String name;

   public Methods(){
       this.name="Unknown";
       this.age= 0;

   }
   public Methods(String name, int age){
       this.name= name;
       this.age= age;
   }
   public void display(){
       System.out.println("Name: " + name);
       System.out.println("Age: " + age);
   }
   public void display0(){
   System.out.println("Name "+ name + "Age"+ age);
   }
   public void Compare(Methods other){
       if(this.age>other.age)
           System.out.println(this.age + " is older than" +other.age);
       else if(this.age<other.age)
           System.out.println(this.age + "is younger than" +other.age);
       else
           System.out.print(this.age + " has the same age " +other.age);
       }
   }
```

```java
class Main{
    public static void main(String[] args) {
        Methods p1 = new Methods("Harsh", 24);
        p1.display();
        Methods p2 = new Methods("Mangu", 22);
        p2.display();

        p1.Compare(p2);

    }
}
```

```
C:\Users\KULDE\OneDrive\Desktop\Java>javac Methods.java

C:\Users\KULDE\OneDrive\Desktop\Java>javac Main.java

C:\Users\KULDE\OneDrive\Desktop\Java>java Main
Name: Harsh
Age: 24
Name: Mangu
Age: 22
24is older than22
```

Q5)

```
class Bank{
    int accn;
    String acctype;
    double bal;
    static double rate;
    static{
        rate = 9.0;
    }

    Bank(int n, String t, int b){
        this.accn = accn;
        this.acctype = acctype;
        this.bal = bal;
    }
    void deposit(double amount) {
        if (amount > 0) {
            bal = bal + amount;
            System.out.println("Deposited: " + amount);
        } else {
            System.out.println("Invalid deposit amount!");
        }
        }

    void withdraw(double amount) {
        if (amount > 0 && amount <= bal) {
            bal =bal - amount;
            System.out.println("Withdrawn: " + amount);
        } else {
            System.out.println("Insufficient balance or invalid amount!");
        }
    }
    void display(){
        System.out.println("Account number: " + accn);
        System.out.println("Account Type: " + acctype);
        System.out.println("Balance "+ bal);
         System.out.println("Interest Rate: " + rate + "%");
        System.out.println("--------------------------");
    }
```

```java
class Main{

public static void main(String[] args) {

        Bank acc1 = new Bank(101, "Savings", 6000);
        Bank acc2 = new Bank(102, "Current", 90000);


        acc1.deposit(4000);
        acc1.withdraw(2500);

        acc2.deposit(2000);
        acc2.withdraw(500);


        acc1.display();
        acc2.display();
        }
    }
```

```
C:\Users\KULDE\OneDrive\Desktop\Java>javac Main.java

C:\Users\KULDE\OneDrive\Desktop\Java>java Main
Deposited: 4000.0
Withdrawn: 2500.0
Deposited: 2000.0
Withdrawn: 500.0
Account number: 0
Account Type: null
Balance 1500.0
Interest Rate: 9.0%
--------------------------
Account number: 0
Account Type: null
Balance 1500.0
Interest Rate: 9.0%
--------------------------

C:\Users\KULDE\OneDrive\Desktop\Java>
```

Q6)

```java
class BankAccount {
    private int accNo;
    private String accType;
    private double balance;
    private static double interestRate;

    static {
        interestRate = 9.0;
    }

    public BankAccount(int accNo, String accType, double balance) {
        this.accNo = accNo;
        this.accType = accType;
        this.balance = balance;
    }

    public void deposit(double amount) {
        if (amount > 0) balance =balance + amount;
    }

    public void withdraw(double amount) {
        if (amount > 0 && amount <= balance) balance = balance - amount;
    }

    public static double calculateInterest(double balance) {
        return (balance * interestRate) / 100.0;
    }
```

```java
    public static double calculateInterest(double balance) {
        return (balance * interestRate) / 100.0;
    }

    public void displayWithInterest() {
        double interest = calculateInterest(balance);
        System.out.println("Account Number: " + accNo);
        System.out.println("Account Type: " + accType);
        System.out.println("Balance: " + balance);
        System.out.println("Interest Rate: " + interestRate + "%");
        System.out.println("Interest Earned: " + interest);
        System.out.println("----------------------------");
    }

    public static void main(String[] args) {
        BankAccount acc1 = new BankAccount(101, "Savings", 5000);
        BankAccount acc2 = new BankAccount(102, "Current", 10000);

        acc1.deposit(2000);
        acc1.withdraw(1500);

        acc2.deposit(3000);
        acc2.withdraw(12000);

        acc1.displayWithInterest();
        acc2.displayWithInterest();
    }
}
```

```
C:\Users\KULDE\OneDrive\Desktop\Java>java BankAccount
Account Number: 101
Account Type: Savings
Balance: 5500.0
Interest Rate: 9.0%
Interest Earned: 495.0
--------------------------
Account Number: 102
Account Type: Current
Balance: 1000.0
Interest Rate: 9.0%
Interest Earned: 90.0
--------------------------
```

Q7)

```
class Rectangle {

    private double length;
    private double width;

    Rectangle(double length, double width) {

        this.length = length;
        this.width = width;
    }


    public double area() {
        return length * width;
    }


    public double perimeter() {
        return 2 * (length + width);
    }

    public void display() {
        System.out.println("Length: " + length);
        System.out.println("Width : " + width);
        System.out.println("Area  : " + area());
        System.out.println("Perimeter: " + perimeter());
    }
}
```

```java
public class Main {
    public static void main(String[] args) {
        // Create Rectangle objects using constructor
        Rectangle r1 = new Rectangle(10, 5);
        Rectangle r2 = new Rectangle(7, 3);

        System.out.println("--- Rectangle 1 ---");
        r1.display();

        System.out.println("\n--- Rectangle 2 ---");
        r2.display();
    }
}
```

```
C:\Users\KULDE\OneDrive\Desktop\Java>javac Rectangle.java

C:\Users\KULDE\OneDrive\Desktop\Java>javac Main.java

C:\Users\KULDE\OneDrive\Desktop\Java>java Main
--- Rectangle 1 ---
Length: 10.0
Width : 5.0
Area  : 50.0
Perimeter: 30.0

--- Rectangle 2 ---
Length: 7.0
Width : 3.0
Area  : 21.0
Perimeter: 20.0

C:\Users\KULDE\OneDrive\Desktop\Java>
```

Q8)

```java
public class Opr{
    int a;
    int b;


    public Opr(int a, int b){
        this.a=a;
        this.b=b;

    }

    void dispOpr(){
        System.out.println("Sum: "+(a+b));
        System.out.println("diff: "+(a-b));
        System.out.println("mul: "+(a*b));
        System.out.println("div: "+(a/b));
        System.out.println("mod: "+(a%b));
    }
}
```

```java
public class Main{
    public static void main(String[] args) {
        Opr o1 = new Opr(5,8);
        o1.dispOpr();

    }
}
```

```
C:\Users\hp\Desktop\MPHC>javac Main.java

C:\Users\hp\Desktop\MPHC>java Main
Sum: 13
diff: -3
mul: 40
div: 0
```

Q10)

```java
public class Author {
    private String name;

    public Author(String name) {
        this.name = name;
    }


    public String getName() {
        return name;
    }

    @Override
    public String toString() {
        return "Author: " + name;
    }
}
```

```java
public class Book {
    private String title;
    private String isbn;
    private Author author; // Aggregation: Book has-a Author

    public Book(String title, String isbn, Author author) {
        this.title = title;
        this.isbn = isbn;
        this.author = author;
    }

    // Getter methods
    public String getTitle() {
        return title;
    }

    public String getIsbn() {
        return isbn;
    }

    public Author getAuthor() {
        return author;
    }

    @Override
    public String toString() {
        return "Book{" +
                "title='" + title + '\'' +
                ", isbn='" + isbn + '\'' +
                ", author=" + author.getName() +
                '}';
    }
}
```

```java
import java.util.ArrayList;
import java.util.List;

public class Library {
    private List<Book> books;

    public Library() {
        this.books = new ArrayList<>();
    }


    public void addBook(Book book) {
        this.books.add(book);
        System.out.println("Book added to the library: " + book.getTitle());
    }


    public void displayBooks() {
        System.out.println("Books in the library:");
        if (books.isEmpty()) {
            System.out.println("The library is currently empty.");
            return;
        }
        for (Book book : books) {
            System.out.println(book);
        }
    }
```

```java
public static void main(String[] args) {
    // Create a new Library object
    Library myLibrary = new Library();

    // Create Author objects
    Author author1 = new Author("J.K. Rowling");
    Author author2 = new Author("George Orwell");
    Author author3 = new Author("Harper Lee");


    Book book1 = new Book("Harry Potter and the Sorcerer's Stone", "978-0439708180", author1);
    Book book2 = new Book("1984", "978-0451524935", author2);
    Book book3 = new Book("To Kill a Mockingbird", "978-0061120084", author3);


    myLibrary.addBook(book1);
    myLibrary.addBook(book2);
    myLibrary.addBook(book3);

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


    myLibrary.displayBooks();
}
```

```
C:\Users\KULDE\OneDrive\Desktop\Java>javac Author.java

C:\Users\KULDE\OneDrive\Desktop\Java>javac Book.java

C:\Users\KULDE\OneDrive\Desktop\Java>javac Library.java

C:\Users\KULDE\OneDrive\Desktop\Java>java Library
Book added to the library: Harry Potter and the Sorcerer's Stone
Book added to the library: 1984
Book added to the library: To Kill a Mockingbird

------------------------------
Books in the library:
Book{title='Harry Potter and the Sorcerer's Stone', isbn='978-0439708180', author=J.K. Rowling}
Book{title='1984', isbn='978-0451524935', author=George Orwell}
Book{title='To Kill a Mockingbird', isbn='978-0061120084', author=Harper Lee}

C:\Users\KULDE\OneDrive\Desktop\Java>
```