COMSATS University Islamabad

Department of Computer Science

Midterm Examination Spring 2023

Object Oriented Programming

Class: BCS, BSE, BAI,BDS,BCT

Instructor:

Marks: 40

Date: 09-05-2023

1. What is the output of the following code? [CLO-1] [Marks: 5]

```
class Student {
    String name;
    int marks;
    void display(){
        System.out.println("Name ="+name);
        System.out.println("Marks ="+marks);
    }
}
class Runner{
    public static void main(String args[]){
        Student s1=new Student();
        s1.display();
        s1.name="Ali";
        s1.marks=44;
        s1.display();
        Student s2=new Student();
        s2=s1;
        s2.display();
        s2.name="Aslam";
        s2.marks=55;
        s2.display();
        s1.display();
    }
}
```

2. What is wrong in following class Example. Re-write the following code after making necessary corrections and find out the output. [CLO-1] [Marks: 3]

```
class Example {
    int a;
    int b;
    static void display(){ //method must be declared static here
        System.out.println("a ="+a);
        System.out.println("b ="+b);
    }
}
class Runner{
    public static void main(String args[]){
        Example obj1=new Example();
        obj1.display();
        obj1.a=1;
        obj1.b=2;
        obj1.display();
        Example obj2=new Example();
        obj2.display();
    }
}
```

3. What is wrong with the following code? Re-write the following code after making necessary corrections. **[CLO-1] [Marks: 2]**

```
class MyClass {
    private int a;
    private int b;
    void MyClass(){
    }
    void MyClass(int a, int b){
        a=a;
        b=b;
    }
    void MyClass(int x, int y){
        a=x;
        b=y;
    }
    @Override
    void display(){
        System.out.println("a = ",a);
        System.out.println("b = ",b);
    }
}
public class Mid {
    public static void main(String args[]) {
        MyClass obj=new MyClass();
        obj.a=11; obj.b=22;
        obj.display()
    }
}
```

4. Create a class diagram for a Railway management system using following classes: **[CLO-2] [Marks: 10]**
    a. Person
    b. Customer
    c. Employee
    d. Train
    e. Ticket
    f. RailwayStation

Assign appropriate data members to each class. The system should have following functions:

a. Display information about a customer
b. Display information about an employee
c. Display ticket information.
d. Display the route for the train which includes departure and arrival place.
e. Assign trains to a railway station.
f. Display trains at a railway station

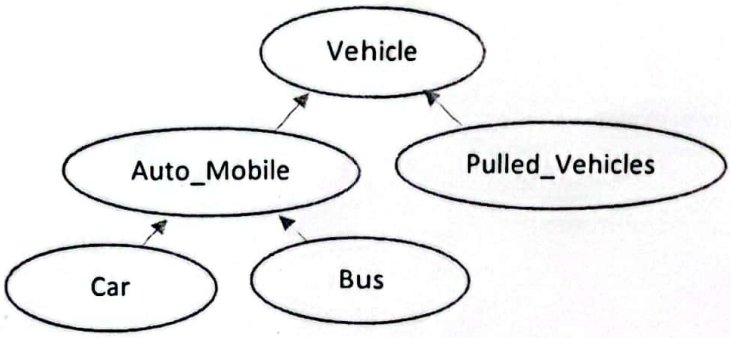
5. Consider the following classes and write the missing code in Bank class. **[CLO-3] [Marks:10]**

```
public class Customer {
   private String name;
   private String address;
   private String email;

   public Customer(String name, String address,
String email) {
      this.name = name;
      this.address = address;
      this.email = email;
   }
   public String getName() {
      return name;
   }
   public String getAddress() {
      return address;
   }

     public String getEmail() {
      return email;
   }

}
```

```
public class Account {
   private int id;
   private Customer c;
   private double balance;

   public Account(int id, Customer c, double balance)
{
      this.id = id;
      this.c = c;
      this.balance = balance;
   }
   public int getId() {
      return id;
   }
     public Customer getC() {
      return c;
   }
   public double getBalance() {
      return balance;
   }

}
```

```
public class Bank {

   private Account [] acc_array ;

   public Bank(Account [] a) {
     acc_array = a;
   }

   public void display()
   {

      //display complete state of all bank accounts

   }

   public void findNamesOfHighDepositAccounts()
   {

      // display the names of all customers who
have balance greater than 50 Lac.

   }

   public double totalDepositInBank()
   {

      // return the total deposit in bank

   }

   public Customer findCustomerByID(int id)
   {

     //search and return a customer using account ID

    }
}
```

6. Implement class **Vehicle** having data members Registration_No and Ownership_Cost. Make argument constructor and toString() method in this class. Create a derive classes called **Auto_Mobiles** (having data members Fuel_Type and Warranty) and **Pulled_Vehicles** (with no additional data members). Create argument constructor and toString() method in both classes. Further inherit classes **Car** and **Bus** from class Auto_Mobiles. Think of one data member in each of these classes and add argument constructor and toString() method. Insert a method checkRegistrationNumber() in **Bus** class that returns true if it is registered for Islamabad. Figure for the scenario is added for the reference. **[CLO-3] [Marks: 10]**



Note:

Do not add additional constructors and methods in classes other than those mentioned in the question.

The Data of parent classes is protected.

The data of leaf child classes is private.

```
class vehicle {
Protected String RegistrationNo;
Protected Double ownership_cost;

vehicle ( ) {
}

class Auto_mobile {
String fuel_Type;
int warranty;
void Pulled_vehicle ( ) {
}

class Auto- extends vehicle {
vehicle ( );
}

class Auto extend Bus {
vehicle ( );
String checkRegistrationNumber ( );

if (checkRN == RN)
{ Return True; }
```