CDAC Mumbai PG-DAC August 24

Assignment No- 5

1) Create a base class BankAccount with methods like deposit() and withdraw(). Derive a class SavingsAccount that overrides the withdraw() method to impose a limit on the withdrawal amount. Write a program that demonstrates the use of overridden methods and proper access modifiers & return the details.

   Solution:

```
package assignment.in;


import java.util.Scanner;
class BankAccount {
   private String accountHolder;
   private double balance;
   // Constructor
   public BankAccount(String accountHolder, double balance) {
      this.accountHolder = accountHolder;
      this.balance = balance;
   }
   // Deposit method
   public void deposit(double amount) {
      if (amount > 0) {
         balance += amount;
         System.out.println("Deposited: " + amount);
      }
      else
      {
         System.out.println("Deposit amount must be positive.");
      }
   }
   // Withdraw method
   public boolean withdraw(double amount) {
      if (amount > 0 && amount <= balance) {
```

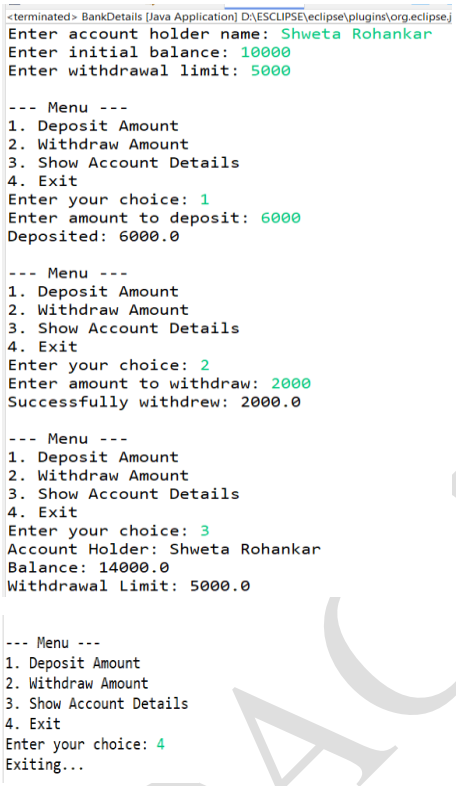
```
            balance -= amount;
            System.out.println("Successfully withdrew: " + amount);
            return true;
        }
        else
        {
            System.out.println("Insufficient balance or invalid amount.");
            return false;
        }
    }
    // Method to display account details
    public void showDetails() {
        System.out.println("Account Holder: " + accountHolder);
        System.out.println("Balance: " + balance);
    }
    // Getter for balance
    public double getBalance() {
        return balance;
    }
}
class SavingsAccount extends BankAccount {
    private double withdrawalLimit;

    // Constructor
    public SavingsAccount(String accountHolder, double balance, double withdrawalLimit) {
        super(accountHolder, balance);
        this.withdrawalLimit = withdrawalLimit;
    }
   // Overridden withdraw method with limit
    @Override
    public boolean withdraw(double amount) {
        if (amount > withdrawalLimit) {
            System.out.println("Withdrawal amount exceeds the limit of: " + withdrawalLimit);
```

```
            return false;
        }
        else
        {
            return super.withdraw(amount);  // Call parent class method
        }
    }
    // Method to show details with withdrawal limit
    @Override
    public void showDetails() {
        super.showDetails();
        System.out.println("Withdrawal Limit: " + withdrawalLimit);
    }
}

public class BankDetails {
    public static void main(String[] args) {  // Corrected main method name
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter account holder name: ");
        String accountHolder = sc.nextLine();
        System.out.print("Enter initial balance: ");
        double balance = sc.nextDouble();
        System.out.print("Enter withdrawal limit: ");
        double withdrawalLimit = sc.nextDouble();
        // Create SavingsAccount object
        SavingsAccount savings = new SavingsAccount(accountHolder, balance, withdrawalLimit);

        int choice;
        do {
            // Display menu options
            System.out.println("\n--- Menu ---");
            System.out.println("1. Deposit Amount");
```

```
System.out.println("2. Withdraw Amount");
System.out.println("3. Show Account Details");
System.out.println("4. Exit");
System.out.print("Enter your choice: ");
choice = sc.nextInt();

switch (choice) {
    case 1:
        // Deposit
        System.out.print("Enter amount to deposit: ");
        double depositAmount = sc.nextDouble();
        savings.deposit(depositAmount);
        break;

    case 2:
        // Withdraw
        System.out.print("Enter amount to withdraw: ");
        double withdrawAmount = sc.nextDouble();
        savings.withdraw(withdrawAmount);
        break;

    case 3:
        // Show Account Details
        savings.showDetails();
        break;

    case 4:
        // Exit
        System.out.println("Exiting...");
        break;

    default:
        System.out.println("Invalid choice.");
```

```
        }
      } while (choice != 4);

      sc.close();
    }
}
```

Output:



```
<terminated> BankDetails [Java Application] D:\ESCLIPSE\eclipse\plugins\org.eclipse.j
Enter account holder name: Shweta Rohankar
Enter initial balance: 10000
Enter withdrawal limit: 5000

--- Menu ---
1. Deposit Amount
2. Withdraw Amount
3. Show Account Details
4. Exit
Enter your choice: 1
Enter amount to deposit: 6000
Deposited: 6000.0

--- Menu ---
1. Deposit Amount
2. Withdraw Amount
3. Show Account Details
4. Exit
Enter your choice: 2
Enter amount to withdraw: 2000
Successfully withdrew: 2000.0

--- Menu ---
1. Deposit Amount
2. Withdraw Amount
3. Show Account Details
4. Exit
Enter your choice: 3
Account Holder: Shweta Rohankar
Balance: 14000.0
Withdrawal Limit: 5000.0

--- Menu ---
1. Deposit Amount
2. Withdraw Amount
3. Show Account Details
4. Exit
Enter your choice: 4
Exiting...
```

2) Create a base class Vehicle with attributes like make and year. Provide a constructor in Vehicle to initialize these attributes. Derive a class Car that has an additional attribute model and write a constructor that initializes make, year, and model. Write a program to create a Car object and display its details.

Solution:

```
package assignment.in;

class vehicle{
    private String make;
```

```
    private int year;

    public vehicle(String make, int year) {
            this.make = make;
            this.year = year;
    }

    public String getMake() {
            return make;
    }
    public int getYear() {
            return year;
    }
    public void displayDetails() {
            System.out.println("Make: " + make);
     System.out.println("Year: " + year);
    }

}

class Car extends vehicle {
    private String model;

    public Car(String make, int year, String model) {
            super(make, year);
            this.model = model;
    }
    public String getModel() {
            return model;
    }

     @Override
       public void displayDetails() {
          super.displayDetails(); // Display make and year from Vehicle
          System.out.println("Model: " + model); // Display model from Car
       }
}

    public class Victor {

            public static void main(String[] args) {
     // Create a Car object
                    Car car = new Car("Toyato", 2009, "Fortuner");

     // Display the car details
                    car.displayDetails();
             }
     }
```

Output:

```
<terminated> Victor [Java Application] D:
Make: Toyato
Year: 2009
Model: Fortuner
```

3) Create a base class Animal with attributes like name, and methods like eat() and sleep(). Create a subclass Dog that inherits from Animal and has an additional method bark(). Write a program to demonstrate the use of inheritance by creating objects of Animal and Dog and calling their methods.

Solution:

```
package assignment.in;


class Animal{
	private String name;

	public Animal(String name) {
		this.name = name;

	}

	public void eat() {
		System.out.println(name + " is eating.");

	}

	public void sleep() {
		System.out.println(name + " is sleeping.");
	}

	public String getName() {
		return name;
	}
}
//subclass
class Dog extends Animal{

	public Dog(String name) {
		super(name);
	}

	public void bark() {
		System.out.println(getName() + " is barking.");
	}
}

public class InheritanceAnimal {
```

```
        public static void main(String[] args) {
                Animal animal = new Animal("Bear");
                animal.eat();
                animal.sleep();

                System.out.println();

                Dog dog = new Dog("Teddy");

                dog.eat();
                dog.sleep();
                dog.bark();

        }

}
```

Output:

```
<terminated> InheritanceAnimal [Jav
Bear is eating.
Bear is sleeping.

Teddy is eating.
Teddy is sleeping.
Teddy is barking.
```

4) Build a class Student which contains details about the Student and compile and run its instance.

Solution:

```
  package assignment.in;

class Student{
        private String name;
        private int age;
        private int PrnNumber;
        private String course;
        private String batchYear;

        public Student(String name, int age, int prnNumber, String course, String batchYear)
        {
                super();
                this.name = name;
                this.age = age;
                PrnNumber = prnNumber;
                this.course = course;
                this.batchYear = batchYear;
        }

        public String getName() {
                return name;
```

```
	}

	public int getAge() {
		return age;
	}

	public int getPrnNumber() {
		return PrnNumber;
	}

	public String getCourse() {
		return course;
	}

	public String getBatchYear() {
		return batchYear;
	}

	public void displayStudentsDetails() {
		System.out.println("Student Name: " +name);
		System.out.println("Student Age: " +age);
		System.out.println("Student PRN : " +PrnNumber);
		System.out.println("Student course Name : " +course);
		System.out.println("Student Batch year : " +batchYear);
	}

}

public class StudentDetails {

	public static void main(String[] args) {
		Student student = new Student("Shweta Rohankar", 24, 109, "CDAC" ,"Aug24");
		student.displayStudentsDetails();
	}
}
```

Output:

```
<terminated> StudentDetails [Java Application] D:\ESCLIPSE
Student Name: Shweta Rohankar
Student Age: 24
Student PRN : 109
Student course Name : CDAC
Student Batch year : Aug24
```

5) Write a Java program to create a base class Vehicle with methods startEngine() and stopEngine(). Create two subclasses Car and Motorcycle. Override the startEngine() and stopEngine() methods in each subclass to start and stop the engines differently.

Solution:

```
	package assignment.in;
```

```
class Vehicle1 {
    public void startEngine() {
        System.out.println("The vehicle's engine is starting.");
    }

    public void stopEngine() {
        System.out.println("The vehicle's engine is stopping.");
    }
}

// Subclass Car
class Car1 extends Vehicle1 {
    @Override
    public void startEngine() {
        System.out.println("The car's engine is starting.");
    }

    @Override
    public void stopEngine() {
        System.out.println("The car's engine turns off smoothly.");
    }
}

// Subclass Motorcycle
class Motorcycle extends Vehicle1 {
    @Override
    public void startEngine() {
        System.out.println("The motorcycle's engine starts with a button press.");
    }

    @Override
    public void stopEngine() {
        System.out.println("The motorcycle's engine shuts down quickly.");
    }
}

public class VehicleEngine {
    public static void main(String[] args) {
        Vehicle1 car = new Car1();
        System.out.println("Car:");
        car.startEngine();
        car.stopEngine();

        System.out.println();
        Vehicle1 motorcycle = new Motorcycle();
        System.out.println("Motorcycle:");
        motorcycle.startEngine();
        motorcycle.stopEngine();
    }
}
```

Output:

```
<terminated> VehicleEngine [Java Application] D:\ESCLIPSE\eclipse\plugins\org.eclipse.justj.openjdk
Car:
The car's engine is starting.
The car's engine turns off smoothly.

Motorcycle:
The motorcycle's engine starts with a button press.
The motorcycle's engine shuts down quickly.
```