

Encapsulation

1. Create a class Student with private fields id, name, age, and grade(A, B, C, D, E, F). Provide getter and setter methods to access and modify these fields.

```
1 package w3w3;
2
3 class student {
4     private int id;
5     private String name;
6     private int age;
7     private String grade;
8
9     public int getId() {
10         return id;
11     }
12     public void setId(int id) {
13         this.id = id;
14     }
15     public String getName() {
16         return name;
17     }
18     public void setName(String name) {
19         this.name = name;
20     }
21     public int getAge() {
22         return age;
23     }
24     public void setAge(int age) {
25         this.age = age;
26     }
27     public String getGrade() {
28         return grade;
29     }
30     public void setGrade(String grade) {
31         this.grade = grade;
32     }
33 }
34
```

```
35 public class w3q1 {
36     public static void main(String[] args) {
37         student s = new student();
38         s.setId(12121);
39         System.out.println("Id :"+s.getId());
40         s.setName("Prashna");
41         System.out.println("Name :"+s.getName());
42         s.setAge(19);
43         System.out.println("Age :"+s.getAge());
44         s.setGrade("A+");
45         System.out.println("Grade. :"+s.getGrade());
46     }
47 }
48
```

Console ×

<terminated> w3q1 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (De

Id :12121
Name :Prashna
Age :19
Grade. :A+

2. Create a class Car with private fields model, price and fuelLevel. Provide getter and setter methods for model and price, but ensure that the fuelLevel field is read-only.

```
1 package w3w3;
2
3 class car {
4     private String model;
5     private int price;
6     private String fuelLevel;
7
8     car (String fuelLevel){
9         this.fuelLevel=fuelLevel;
10    }
11    public String toString() {
12        return "fuel level :"+fuelLevel;
13    }
14    public String getModel() {
15        return model;
16    }
17    public void setModel(String model) {
18        this.model = model;
19    }
20    public int getPrice() {
21        return price;
22    }
23    public void setPrice(int price) {
24        this.price = price;
25    }
26 }
27
```

```
27
28 public class w3q2 {
29     public static void main(String[] args) {
30         car c = new car("full");
31
32         c.setModel("Duccati");
33         System.out.println("Model :"+c.getModel());
34         c.setPrice(10);
35         System.out.println("Price :"+c.getPrice());
36         System.out.println(c);
37     }
38 }
39
```

Console ×

<terminated> w3q2 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (D

Model :Duccati
Price :10
fuel level :full

Abstraction

3. Create an abstract class Vehicle with abstract methods startEngine() and stopEngine(). Then create two classes Car and Motorcycle that extend Vehicle and implement these methods differently.

```
1 package w3w3;
2
3 abstract class Vehicle{
4     abstract void startEngine();
5     abstract void stopEngine();
6 }
7 class Car1 extends Vehicle{
8     void startEngine() {
9         System.out.println("Car engine started");
10    }
11    void stopEngine() {
12        System.out.println("Car engine stopped");
13    }
14 }
15 class motorcycle extends Vehicle{
16    void startEngine() {
17        System.out.println("Motorcycle engine started");
18    }
19    void stopEngine() {
20        System.out.println("Motorcycle engine stopped");
21    }
22 }
23
24 public class w3q3 {
25     public static void main(String[] args) {
26         Car1 c = new Car1();
27         motorcycle m = new motorcycle();
28         c.startEngine();
29         c.startEngine();
30         m.startEngine();
31         m.stopEngine();
32     }
33 }
```

Console ×

<terminated> w3q3 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 1

Car engine started
Motorcycle engine started
Motorcycle engine stopped

4. Create an abstract class GameCharacter with abstract methods like attack() and defend(). Then, create subclasses Warrior and Archer with different attack and

defense

behaviors.

```
1 package w3w3;
2
3 abstract class GameCharacter{
4     abstract void attack();
5     abstract void defend();
6 }
7 class Warrior extends GameCharacter{
8     void attack() {
9         System.out.println("Warrior Attack");
10    }
11    void defend() {
12        System.out.println("Warrior Defend");
13    }
14 }
15 class Archer extends GameCharacter{
16    void attack() {
17        System.out.println("Archer Attack");
18    }
19    void defend() {
20        System.out.println("Archer Defend");
21    }
22 }
23
24 public class w3q4 {
25     public static void main(String[] args) {
26         Warrior w = new Warrior();
27         Archer a = new Archer();
28         w.attack();
29         w.defend();
30         a.attack();
31         a.defend();
32     }
33 }
~ ~
```

Console ×

<terminated> w3q4 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\java

Warrior Defend
Archer Attack
Archer Defend

Interface

5. Create an interface `PaymentMethod` with a method `processPayment(double amount)`. Implement it in classes `Esewa` and `Khalti`.

```
1 package w3w3;
2
3 interface PaymentMethod{
4     public void processPayment(double amount);
5 }
6 class Esewa implements PaymentMethod{
7     public void processPayment(double amount) {
8         System.out.println("Esewa credited : Rs "+amount);
9     }
10 }
11 class Khalti implements PaymentMethod{
12     public void processPayment(double amount) {
13         System.out.println("Khalti credited : Rs "+amount);
14     }
15 }
16 public class w3q5 {
17     public static void main(String[] args) {
18         Esewa e = new Esewa();
19         Khalti k = new Khalti();
20         e.processPayment(10);
21         k.processPayment(100);
22     }
23 }
24
```

Console ×

<terminated> w3q5 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 10, 2023)

Esewa credited : Rs 10.0
Khalti credited : Rs 100.0

6. Create an interface `RemoteControl` with methods `powerOn()` and `powerOff()`. Implement this interface in classes `TV` and `AC`, which turn on and off their

respective

devices.

```
1 package w3w3;
2
3 interface RemoteControl{
4     abstract void powerOn();
5     abstract void powerOff();
6 }
7 class TV implements RemoteControl{
8     public void powerOn() {
9         System.out.println("Tv On");
10    }
11    public void powerOff() {
12        System.out.println("Tv Off");
13    }
14 }
15 class AC implements RemoteControl{
16    public void powerOn() {
17        System.out.println("AC On");
18    }
19    public void powerOff() {
20        System.out.println("AC Off");
21    }
22 }
23 public class w3q6 {
24    public static void main(String[] args) {
25        TV t = new TV();
26        t.powerOn();
27        t.powerOff();
28        AC a = new AC();
29        a.powerOn();
30        a.powerOff();
31    }
32 }
33
```

Console ×

<terminated> w3q6 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw

Tv On
Tv Off
AC On
AC Off

File Handling

7. Write a program to take the name of foods as inputs from the user and store them in a .txt file.

```
1 package w3w3;
2
3 import java.io.BufferedReader;
4
5
6
7
8
9
10 public class w3q7 {
11     public static void main(String[] args) {
12         Scanner sc = new Scanner(System.in);
13         try {
14             System.out.println("Enter Name of foods :");
15             String food = sc.nextLine();
16             FileWriter f= new FileWriter("myfile.txt");
17             BufferedWriter fw = new BufferedWriter(f);
18             fw.write(food);
19             fw.close();
20
21
22             FileReader r= new FileReader("myfile.txt");
23             BufferedReader fr = new BufferedReader(r);
24             fr.close();
25
26
27             sc.close();
28         } catch (IOException e) {
29             e.printStackTrace();
30         }
31     }
32 }
33
34
```

Console ×

<terminated> w3q7 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 14, 2023)

Enter Name of foods :
pineapple chicken pizza

pineapple chicken pizza

8. Create a class Student with private fields name, age, grade(A, B, C, D, E, F). Then, write a program that stores student information(id, name, age, grade) into a .csv file.

```
package w3w3;

import java.io.FileWriter;
import java.io.IOException;

class student1 {
    private String name;
    private int age;
    private char grade;

    student1(String name, int age, char grade) {
        this.name = name;
        this.age = age;
        this.grade = grade;
    }

    public String getName() {
        return name;
    }

    public int getAge() {
        return age;
    }

    public char getGrade() {
        return grade;
    }

    public String toString() {
        return name + "," + age + "," + grade;
    }
}
```

```

34 public class w3q8 {
35     public static void main(String[] args) {
36         student1 s = new student1("Prashna Shrestha", 19, 'A');
37         student1 s1 = new student1("Salina Jyakhwa", 20, 'A');
38         student1 s2 = new student1("Lasata", 19, 'A');
39
40         student1[] students = {s, s1, s2};
41
42         writeStudentsToCSV("students.csv", students);
43     }
44
45     public static void writeStudentsToCSV(String fileName, student1[] students) {
46         try (FileWriter writer = new FileWriter(fileName)) {
47             writer.write("ID,Name,Age,Grade\n");
48
49             for (int i = 0; i < students.length; i++) {
50                 student1 student = students[i];
51                 writer.write((i + 1) + "," + student.toString() + "\n");
52             }
53
54             System.out.println("Student information successfully saved to " + fileName);
55         } catch (IOException e) {
56             System.out.println("An error occurred while writing to the file.");
57             e.printStackTrace();
58         }
59     }
60 }
61

```

Console ×

<terminated> w3q8 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 14, 2024, 5:23:52 PM – 5:23:53 PM) [pid: 15104]
 Student information successfully saved to students.csv

A	B	C	D
ID	Name	Age	Grade
1	Prashna Shrestha	19	A
2	Salina Jyakhwa	20	A
3	Lasata	19	A

9. Write a program that reads a list of students data from a csv file and stores them in a list. Then display the list of students according to their grade.

```
1 package w3w3;
2
3 import java.io.BufferedReader;
4 import java.io.FileReader;
5 import java.io.IOException;
6
7 public class w3q9 {
8     public static void main(String[] args) {
9         readCSV("students.csv");
10    }
11    public static void readCSV(String fileName) {
12        String line = "";
13        String splitBy = ",";
14
15        try (BufferedReader br = new BufferedReader(new FileReader(fileName))) {
16            String header = br.readLine();
17            System.out.println("Header: " + header);
18
19            //read from csv file
20            while ((line = br.readLine()) != null) {
21                String[] studentData = line.split(splitBy);
22
23                //print ID, Name, Age, Grade)
24                System.out.println("ID: " + studentData[0] +
25                                   ", Name: " + studentData[1] +
26                                   ", Age: " + studentData[2] +
27                                   ", Grade: " + studentData[3]);
28            }
29        } catch (IOException e) {
30            e.printStackTrace();
31        }
32    }
33 }
34
```

Console ×

```
<terminated> w3q9 (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 14, 2024, 5:28:47 PM – 5:28:48 PM) [p
Header: ID,Name,Age,Grade
ID: 1, Name: Prashna Shrestha, Age: 19, Grade: A
ID: 2, Name: Salina Jyakhwa, Age: 20, Grade: A
ID: 3, Name: Lasata, Age: 19, Grade: A
```