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Lab Assignment – 4 (JP)

Aim: Write a java program to demonstrate usage of abstract class, interface in java and I/O Stream class.

* Objective:

→ To study abstract class
→ To study Interface class
→ To study I/O stream class.

* Theory:

① Java Abstract:

Java abstract is a process of hiding certain details and showing only essential information to user. Abstraction can be achieved by either abstract class or interface. The abstract keyword is a non-access modifier, used for classes and methods.

② Java Interface:

Another way to achieve abstraction in Java is with interface. An interface is a completely 'abstract class' that is used to group related methods with empty bodies.

To access interface methods, interface must be 'implemented' by another class with implements keywords. Body of interface method is provided by 'implement class.

③ Java I/O : Input - Output stream :

Java performs I/O through streams. A stream is linked to a physical layer by java I/O stream to make input and output stream operation in java. In general, stream means continuous flow of data. Streams are clean way to deal with input/output without having every part of your code understand physical.

→ Conclusion:
Thus, we have successfully implemented usage of abstract class, interface in java and I/O stream classes.

★ FAQ

Q: What is difference b/w abstract class and concrete class?

Ans

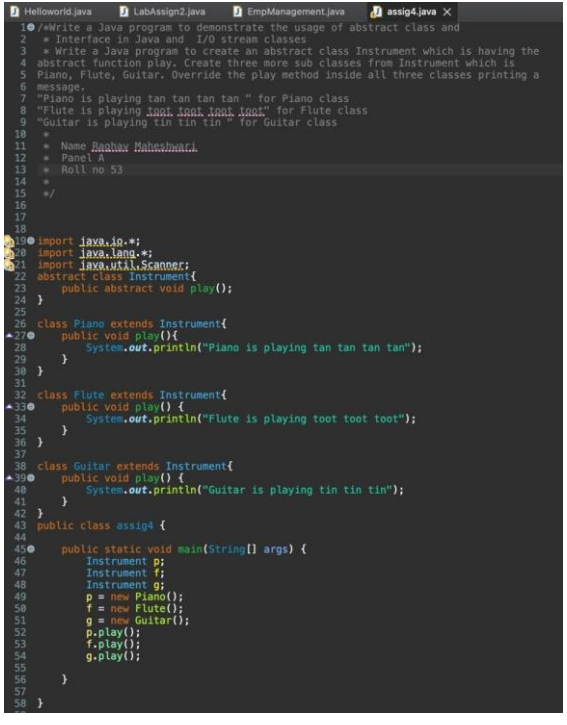
Abstract class	Concrete class
→ Abstract class can have both an abstract as well as concrete method.	→ Concrete class can only have concrete method.
→ Abstract class cannot be instantiated using new keyword.	→ Concrete class can be instantiated using new keyword.
→ Abstract class cannot be declared as final class	→ Concrete class can be declared as final class.

Q2 Can we define private and protected modifiers for data members in interfaces?

Ans. NO, it is not possible to define private and protected modifiers for the members in interfaces in java.

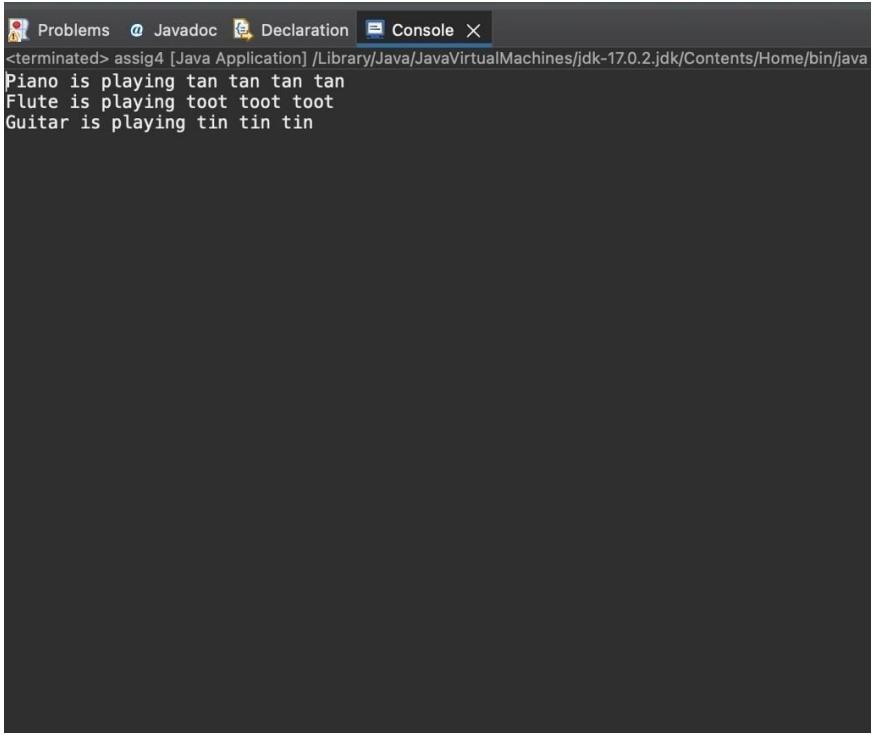
Seen

CODE 4A

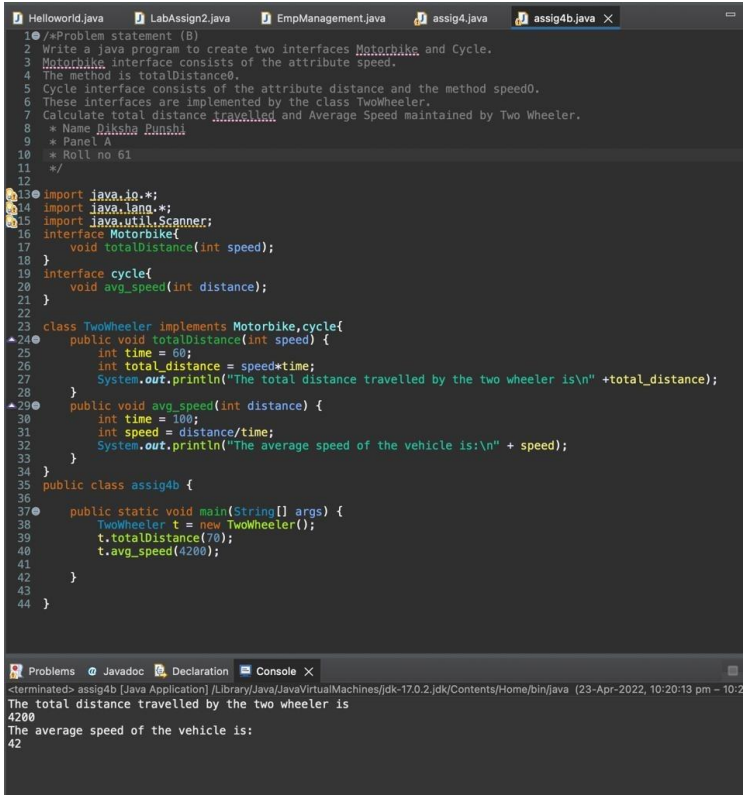


```
Helloworld.java  LabAssign2.java  EmpManagement.java  assig4.java
/*Write a Java program to demonstrate the usage of abstract class and
 * Interface in Java and  I/O stream classes
 * Write a Java program to create an abstract class Instrument which is having the
abstract function play. Create three more sub classes from Instrument which is
Piano, Flute, Guitar. Override the play method inside all three classes printing a
message.
"Piano is playing tan tan tan tan " for Piano class
"Flute is playing toot toot toot toot" for Flute class
"Guitar is playing tin tin tin " for Guitar class
 *
 *  Name Raghav Maheshwari
 *  Panel A
 *  Roll no 53
 *
 */



import java.io.*;
import java.lang.*;
import java.util.Scanner;
abstract class Instrument{
    public abstract void play();
}

class Piano extends Instrument{
    public void play(){
        System.out.println("Piano is playing tan tan tan tan");
    }
}

class Flute extends Instrument{
    public void play() {
        System.out.println("Flute is playing toot toot toot");
    }
}

class Guitar extends Instrument{
    public void play() {
        System.out.println("Guitar is playing tin tin tin");
    }
}
public class assig4 {

    public static void main(String[] args) {
        Instrument p;
        Instrument f;
        Instrument g;
        p = new Piano();
        f = new Flute();
        g = new Guitar();
        p.play();
        f.play();
        g.play();

    }

}
```

OUTPUT:


Problems
Javadoc
Declaration
Console
<terminated> assig4 [Java Application] /Library/Java/JavaVirtualMachines/jdk-17.0.2.jdk/Contents/Home/bin/java
Piano is playing tan tan tan tan
Flute is playing toot toot toot
Guitar is playing tin tin tin

CODE 4B:



```
/*Problem statement (B)
Write a java program to create two interfaces Motorbike and Cycle.
Motorbike interface consists of the attribute speed.
The method is totalDistance0.
Cycle interface consists of the attribute distance and the method speed0.
These interfaces are implemented by the class TwoWheeler.
Calculate total distance travelled and Average Speed maintained by Two Wheeler.
 * Name Diksha Punshi
 * Panel A
 * Roll no 61
 */

import java.io.*;
import java.lang.*;
import java.util.Scanner;
interface Motorbike{
    void totalDistance(int speed);
}
interface cycle{
    void avg_speed(int distance);
}

class TwoWheeler implements Motorbike,cycle{
    public void totalDistance(int speed) {
        int time = 60;
        int total_distance = speed*time;
        System.out.println("The total distance travelled by the two wheeler is\n" +total_distance);
    }
    public void avg_speed(int distance) {
        int time = 100;
        int speed = distance/time;
        System.out.println("The average speed of the vehicle is:\n" + speed);
    }
}
public class assig4b {

    public static void main(String[] args) {
        TwoWheeler t = new TwoWheeler();
        t.totalDistance(70);
        t.avg_speed(4200);

    }

}
```

```
<terminated> assig4b [Java Application] /Library/Java/JavaVirtualMachines/jdk-17.0.2.jdk/Contents/Home/bin/java  (23-Apr-2022, 10:20:13 pm – 10:2
The total distance travelled by the two wheeler is
4200
The average speed of the vehicle is:
42
```