Practical no. 4

FS19CO042

Aim:

4.1 Create a package com.gpm.complex. Create an interface Complex in it with following member methods: realPart(), imgPart(), magnitude() and argument() along with default methods plus(), minus(), into() and divideBy() having appropriate parameters and return types.

4.2 In the same package create class CartesianComplex with real and img and class PolarComplex with r and theta as their member fields. Make the classes implement the Complex interface. Override all non-default methods in the interface. Also override toString().

4.3 Now in main(), create one objects of both the classes defined in 4.2 and print their addition and multiplication.

4.4 Create a Java swing frame by creating a subclass of javax.swing.JFrame class. Add a java.awt.event.MouseListener by passing an object of an anonymous subclass of java.awt.event.MouseAdapter on the JFrame. Display the coordinates of point at which mouse is clicked

Tool used: Editor (Notepad/Intellij IDE), JDK and JRE

Code:

4.1 Create a package com.gpm.complex. Create an interface Complex in it with following member methods: realPart(), imgPart(), magnitude() and argument() along with default methods plus(), minus(), into() and divideBy() having appropriate parameters and return types.

Code :

```
package com.gpm.complex;

public interface Complex {
    void realPart();

    void imgPart();

    void magnitude();

    void argument();

    default float plus(float a, float b) {
        return a + b;
    }

    default float minus(float a, float b) {
        return a - b;
    }

    default float into(float a, float b) {
        return a * b;
    }

    default float divideBy(float a, float b) {
        return a / b;
    }

}
```

4.2 In the same package create class CartesianComplex with real and img and class PolarComplex with r and theta as their member fields. Make the classes implement the Complex interface. Override all non-default methods in the interface. Also override toString().

```
package com.gpm.complex;

public class CartesianComplex implements Complex {
    CartesianComplex real;
    CartesianComplex img;

    @Override
    public String toString() {
        return "CartesianComplex";
    }

    @Override
    public void realPart() {

    }

    @Override
    public void imgPart() {

    }

    @Override
    public void magnitude() {

    }

    @Override
    public void argument() {

    }

}
```

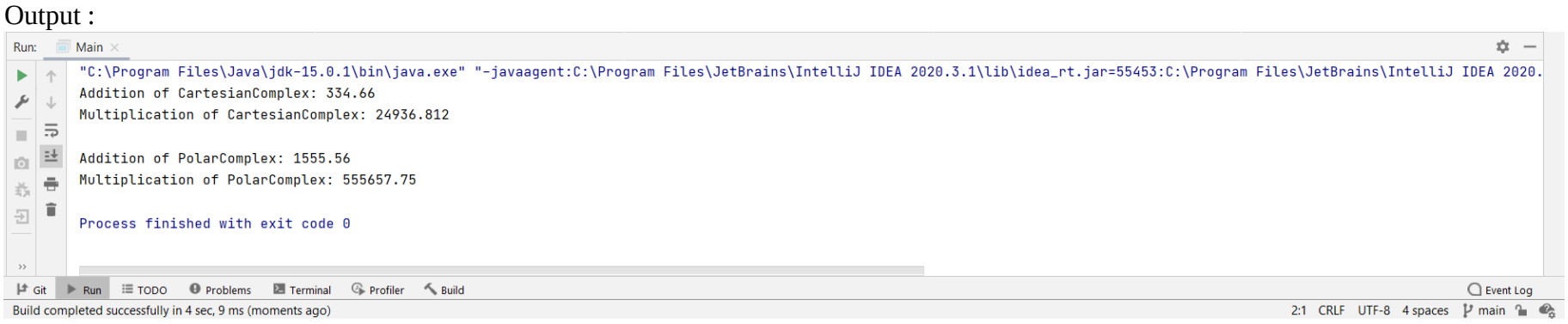
```
package com.gpm.complex;

public class PolarComplex implements Complex {
    PolarComplex r;
    PolarComplex theta;

    @Override
    public String toString() {
        return "PolarComplex";
    }

    @Override
    public void realPart() {

    }

    @Override
    public void imgPart() {

    }

    @Override
    public void magnitude() {

    }

    @Override
    public void argument() {

    }
}
```

4.3 Now in main(), create one objects of both the classes defined in 4.2 and print their addition and multiplication.

Code :

```
package com.gpm.complex;

public class Main {

    public static void main(String[] args) {

        CartesianComplex cartesianComplex = new CartesianComplex();
        PolarComplex polarComplex = new PolarComplex();

        System.out.println("Addition of CartesianComplex: "+cartesianComplex.plus(111.99f, 222.67f));
        System.out.println("Multiplication of CartesianComplex: "+cartesianComplex.into(111.99f, 222.67f)+"\n");

        System.out.println("Addition of PolarComplex: "+polarComplex.plus(555.78f, 999.78f));
        System.out.println("Multiplication of PolarComplex: "+polarComplex.into(555.78f, 999.78f));

    }
}
```

Output :



4.4 Create a Java swing frame by creating a subclass of javax.swing.JFrame class. Add a java.awt.event.MouseListener by passing an object of an anonymous subclass of java.awt.event.MouseAdapter on the JFrame. Display the coordinates of point at which mouse is clicked.

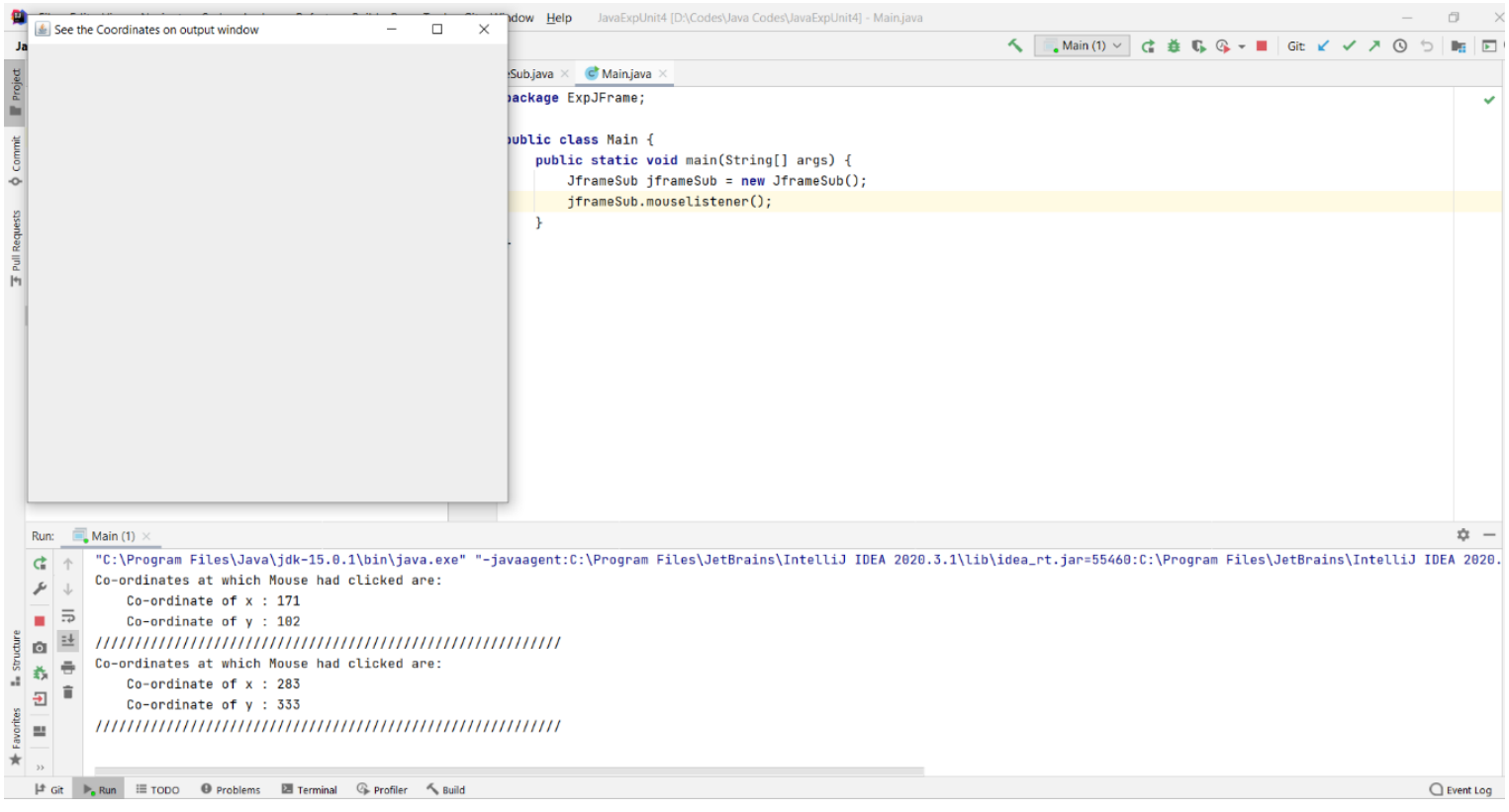
Code :

```
package ExpJFrame;

import javax.swing.*;
import java.awt.event.MouseAdapter;
import java.awt.event.MouseEvent;

public class JframeSub extends JFrame {

    public JframeSub() {

    }

    public void mouselistener() {

        addMouseListener(new MouseAdapter() {
            public void mousePressed(MouseEvent e) {
                int x = e.getX();
                int y = e.getY();
                System.out.println("Co-ordinates at which Mouse had clicked are: \n" +
                        "\tCo-ordinate of x : " + x +
                        "\n\tCo-ordinate of y : " + y);
                System.out.println("////////////////////////////////////////////////////////////");
            }
        });

        setTitle("See the Coordinates on output window");
        setLayout(null);
        setVisible(true);
        setSize(500, 500);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

    }
}
```

Main method :

```
package ExpJFrame;

public class Main {
    public static void main(String[] args) {
        JframeSub jframeSub = new JframeSub();
        jframeSub.mouselistener();
    }
}
```

Output :



Conclusion: Thus, we understood and executed programs regarding interfaces and swing framework.