



2022

February

Software Construction and Development

Lab 02

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Section: SE – A

TASK 01

CODE

```
public class Task01 {

    public static void main(String[] args) {
        Circle C = new Circle(2);
        Rectangle R = new Rectangle(4,10);
        Triangle T = new Triangle(10,5);
        Square S = new Square(2);
        R.genereatearea();
        T.genereatearea();
        C.genereatearea();
        S.genereatearea();
    }

}

abstract class Shape{
    abstract void genereatearea();
}

class Circle extends Shape{
    private double radius, area;

    Circle(){}
    Circle(double x)
    {
        radius = x;
    }
    void genereatearea(){
        area = 3.142 * (radius * radius);
        System.out.println("Area of Circle: " + area);
    }
}

class Triangle extends Shape{
    double height, base, area;
    Triangle(){}
    Triangle(double x, double y)
    {
        height = x;
```

```

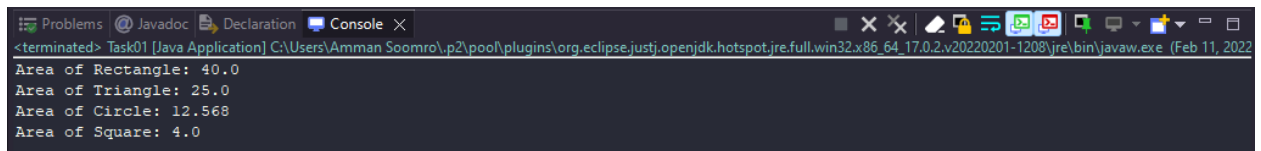
        base = y;
    }
    void genereatearea(){
        area = (base*height)/2;
        System.out.println("Area of Triangle: " + area);
    }
}

class Rectangle extends Shape{
    protected double width, length, area;
    Rectangle(){}
    Rectangle(double x, double y)
    {
        width = x;
        length = y;
    }
    void genereatearea(){
        area = width * length;
        System.out.println("Area of Rectangle: " + area);
    }
    void genereatearea1(){
        area = width * length;
        System.out.println("Area of Square: " + area);
    }
}

class Square extends Rectangle{
    Square(double x)
    {
        super(x,x);
    }
    void CheckSides()
    {
        if(width==length)
        {
            area = width * length;
        }
    }
    void genereatearea(){
        CheckSides();
        System.out.println("Area of Square: " + area);
    }
}

```

OUTPUT



The screenshot shows the Eclipse IDE's console window. The title bar includes tabs for 'Problems', 'Javadoc', 'Declaration', and 'Console'. The console text is as follows:

```
<terminated> Task01 [Java Application] C:\Users\Amman Soomro\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.2.v20220201-1208\jre\bin\javaw.exe (Feb 11, 2022  
Area of Rectangle: 40.0  
Area of Triangle: 25.0  
Area of Circle: 12.568  
Area of Square: 4.0
```

TASK 02

CODE

```
public class Task02 {

    public static void main(String[] args) {
        BankA A = new BankA(1000);
        BankA B = new BankA(1500);
        BankA C = new BankA(2000);

        System.out.println("Balance in Bank A: " + A.getBalance());
        System.out.println("Balance in Bank B: " + B.getBalance());
        System.out.println("Balance in Bank C: " + C.getBalance());
    }
}

class Bank{
    double getBalance()
    {
        return 0;
    }
}

class BankA extends Bank
{
    double bal;
    BankA(){
    }
    BankA(double x)
    {
        bal = x;
    }
    double getBalance()
    {
        return bal;
    }
}

class BankB extends Bank
{
    double bal;
    BankB(){
    }
    BankB(double x)
    {
        bal = x;
    }
}
```

```
    }  
    double getBalance()  
    {  
        return bal;  
    }  
}  
  
class BankC extends Bank  
{  
    double bal;  
    BankC(){}  
    BankC(double x)  
    {  
        bal = x;  
    }  
    double getBalance()  
    {  
        return bal;  
    }  
}
```

OUTPUT

```
<terminated> Task02 [Java Application] C:\Users\Amman Soomro\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.2.v20220201-1208\jre\bin\javaw.exe (Feb 11, 2022  
Balance in Bank A: 1000.0  
Balance in Bank B: 1500.0  
Balance in Bank C: 2000.0
```

TASK 03

CODE

```
public class Task03 {
    public static void main(String[] args) {
        ImtiazStore I = new ImtiazStore(5420);
        BinHashimStore B = new BinHashimStore(11560);
        I.CalculateBill();
        B.CalculateBill();
    }
}

abstract class Store{
    abstract void CalculateBill();
}

class ImtiazStore{
    double totalbill;
    ImtiazStore(){
    }
    ImtiazStore(double bill){
        totalbill = bill;
    }
    void CalculateBill() {
        System.out.println("===== Imtiaz Store =====");
        System.out.println("Totalbill: " + totalbill);
        System.out.println("Bill after (7%) discount: " + (totalbill - (totalbill
* 0.07)));
    }
}

class BinHashimStore{
    double totalbill;
    BinHashimStore(){
    }
    BinHashimStore(double bill){
        totalbill = bill;
    }
    void CalculateBill() {
        System.out.println(" ");
        System.out.println("===== BinHashim Store =====");
        System.out.println("Totalbill: " + totalbill);
        System.out.println("Bill after (5%) discount: " + (totalbill - (totalbill
* 0.05)));
    }
}
```

OUTPUT

```
<terminated> Task03 [Java Application] C:\Users\Amman Soomro\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.2.v20220201-1208\jre\bin\javaw.exe (Feb 11, 2022)
===== Imtiaz Store =====
Totalbill: 5420.0
Bill after (7%) discount: 5040.6

===== BinHashim Store =====
Totalbill: 11560.0
Bill after (5%) discount: 10982.0
```


TASK 04

CODE

```
public class Task04 {  
  
    public static void main(String[] args) {  
        ConnectedState CS = new ConnectedState();  
        DisconnectedState DS = new DisconnectedState();  
        PushBackConnectedState PCS = new PushBackConnectedState();  
        PushBackDisconnectedState PDS = new PushBackDisconnectedState();  
        PushBackConnection PBC = new PushBackConnection();  
  
        CS.connect();  
        CS.send(16);  
        System.out.println("Received " + CS.receive() + " bits of Data.");  
        CS.disconnect();  
  
        DS.connect();  
        DS.send(19);  
        System.out.println("Received " + DS.receive() + " bits of Data.");  
        DS.disconnect();  
  
        PDS.connect();  
        PDS.send(46);  
        System.out.println("Received " + PDS.receive() + " bits of Data.");  
        PDS.pushBack(34);  
        System.out.println("Received " + PDS.receive() + " bits of more Data.");  
        PDS.disconnect();  
  
        PCS.connect();  
        PCS.send(83);  
        System.out.println("Received " + PCS.receive() + " bits of Data.");  
        PCS.pushBack(27);  
        System.out.println("Received " + PCS.receive() + " bits of more Data.");  
        PCS.disconnect();  
  
        PBC.connect();  
        PBC.send(63);  
        System.out.println("Received " + PBC.receive() + " bits of Data.");  
        PBC.pushBack(20);  
        System.out.println("Received " + PBC.receive() + " bits of more Data.");  
        PBC.disconnect();  
    }  
}
```

```

}

interface connections{
    public void connect();
    public void disconnect();
    public void send(int data);
    public int receive();
}

interface pushback extends connections{
    public void pushBack(int value);
}

class ConnectedState{

    private int Data;

    public void connect() {
        System.out.println("===== Connected Stated =====");
        System.out.println("Connection Established.");
    }
    public void disconnect() {
        System.out.println("Connection Disconnected.");
    }
    public void send(int data) {
        Data = data;
        System.out.println("Sending " + Data + " bits of Data.");
    }
    public int receive() {
        return Data;
    }
}

class DisconnectedState{

    private int Data;

    public void connect() {
        System.out.println("===== Disconnected Stated =====");
        System.out.println("Connection Established.");
    }
    public void disconnect() {
        System.out.println("Connection Disconnected.");
    }
}

```

```

    }
    public void send(int data) {
        Data = data;
        System.out.println("Sending " + Data + " bits of Data.");
    }
    public int receive() {
        return Data;
    }
}

class PushBackConnectedState extends ConnectedState implements pushback{

    private int Data;

    public void pushBack(int value) {
        Data = value;
        System.out.println("Pushing back " + Data + " bits of Data.");
    }
    public void connect() {
        System.out.println("===== PushBack Connected State
=====");
        System.out.println("Connection Established.");
    }
    public void disconnect() {
        System.out.println("Connection Disconnected.");
    }
    public void send(int data) {
        Data = data;
        System.out.println("Sending " + Data + " bits of Data.");
    }
    public int receive() {
        return Data;
    }
}

class PushBackConnection implements pushback{

    private int Data;

    public void pushBack(int value) {
        Data = value;
        System.out.println("Pushing back " + Data + " bits of Data.");
    }
    public void connect() {

```

```

        System.out.println("===== PushBack Connection
=====");
        System.out.println("Connection Established.");
    }
    public void disconnect() {
        System.out.println("Connection Disconnected.");
    }
    public void send(int data) {
        Data = data;
        System.out.println("Sending " + Data + " bits of Data.");
    }
    public int receive() {
        return Data;
    }
}

class PushBackDisconnectedState extends DisconnectedState implements pushback{

    private int Data;

    public void pushBack(int value) {
        Data = value;
        System.out.println("Pushing back " + Data + " bits of Data.");
    }
    public void connect() {
        System.out.println("===== PushBack Disconnected State
=====");
        System.out.println("Connection Established.");
    }
    public void disconnect() {
        System.out.println("Connection Disconnected.");
    }
    public void send(int data) {
        Data = data;
        System.out.println("Sending " + Data + " bits of Data.");
    }
    public int receive() {
        return Data;
    }
}

```

OUTPUT

```
<terminated> Task04 [Java Application] C:\Users\Amman Soomro\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.2.v20220201-1208\jre\bin\javaw.exe (Feb 12, 2022)
===== Connected Stated =====
Connection Established.
Sending 16 bits of Data.
Received 16 bits of Data.
Connection Disconnected.
===== Disconnected Stated =====
Connection Established.
Sending 19 bits of Data.
Received 19 bits of Data.
Connection Disconnected.
===== PushBack Disconnected State =====
Connection Established.
Sending 46 bits of Data.
Received 46 bits of Data.
Pushing back 34 bits of Data.
Received 34 bits of more Data.
Connection Disconnected.
===== PushBack Connected State =====
Connection Established.
Sending 83 bits of Data.
Received 83 bits of Data.
Pushing back 27 bits of Data.
Received 27 bits of more Data.
Connection Disconnected.
===== PushBack Connection =====
Connection Established.
Sending 63 bits of Data.
Received 63 bits of Data.
Pushing back 20 bits of Data.
Received 20 bits of more Data.
```