Inheritance Code Examples

Main.java | Base.java | Derived.java

```java
package question1;

class Base {
    public void display() {
        System.out.println("Base");
    }
}

```

Main.java | Base.java | Derived.java

```java
package question1;

class Derived extends Base {
    public void display() {
        System.out.println("Derived");
    }
}

```

*Main.java Base.java Derived.java

```
1  package question1;
2
3  public class Main {
4
5      public static void main(String[] args) {
6          Base x = new Base();
7          x.display();
8          Base y = new Derived();
9          y.display();
10         Derived z = new Derived();
11         z.display();
12         Base w = z;
13         w.display();
14         Derived q = new Base();
15         q.display();
16     }
17
18 }
19
```

Main.java | Base.java | Derived.java

```java
package question1;

public class Main {

    public static void main(String[] args) {
        Base x = new Base();
        x.display();
        Base y = new Derived();
        y.display();
        Derived z = new Derived();
        z.display();
        Base w = z;
        w.display();
        Derived q = (Derived) new Base();
        q.display();
    }

}

```

Problems | Javadoc | Declaration | Console

<terminated> Main [Java Application] /Library/Java/JavaVirtualMachines/jdk-14.0.1.jdk/Contents/Home/bin/java (Oct 31, 2021, 4:08:29 PM – 4:08:32 PM)

```
Base
Derived
Derived
Derived
Exception in thread "main" java.lang.ClassCastException: class question1.Base cannot be cast to class question1.Derived
        at question1.Main.main(Main.java:14)
```

Account.java | SavingsAccount.java | CheckingAccount.java | AccountApp.java

```java
package bankaccount;

public abstract class Account {

    private String name;
    private long amount;

    Account(String name, long amount) {
        this.name = name;
        setAmount(amount);
    }

    public void deposit(long amount) {
        this.amount += amount;
    }

    public String getName() {
        return name;
    }

    public long getAmount() {
        return amount;
    }

    public void setAmount(long amount) {
        this.amount = amount;
    }
}
```

Account.java | SavingsAccount.java | CheckingAccount.java | AccountApp.java

```java
package bankaccount;

public class SavingsAccount extends Account {

    SavingsAccount(long amount) {
        super("savings", amount);
    }
}

```

Account.java | SavingsAccount.java | CheckingAccount.java | AccountApp.java

```java
package bankaccount;

public class CheckingAccount extends Account {

    CheckingAccount(long amount) {
        super("checking", amount);
    }

    public void withdraw(long amount) {
        setAmount(getAmount() - amount);
    }
}

```

Account.java | SavingsAccount.java | CheckingAccount.java | AccountApp.java

```java
package bankaccount;

public class AccountApp {

    public static void main(String[] args)
    {
        SavingsAccount sa = new SavingsAccount(10000);
        System.out.println("account name: " + sa.getName());
        System.out.println("initial amount: " + sa.getAmount());
        sa.deposit(5000);
        System.out.println("new amount after deposit: " + sa.getAmount());

        CheckingAccount ca = new CheckingAccount(20000);
        System.out.println("account name: " + ca.getName());
        System.out.println("initial amount: " + ca.getAmount());
        ca.deposit(6000);
        System.out.println("new amount after deposit: " + ca.getAmount());
        ca.withdraw(3000);
        System.out.println("new amount after withdrawal: " + ca.getAmount());
    }

}

```

Point.java | ColoredPoint.java | PointApp.java

```java
package point;

public class Point {

    private double x;   // Cartesian
    private double y;   // coordinates

    public Point() {
        x = 0.0;
        y = 0.0;
    }

    // create and initialize a point with given (x, y)
    public Point(double x, double y) {
        this.x = x;
        this.y = y;
    }

    // return Euclidean distance between invoking point p and q
    public double distanceTo(Point other) {
        double dx = this.x - other.x;
        double dy = this.y - other.y;
        return Math.sqrt(dx*dx + dy*dy);
    }

    @Override
    public String toString() {
        return "Point [x=" + x + ", y=" + y + "]";
    }
}

```

Point.java | ColoredPoint.java | PointApp.java

```java
package point;

import java.awt.Color;

public class ColoredPoint extends Point {

    private Color color;

    public ColoredPoint() {
        super();
        color = Color.black;
    }

    public ColoredPoint(double x, double y) {
        this(x, y, Color.black);
    }

    public ColoredPoint(double x, double y, Color color) {
        super(x ,y);
        this.color = color;
    }

    public Color getColor() {
        return color;
    }

    public void setColor(Color color) {
        this.color = color;
    }

    @Override
    public String toString() {
        return "ColoredPoint [color=" + color.toString() + super.toString();
    }
}
```

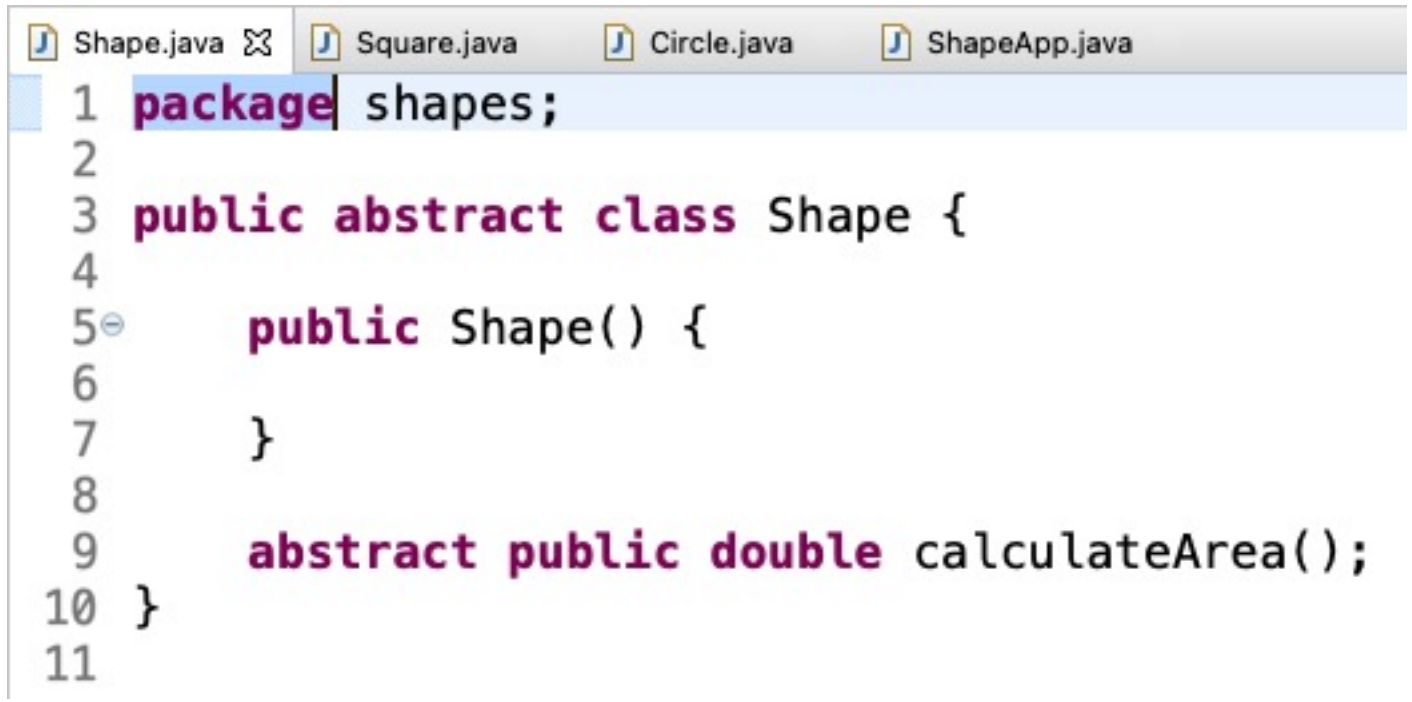
Point.java | ColoredPoint.java | PointApp.java

```java
package point;

import java.awt.Color;

public class PointApp {

    public static void main(String[] args) {

        Point firstPoint = new Point();
        System.out.println("first point: " + firstPoint.toString());

        ColoredPoint secondPoint = new ColoredPoint(3.0, 4.0);
        System.out.println("second point: " + secondPoint.toString());

        secondPoint.setColor(Color.red);
        System.out.println("recolored second point: " + secondPoint.toString());

        System.out.println("distance from first to second point is "
                + firstPoint.distanceTo(secondPoint));

        System.out.println("distance from first to second point is "
                + secondPoint.distanceTo(firstPoint));
    }

}
```

Problems | Javadoc | Declaration | Console

<terminated> PointApp [Java Application] /Library/Java/JavaVirtualMachines/jdk-14.0.1.jdk/Contents/Home/bin/java (Oct 31, 2021, 4:24:49 PM – 4:24:50 PM)

```
first point: Point [x=0.0, y=0.0]
second point: ColoredPoint [color=java.awt.Color[r=0,g=0,b=0]Point [x=3.0, y=4.0]
recolored second point: ColoredPoint [color=java.awt.Color[r=255,g=0,b=0]Point [x=3.0, y=4.0]
distance from first to second point is 5.0
distance from first to second point is 5.0
```


Shape.java
Square.java
Circle.java
ShapeApp.java
1 package shapes;
2
3 public abstract class Shape {
4
5 public Shape() {
6
7 }
8
9 abstract public double calculateArea();
10 }
11

Shape.java | Square.java | Circle.java | ShapeApp.java

```java
package shapes;

public class Square extends Shape {

    private double length;

    public Square(double length) {
        this.setLength(length);
    }

    public double calculateArea() {
        return length * length;
    }

    public double getLength() {
        return length;
    }

    public void setLength(double length) {
        this.length = length;
    }
}

```

Shape.java | Square.java | Circle.java | ShapeApp.java

```java
package shapes;

public class Circle extends Shape {

    private double radius;

    public Circle(double length) {
        this.setLength(length);
    }

    public double calculateArea() {
        return Math.PI * radius * radius;
    }

    public double getLength() {
        return radius;
    }

    public void setLength(double radius) {
        this.radius = radius;
    }

}

```

Shape.java | Square.java | Circle.java | ShapeApp.java

```
1  package shapes;
2
3  public class ShapeApp {
4
5      public static void main(String[] args) {
6
7          Shape[] shapeArray = new Shape[2];
8          shapeArray[0] = new Square(5);
9          shapeArray[1] = new Circle(10);
10
11         for (Shape shape: shapeArray)
12             System.out.println(shape.calculateArea());
13     }
14 }
15
```

Problems | Javadoc | Declaration | Console

<terminated> ShapeApp [Java Application] /Library/Java/JavaVirtualMachines/jdk-14.0.1.jdk/Contents/Home/bin/java (C

```
25.0
314.1592653589793
```