Northern University of Business and Technology Khulna
Department of Computer Science and Engineering

Assignment 1_Polymorphism is Fun

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Polymorphism is Fun

Assume that the following classes have been defined:

```
public class Quadrilateral
{
  public String name = "Quadrilateral";

  public void method1()
  {
    System.out.println("Quadrilateral 1");
  }
   public void method2()
  {
    System.out.println("Quadrilateral 2");
  }
    public void method3()
  {
    System.out.println("Quadrilateral 3");
  }
      public void method4()
  {
    System.out.println("Quadrilateral 4");
  }
    public String toString(){
          this.method4();
          return "This is Quadrilateral Class";
    }
}
```

```
public class Trapezium extends Quadrilateral
{
  public String name = "Trapezium";

  public void method1(){
       System.out.println("Trapezium 1");
  }

  public String toString(){
       return "This is a "+ name;
  }
}
```

```
public class Kite extends Quadrilateral
{
  public String name = "Kite";

  public void method1()
  {
    System.out.println("Kite 1");
  }
   public void method3()
  {
    System.out.println("Kite 3");
  }
    public void method4()
  {
    System.out.println("Kite 4");
  }
}
```

```
public class Parallelogram extends Quadrilateral
{
  public String name = "Parallelogram";

    public void method3()
  {
    System.out.println("Parallelogram 3");
    super.method2();
    method4();
  }
}
```

```
public class Rhombus extends Parallelogram
{
  public String name = "Rhombus";

  public void method1(){
        System.out.println(this);
        System.out.println("Rhombus 1");
  }

  public void method3(){
        super.method2();
        System.out.println("Rhombus 3");
  }

}
```

```
public class Rectangle extends Parallelogram
{
  public String name = "Rectangle";

  public void method2(){
       method4();
       System.out.println("Rectangle 2");
       System.out.println(this);
  }

  public int compareTo(Rectangle a){
       if(a instanceof Rectangle){
            return 1;
       }else{
            return 0;
       }
  }

}
```

```
public class Square extends Rectangle
{
  public String name = "Square";

  public void method1(){
       method3();
       System.out.println("Square 1");
  }

  public void method2(){
       super.method2();
       System.out.println("Square 2");
       method3();
  }
}
```

And assume that the following variables have been defined:

```
Quadrilateral shape1 = new Quadrilateral();
Object shape2 = new Kite();
Quadrilateral shape3 = new Trapezium();
Object shape4 = new Parallelogram();
Parallelogram shape5 = new Rhombus();
Quadrilateral shape6 = new Rectangle();
Parallelogram shape7 = new Square();
Rectangle shape8 = new Square();
```

In the table below, indicate in the right-hand column the output produced by the statement in the left-hand column. If the statement produces more than one line of output, indicate the line breaks with slashes as in "a/b/c" which indicates three lines of output with "a" followed by "b" followed by "c". If the statement causes an error, fill in the right-hand column with either "CT" for "compile time error" or RE for "runtime error" to indicate when the error would be detected.

Statement	Output
`System.out.println(shape1.name);`	`Quadrilateral`
`System.out.println(shape2.name);`	`CT`
`System.out.println(shape3.name);`	`Quadrilateral`
`System.out.println(shape4.name);`	`CT`
`System.out.println(shape5.name);`	`Parallelogram`
`System.out.println(shape6.name);`	`Quadrilateral`
`System.out.println(shape7.name);`	`Parallelogram`
`shape1.method1();`	`Quadrilateral 1`
`shape1.method2();`	`Quadrilateral 2`
`shape1.method3();`	`Quadrilateral 3`
`shape1.method4();`	`Quadrilateral 4`
`shape2.method1();`	`CT`
`shape2.method2();`	`CT`
`shape2.method3();`	`CT`
`shape2.method4();`	`CT`
`shape3.method1();`	`Trapezium 1`

shape3.method2();	Quadrilateral 2
shape3.method3();	Quadrilateral 3
shape3.method4();	Quadrilateral 4
shape4.method1();	CT
shape4.method2();	CT
shape4.method3();	CT
shape4.method4();	CT
shape5.method1();	Quadrilateral 4/This is Quadrilateral Class/Rhombus 1
shape5.method2();	Quadrilateral 2
shape5.method3();	Quadrilateral 2/Rhombus 3
shape5.method4();	Quadrilateral 4
shape6.method1();	Quadrilateral 1
shape6.method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class
shape6.method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
shape6.method4();	Quadrilateral 4
shape7.method1();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4/Square 1
shape7.method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class/Square 2/Parallelogram 3/Quadrilateral 2/ Quadrilateral 4
shape7.method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
shape7.method4();	Quadrilateral 4

System.out.println(shape8.compareTo(shape8));	1
((Quadrilateral) shape1).method1();	Quadrilateral 1
((Quadrilateral) shape2).method1();	Kite 1
((Quadrilateral) shape3).method1();	Trapezium 1
((Quadrilateral) shape4).method1();	Quadrilateral 1
((Quadrilateral) shape5).method1();	Quadrilateral 4/This is Quadrilateral Class/Rhombus 1
((Quadrilateral) shape6).method1();	Quadrilateral 1
((Quadrilateral) shape7).method1();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4/Square 1
((Quadrilateral) shape1).method2();	Quadrilateral 2
((Quadrilateral) shape2).method2();	Quadrilateral 2
((Quadrilateral) shape3).method2();	Quadrilateral 2
((Quadrilateral) shape4).method2();	Quadrilateral 2
((Quadrilateral) shape5).method2();	Quadrilateral 2
((Quadrilateral) shape6).method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class
((Quadrilateral) shape7).method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class/Square 2/Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Quadrilateral) shape1).method3();	Quadrilateral 3
((Quadrilateral) shape2).method3();	Kite 3
((Quadrilateral) shape3).method3();	Quadrilateral 3
((Quadrilateral) shape4).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4

((Quadrilateral) shape5).method3();	Quadrilateral 2/Rhombus 3
((Quadrilateral) shape6).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Quadrilateral) shape7).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Object) shape1).method1();	CT
((Object) shape2).method1();	CT
((Object) shape3).method1();	CT
((Object) shape4).method1();	CT
((Object) shape5).method1();	CT
((Object) shape6).method1();	CT
((Object) shape7).method1();	CT
((Object) shape1).method2();	CT
((Object) shape2).method2();	CT
((Object) shape3).method2();	CT
((Object) shape4).method2();	CT
((Object) shape5).method2();	CT
((Object) shape6).method2();	CT
((Object) shape7).method2();	CT
((Object) shape1).method3();	CT
((Object) shape2).method3();	CT
((Object) shape3).method3();	CT

((Object) shape4).method3();	CT
((Object) shape5).method3();	CT
((Object) shape6).method3();	CT
((Object) shape7).method3();	CT
((Kite) shape1).method1();	RE
((Kite) shape2).method1();	Kite 1
((Kite) shape3).method1();	RE
((Kite) shape4).method1();	RE
((Kite) shape5).method1();	CT
((Kite) shape6).method1();	RE
((Kite) shape7).method1();	CT
((Kite) shape1).method2();	RE
((Kite) shape2).method2();	Quadrilateral 2
((Kite) shape3).method2();	RE
((Kite) shape4).method2();	RE
((Kite) shape5).method2();	CT
((Kite) shape6).method2();	RE
((Kite) shape7).method2();	CT
((Kite) shape1).method3();	RE
((Kite) shape2).method3();	Kite 3

((Kite) shape3).method3();	RE
((Kite) shape4).method3();	RE
((Kite) shape5).method3();	CT
((Kite) shape6).method3();	RE
((Kite) shape7).method3();	CT
((Parallelogram) shape1).method1();	RE
((Parallelogram) shape2).method1();	RE
((Parallelogram) shape3).method1();	RE
((Parallelogram) shape4).method1();	Quadrilateral 1
((Parallelogram) shape5).method1();	Quadrilateral 4/This is Quadrilateral Class/Rhombus 1
((Parallelogram) shape6).method1();	Quadrilateral 1
((Parallelogram) shape7).method1();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4/Square 1
((Parallelogram) shape1).method2();	RE
((Parallelogram) shape2).method2();	RE
((Parallelogram) shape3).method2();	RE
((Parallelogram) shape4).method2();	CT
((Parallelogram) shape5).method2();	Quadrilateral 2
((Parallelogram) shape6).method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class
((Parallelogram) shape7).method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class/Square 2 Parallelogram 3/Quadrilateral 2/Quadrilateral 4

((Parallelogram) shape1).method3();	RE
((Parallelogram) shape2).method3();	RE
((Parallelogram) shape3).method3();	RE
((Parallelogram) shape4).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Parallelogram) shape5).method3();	Quadrilateral 2/Rhombus 3
((Parallelogram) shape6).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Parallelogram) shape7).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Trapezium) shape1).method1();	RE
((Trapezium) shape2).method1();	RE
((Trapezium) shape3).method1();	Trapezium 1
((Trapezium) shape4).method1();	RE
((Trapezium) shape5).method1();	CT
((Trapezium) shape6).method1();	RE
((Trapezium) shape7).method1();	CT
((Trapezium) shape1).method2();	RE
((Trapezium) shape2).method2();	RE
((Trapezium) shape3).method2();	Quadrilateral 2
((Trapezium) shape4).method2();	RE
((Trapezium) shape5).method2();	CT
((Trapezium) shape6).method2();	RE

((Trapezium) shape7).method2();	CT
((Trapezium) shape1).method3();	RE
((Trapezium) shape2).method3();	RE
((Trapezium) shape3).method3();	Quadrilateral 3
((Trapezium) shape4).method3();	RE
((Trapezium) shape5).method3();	CT
((Trapezium) shape6).method3();	RE
((Trapezium) shape7).method3();	CT
((Rhombus) shape1).method1();	RE
((Rhombus) shape2).method1();	RE
((Rhombus) shape3).method1();	RE
((Rhombus) shape4).method1();	RE
((Rhombus) shape5).method1();	Quadrilateral 4/This is Quadrilateral Class/Rhombus 1
((Rhombus) shape6).method1();	RE
((Rhombus) shape7).method1();	RE
((Rhombus) shape1).method2();	RE
((Rhombus) shape2).method2();	RE
((Rhombus) shape3).method2();	RE
((Rhombus) shape4).method2();	RE
((Rhombus) shape5).method2();	Quadrilateral 2

((Rhombus) shape6).method2();	RE
((Rhombus) shape7).method2();	RE
((Rhombus) shape1).method3();	RE
((Rhombus) shape2).method3();	RE
((Rhombus) shape3).method3();	RE
((Rhombus) shape4).method3();	RE
((Rhombus) shape5).method3();	Quadrilateral 2/Rhombus 3
((Rhombus) shape6).method3();	RE
((Rhombus) shape7).method3();	RE
((Rectangle) shape1).method1();	RE
((Rectangle) shape2).method1();	RE
((Rectangle) shape3).method1();	RE
((Rectangle) shape4).method1();	RE
((Rectangle) shape5).method1();	RE
((Rectangle) shape6).method1();	Quadrilateral 1
((Rectangle) shape7).method1();	Parallelogram 3/Quadrilateral 2 /Quadrilateral 4/Square 1
((Rectangle) shape1).method2();	RE
((Rectangle) shape2).method2();	RE
((Rectangle) shape3).method2();	RE
((Rectangle) shape4).method2();	RE

((Rectangle) shape5).method2();	RE
((Rectangle) shape6).method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class
((Rectangle) shape7).method2();	Quadrilateral 4/Rectangle 2/Quadrilateral 4/This is Quadrilateral Class/Square 2 /Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Rectangle) shape1).method3();	RE
((Rectangle) shape2).method3();	RE
((Rectangle) shape3).method3();	RE
((Rectangle) shape4).method3();	RE
((Rectangle) shape5).method3();	RE
((Rectangle) shape6).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Rectangle) shape7).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Square) shape1).method1();	RE
((Square) shape2).method1();	RE
((Square) shape3).method1();	RE
((Square) shape4).method1();	RE
((Square) shape5).method1();	RE
((Square) shape6).method1();	RE
((Square) shape7).method1();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4/Square 1
((Square) shape1).method2();	RE
((Square) shape2).method2();	RE

((Square) shape3).method2();	RE
((Square) shape4).method2();	RE
((Square) shape5).method2();	RE
((Square) shape6).method2();	RE
((Square) shape7).method2();	Quadrilateral 4/Rectangle 2 Quadrilateral 4/This is /Quadrilateral Class/Square 2 Parallelogram 3/Quadrilateral 2/Quadrilateral 4
((Square) shape1).method3();	RE
((Square) shape2).method3();	RE
((Square) shape3).method3();	RE
((Square) shape4).method3();	RE
((Square) shape5).method3();	RE
((Square) shape6).method3();	RE
((Square) shape7).method3();	Parallelogram 3/Quadrilateral 2/Quadrilateral 4