SE3001 – Software Const. & Dev. | Fall 2024

Time Allowed: 15 mins | Date: Sep 10, 2024

Section: _____ | Marks Obtained:

Roll no: _____ | Total Marks: 12

Quiz# 1

Q.1) You have the following code

```
class RealNumber {
    protected double real;
    public RealNumber(double real) {
        this.real = real;
    }
    @Override
    public String toString() {
        return real + ""; // a trick to convert into string
    }
}
class ComplexNumber extends RealNumber {
    private double imaginary;
    public ComplexNumber(double real, double imaginary) {
        this.imaginary = imaginary;
    }
    @Override
    public String toString() {
        return real + ", " + imaginary;
    }
}
```

a. Recall that the base class constructor is always called from within the derived class constructor, whether you write it or not. The above code has a compile time error related to constructors. Remove it. (3 marks)

```
class RealNumber {
…
public RealNumber() {
   real = 0;
}
…
}
OR
public ComplexNumber(double real, double imaginary) {
  super(real);
  …
}
}
```

b. class RealNumber is overriding which class's toString method? (2 marks)

class Object's

c. Create two objects and call functions to demonstrate polymorphism. Mention whether static or dynamic binding will be used. (2 marks)

```
RealNumber n1 = new RealNumber(4);
RealNumber n2 = new ComplexNumber(4, 5);
n1.toString();
n2.toString();
```

Dynamic binding is used for polymorphic code

Q.2) You have the following interface:

```
interface Relatable {
    public boolean isLargerThan(Relatable other);
}
```

a) class RealNumber wants to be Relatable. Mention the code changes that you'll do in RealNumber. (2 marks)

```
interface Relatable {
    public boolean isLargerThan(Relatable other);
    public double getValue(Relatable other);
}

class RealNumber implements Relatable {
…
public boolean isLargerThan(Relatable other) {
   return this.getValue() > other.getValue();
}
…
}
```

b) How can we allow the comparison of real number with complex number? Write code. (3 marks)

ComplexNumber implicitly implements Relatable because it inherits from RealNumber, which implements Relatable. It inherits RealNumber's definition of isLargerThan(). All it has to do is to override isLargerThan() appropriately.