

No. of Pages	4
No. of Questions	4
Total Marks	36
Time	2 hours

Department of Computer Science and Engineering
FINAL EXAMINATION Summer 2019
CSE 111: Programming Language II

- ✓ Write theory teacher's initial (AAR/JNM/MSA/RWB/SEJ/SLI/TRA/WAR) on top of the answer script.
- ✓ Answer all questions. Use back part of the answer script for rough work.
- ✓ Answer questions 1, 2, and 3 at the beginning part of answer script.
- ✓ Write final answers of tracing problems on the question paper.
- ✓ Figure in bracket [] next to each question indicates marks for that question.
- ✓ At the end of exam, put question paper inside answer script and return both.
- ✓ Understanding the question is part of the exam, please do not ask questions. No washroom breaks.

A

Section: _____ ID: _____ Name in CAPITAL: _____

Lab Teacher Name/Initials _____ Lab Room Number _____ Lab Day & Time _____

Question 1 [10 Points] CO9

[Answer on answer script, at the beginning part]

Design the Rectangle and Circle classes so that the following output is printed when we run the Q01 class.

Hint: Rectangle and Circle classes are child classes of Shape

Area of the circle: 12.56
Area of the rectangle: 35.0

```
abstract class Shape {  
    abstract double getArea();  
}  
  
public class Q1 {  
    public static void main(String[] args) {  
        Shape circle = new Circle(2);  
        Shape rectangle = new Rectangle(5, 7);  
  
        System.out.println("Area of the circle:"+circle.getArea());  
        System.out.println("Area of the rectangle:"+rectangle.getArea());  
    }  
}
```

(Detail own)

Question 2 [10 Points] CO 4

[Answer on answer script, at the beginning part]

Given the following classes, complete the code so that the following output is printed when we run the Q2 class.

6.0
13.75

```
public class Q2 {  
    /*  
     * Write your code here  
     */  
    public static void main(String[] args) {  
        System.out.println(product(2,3));  
        System.out.println(product(5.5,2.5));  
    }  
}
```

Question 3 [10 Points] BONUS CO8, CO9

[Answer on answer script, at the beginning part]

Given the following classes, design the **Motorbike** class so that the following output is printed when we run the Q3 class.

Note: **Motorbike** is to be designed based on the **Bike** interface.

Speed: 0
Speed: 60
Speed: 50

```
interface Bike {  
  
    void speedUp(int increment);  
    void applyBrakes(int decrement);  
  
}  
  
public class Q3 {  
    public static void main(String[] args) {  
  
        Motorbike mb = new Motorbike();  
        mb.printStatus();  
  
        mb.speedUp(60);  
        mb.printStatus();  
  
        mb.applyBrakes(10);  
        mb.printStatus();  
  
    }  
}
```

Q6 Claim 1+2+3 (sequentially read)
 - 1st man explanation

Question 4 [10 Points] CO 4

```

public class Person {
    public void sendSMS() {
        System.out.println(this + "Person sendSMS");
    }
    public void sendEmail() {
        System.out.println(this + "Person sendEmail");
    }
    public String toString() {
        return "Person: ";
    }
}

public class Staff extends Person {
    public void sendSMS() {
        System.out.println(this + "Staff sendSMS");
    }
    public void sendEmail() {
        System.out.println(this + "Staff sendEmail");
    }
    public String toString() {
        return "Staff: ";
    }
}

public class PostGradStudent extends Student {
    public void sendSMS() {
        super.sendSMS();
        System.out.println(this + "PostGradStudent sendSMS");
    }
    public void sendEmail() {
        System.out.println(this + "PostGradStudent sendEmail");
    }
    public void depositAllowance() {
        System.out.println(this + "PostGradStudent depositAllowance");
    }
}

public class Student extends Person {
    public void sendEmail() {
        System.out.println(this + "Student sendEmail");
    }
    public void depositAllowance() {
        System.out.println(this + "Student depositAllowance");
    }
}

```

Assume that the following variables have been defined:

```

Person person1 = new Student();
Person person2 = new PostGradStudent();
Student student1 = new Student();
Student student2 = new PostGradStudent();
Staff staff1 = new Staff();
Object obj1 = new Student();

```

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, write either "CT" for "compile time error" or RE for "runtime error" to indicate when the error would be detected.

Statement	Output [answer on question paper]
staff1.sendSMS();	
person1.sendEmail();	
person2.sendEmail();	
student1.sendEmail();	
student2.sendEmail();	
student1.depositAllowance();	
student2.depositAllowance();	
((PostGradStudent)staff1).depositAllowance();	
((Student)person2).depositAllowance();	
((PostGradStudent)obj1).sendEmail();	

Ques 1 + 2 + 3 (sequentially read)

- Unit min \leftarrow explanation

Question 5 [6 Points] COS
[answer on question paper]

```
class Parent {  
    static int q = 10;  
    static int r = 5;  
    int p = 20;  
    public Parent() {  
        ++p;  
        --r;  
    }  
    public void proc(int n, int m) {  
        int p = 1;  
        p += m + (p++);  
        p += 2 + n;  
        r += p + p;  
        System.out.println(r + " " + p);  
    }  
}  
class Child extends Parent {  
    static public int r = 1;  
    public Child(int p) {  
        super.p = p;  
        ++p;  
        r = p + q + 1;  
    }  
    public Child(Parent b) {  
        super.p = b.r;  
        r = b.p;  
    }  
    public void proc(int n, int m) {  
        int q = 2;  
        q += this.q;  
        p = this.q + 2 + r;  
        super.proc(p, q);  
        r = p + q + super.r;  
        System.out.println(r + " " + p);  
    }  
}
```

Consider the following code:
[answer on question paper]

Parent a1 = new Parent(); Child b1 = new Child(8); Child b2 = new Child(b1); b2.proc(1, 51); a1.proc(6, 2);	Output