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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2011/2012**

COURSE NAME : JAVA PROGRAMMING
COURSE CODE : BIT 3383/ BIT 33803
PROGRAMME : BACHELOR OF INFORMATION TECHNOLOGY
EXAMINATION DATE : JANUARY 2012
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS.

THIS QUESTIONS PAPER CONSISTS OF SIX (6) PAGES

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Instruction: Answer ALL questions.

Q1 State **FOUR (4)** characteristics of Java.

(4 marks)

Q2 Given the following class, called `Twinkle`, write some code that creates an instance of the class, initializes its two member variables, and then displays the value of each member variable.

```
public class Twinkle {
    public int anInt;
    public double aDouble;
}
```

(5 marks)

Q3 Consider the following code snippet:

```
int i = 705;
int n = i++%5;
```

- (a) What are the values of `i` and `n` after the code is executed?
- (b) What are the final values of `i` and `n` if instead of using the postfix increment operator (`i++`), the prefix version (`++i`) is used?

(4 marks)

Q4 What are the outputs of the following program:

```
class Star
{
    public static void main(String arg[])
    {
        int i,j;
        for(i=1;i<=6;i++)
        {
            for(j=1;j<=6-i;j++)
                System.out.print(" ");
            for(j=1;j<=2*i-1;j++)
                System.out.print("*");
            System.out.println();
        }
    }
}
```

(4 marks)

Q5 Consider the following two classes:

```
public class ClassA {
    public void methodOne(int i) {}
    public void methodTwo(int i) {}
    public static void methodThree(int i) {}
    public static void methodFour(int i) {}
}

public class ClassB extends ClassA {
    public static void methodOne(int i) {}
    public void methodTwo(int i) {}
    public void methodThree(int i) {}
    public static void methodFour(int i) {}
}
```

- (a) Which method overrides a method in the superclass?
(b) Which method hides a method in the superclass?

(4 marks)

Q6 Determine and justify whether method overloading occurred in the following program.

```
class A {
    public void display() {
        System.out.println("Java");
    }
}

public class B extends A {
    public void display() {
        System.out.println("Hi");
    }
}

class obj1 {
    public static void main (String[] args) {
        B b = new B();
        b.display();
    }
}
```

(4 marks)

Q7 Given the following Java code:

```
switch (beta)
{
    case 3:
        beta = beta + 3;
        beta++;
    case 1:
        beta = beta + 1;
    case 2:
        beta--;
        break;
    case 5:
        beta = beta + 5;
    case 4:
        beta = beta + 4;
}
```

Figure Q7

- (a) Referring to **Figure Q7**, suppose the input is 3 and all variables are declared properly, show each value of `beta` after each related statements in the above Java code is executed. (4 marks)
- (b) Explain **ONE (1)** implication of placing the reserved word `break` in each case statement. (2 marks)
- (c) Modify the above Java code so that only one `case` statement will be executed based on the input. (4 marks)

Q8 Given the following Java code:

```
j = 2;
for (i = 1; i <= 4; i++)
{
    System.out.print(j + " ");
    j = j + 5;
}
System.out.println();
```

Figure Q8

- (a) Show the outputs produced from the Java code in **Figure Q8**? (4 marks)
- (b) Design a flowchart for the Java code in **Figure Q8**. (5 marks)
- (c) Rewrite the above Java code in **Figure Q8** using `do..while` loop that produces the same output. (6 marks)

Q9 Consider the following Java codes:

```
public class FirstClass
{
    private int a;
    private int b;

    public void one(){ }
    public void two(int x, int y){ }
    public FirstClass(){ }
}

public class SecondClass extends First
{
    private int c;

    public void one(){ }
    public SecondClass(){ }
}

FirstClass firstObj;
SecondClass secondObj;
```

Figure Q9

- (a) Identify class name, attributes and operations. (4 marks)
- (b) State **TRUE** or **FALSE** if the private members of `FirstClass` are public members of `SecondClass`. (2 marks)
- (c) Write the definition of the method `two` of `FirstClass` so that the instance variable `a` is initialized to the value of the first parameter of method `two` and the instance variable `b` is initialized to the value of the second parameter of method `two`. (4 marks)

Q10 A class named `Rectangle` contains:

- (i) Two double data fields named `length` and `width` with default values 1.0 to denote the length and width of a rectangle.
 - (ii) A no argument constructor which creates a default rectangle.
 - (iii) A constructor that creates a rectangle with the specified `length` and `width`.
 - (iv) A method named `getArea()` determining the area of the rectangle.
- (a) Draw the UML diagram for class `Rectangle`. (3 marks)
- (b) Write a Java program to implement the class `Rectangle`. (7 marks)

Q11 Explain how polymorphism works in the following Java class programs.

```

class School extends Building {
}

class Building extends Architecture {
public void display(){
    System.out.println("Building");
}
}

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

class obj {
    public static void main (String[ ] args ){
        School school = new School();
        school.display();
        Building building = new Building();
        building.display();
        Architecture architecture = new Architecture();
        architecture.display();
    }
}

```

(10 marks)

Q12 There is a text field at the top of the frame (used to display the results) and a 4 by 4 grid of buttons. A label can also be used to display the results. Create a program using a grid layout to position the digit and operator buttons in a frame as shown in **Figure Q12** below.

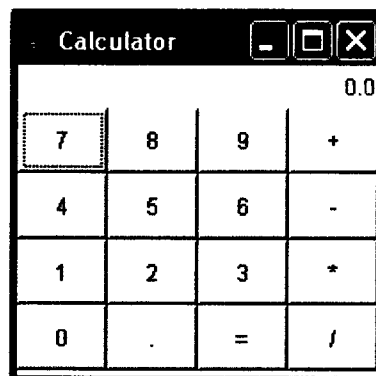


Figure Q12

(20 marks)