UVA WELLASSA UNIVERSITY OF SRI LANKA

DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

END SEMESTER EXAMINATION – SEMESTER I – 2008/2009

CST 201-2 OBJECT ORIENTED DESIGN CONCEPTS & CASE TOOLS

Time Allowed: TWO HOURS **Answer All Questions** **All questions carry equal marks**

(1)

(a) Consider the following Java program

```
public class Question1 {
    public static void main(String[] args) {
        int x, y = 1, z = 0;
        String myStr = "CST";
        boolean yesNo = false;
        switch (x){
            case 0: for(int j=1; j < 5; j++){
                    if (j==3)continue;
                    y = y + 2;
                    } break;
            case 1: if (yesNo == true) y = 20;
                    else y = 40;
                    break;
            case 2: z = 23 % 12;
                    break;
            case 3: z = 15 / 8 * 8;
            deafult : myStr = "UWU";
        }
    }
}
```

Fill in the following table for each initial value of x

	x	y	z	yesNo	myStr
(i)	0				
(ii)	1				
(iii)	2				
(iv)	3				
(v)	6				

10 Marks

(b) Consider the following Java class which from part of a program. Note that line numbers are included for reference purposes.

```
1.  class Vehicle {
2.      String model, make;
3.      private int fuelTankCapacity;
4.      protected int currentFuelVolume;
5.  Vehicle (){
6.      model = "unknown";
7.      make = "unknown";
8.  }
9.  Vehicle (String  newModel){
10.     model = newModel;
11. }
12. }
13. public class Car extends Vehicle{
14. Car (String newModel){
15.     super (newModel);
16. }
17. public static void main (String args[]){
18. }
19. }
```

Consider the following actions in relation to the above class. Write down whether the effect of what is inserted details result in a valid or invalid program. If it is incorrect, give your reason why it is incorrect. Consider each item to be an independent item applied to the original code given. i.e. effect of one item on the code should not be considered when answering when subsequent items.

(i) Insert the following code segment after line 1

```
public Vehicle (String newMake){
    make = newMake;
}
```

(ii) Insert the following code segment after line 17

```
Car c1 = new Car();
c1.make = "Toyota";
```

(iii) Insert the following code segment after line 17

```
Car c1 = new Car ("Nissan", "Sunny");
Vehicle v1;
v1 = c1;
```

(iv) Insert the following code segment after line 17

```
Car c1 = new Car ("Nissan", "Sunny");
c1.fuelTankCapacity = 50;
c1.currentFuelVolume = 15;
```

12 Marks

(c) Explain the difference between "Method Overloading" and "Method Overriding" using suitable illustration(s).

3 Marks

(2)

(a) Can an applet make network connections to any host on the Internet ?
Can an applet read or write to the local file system ?

2 Marks

(b) Consider the following segment of code

```
import java.awt.Graphics;
import java.awt.Font;
import java.awt.Color;

public class HelloApplet extends java.applet.Applet{
    int number;

    public void init(){
        number = 1;
    }
    public void start(){
        number = 25;
    }
    public void paint (Graphics g){
        g.drawString("The number is " + number++, 10, 20);
    }
}
```

(i) Write the steps required to view the result of running the above program in a browser.

5 Marks

(ii) What is the output of the program?

5 Marks

(iii) Assume that the user minimize the browser window and maximize it again. What would be result displayed on the screen ?

5 Marks

(c) Explain the event handling mechanism used in Java to handle user input.

8 Marks

(3) The following class was developed by a programmer to represent a geometric shape as part of a simple drawing program written in Java. Assume that the main functions required for any geometric figure are the ability to draw it on the screen and the ability to move it to a different place. Note that line numbers are included for reference purposes.

```
public abstract class Shape {
    int xPos, yPos;
    String color;
    abstract void draw();
    abstract void move(int newX, int newY);
}
```

(a) What is the purpose of declaring a class as abstract? 5 Marks

(b) What are the main effects of declaring a class as an abstract class? 5 Marks

(c) The programmer wishes to create the two figures "rectangle" and "square" declare sub-classes of the class Shape to represent a rectangle and a square. Include the definition and implementation of any methods that you define.

5 Marks

(d) The programmer later modified the class Shape as follows:

```
public abstract class Shape {
    int xPos, yPos;
    String color;
    abstract void draw();
    abstract void move(int newX, int newY){
        xPos = newX;
        yPos = newY;
    }
}
```

Comment on the validity of the modification. 5 Marks

(e) What is the difference between an **abstract class** and an **interface**? 5 Marks