King Fahd University of Petroleum & Minerals

College of Computer Science and Engineering

Information and Computer Science Department

First Semester 091 (2009/2010)

ICS 201 – Introduction to Computing II

Major Exam 2

Thursday, 31th December, 2009

Time: 120 minutes

Name: _____

ID#: _____

Please circle your section number below:

Section	03	05	04	06
Instructor	Tarek	Sami	Sukairi	Sukairi
Day and Time	SMW 9 - 9:50	SMW 8 -8:50	SMW 10 - 10:50	SMW 13:10 – 14:00

Question #	Maximum Mark	Obtained Mark
1	5	
2	25	
3	20	
4	25	
5	25	
Total	**100**	

Question 1 [5 marks]

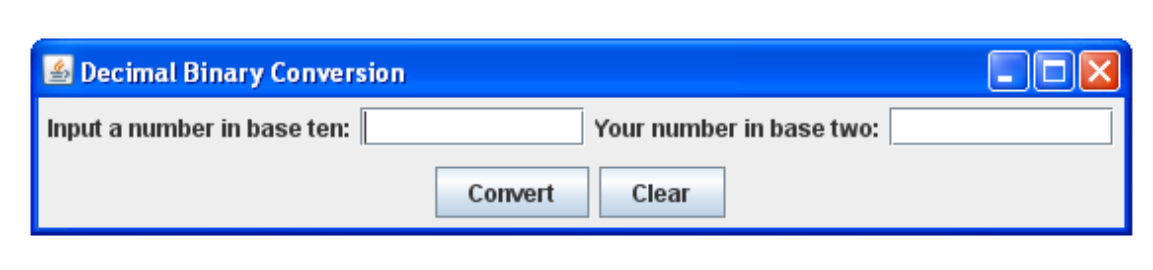
(a) What is the difference between the classical compilation model (C, C++, etc.) and the Java compilation model? **[3 marks]**

(b) Can a Java program be executed without a JVM? (Justify your answer) **[2 marks]**

Question 2 [25 marks]

Write a program that converts integers from base ten (decimal) notation to base two notation. Use Swing to perform input and output via a window interface. The user enters a base ten numeral in one text field and clicks the button "Convert"; the equivalent base-two numeral then appears in another text field. Be sure to label the two text fields. Include a "Clear" button that clears both text fields when clicked. Implement only decimal to binary conversion (not binary to decimal conversion).

The GUI should look like the following:



Hint 1: include a private method that converts a string from a base ten numeral to the string for the equivalent base two numeral.

Hint 2: The binary representation of 14 is 1110 and it is computed as follows:

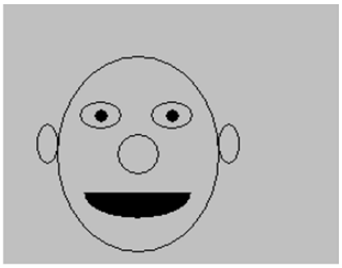
14 % 2 = **0**,
(14 / 2 = 7)
7 % 2 = **1**,
(7 / 2 = 3)
3 % 2 = **1**,
(3 / 2 = 1)
1 % 2 = **1**,
(1 / 2 = 0).

(Start the code in the next page)

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionListener;
import java.awt.event.ActionEvent;

public class Converter extends JFrame implements ActionListener {



public Converter (){









  }

  public void actionPerformed(ActionEvent e)
  {









  }
```

```
  public static void main(String[] args)
  {
    Converter c = new Converter();
    c.setVisible(true);
  }
}
```

Question 3.1: Fill the empty lines of the following applet class with the Java statements to draw the required parts of the following figure and its background. You should set your own coordinates on the figure and use them in drawing. **[15 marks]**



```
import java.awt.*;
import java.applet.*;
public class Face extends Applet
{
    public void paint(Graphics g)
    {
                                                    // background rectangle
                                                    // Change the colour
                                                    // fill background rectangle
                                                     // head
                                                    // left eye
                                                    // right eye
                                                    // change the colour
                                                    // pupil (left)
                                                    // pupil (right)
                                                    // nose
                                                    // mouth
                                                    // left ear
                                                    // right ear
}
```

Question 3.2: Consider the following Java application code. Provide the changes to make your code works as an applet. You do not have to rewrite the code; you can omit/comment or replace some parts. [**5 marks]**

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class Test_Exam_091 {
        public static void main(String[] args) {
                new MyFrame();
        }
}
class MyFrame extends JFrame implements MouseListener{
        public MyFrame() {
           setTitle("Playing With The Mouse!");
           setSize(400, 400);
           setResizable(false);
           setVisible(true);
           addMouseListener(this);
           setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
           show();
        }
        public void mouseEntered(MouseEvent me) {
            System.out.println("Mouse entered at: (" + me.getX() + ", " + me.getY() +")");
        }
        public void mouseExited(MouseEvent me) {
           System.out.println("Mouse exited at: (" + me.getX() + ", " + me.getY() +")");
        }
        public void mouseClicked(MouseEvent me) {
          System.out.println("Mouse clicked at: (" + me.getX() + ", " + me.getY() +")");
        }
        public void mousePressed(MouseEvent me) {
           System.out.println("Mouse pressed at: (" + me.getX() + ", " + me.getY() +")");
        }
        public void mouseReleased(MouseEvent me) {
          System.out.println("Mouse released at: (" + me.getX() + ", " + me.getY() +")");
        }
} // End of MyFrame class
```

Question 4 [25 marks]

Consider the following Java Applet:

(a) Write the Java program **MoveText.java** for the above applet. **[20 marks]**

Description of the program:

Whenever the user clicks inside the frame of the applet, the string "ICS-201" gets printed

- in random colors,
- in Times New Roman font with random size ranging from 10-50.
- At the locations of the mouse click.

Do not draw the arrow and the text "User clicks here". They are only shown for explanation.

(b) Write an HTML file for running the applet. Name your applet as **MoveText.java**. Take the width and height to be 200 each. **[5 marks]**

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Question 4 [25 marks]

Write a GUI program that animates a four-colored "beach ball" in place by rotating the colors. The beach ball can be drawn as a solid circle with four different colors in each of the four quadrants of the circle. Use a thread to rotate the colors every quarter second.

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