

Please fill in your Student Number and Name.

Student Number : _____

Name:

Student Number:

University of Cape Town ~ Department of Computer Science
Computer Science 1016S ~ 2008
Supplementary Test 3

Question	Max	Mark	Internal	External
1	7			
2	13			
3	10			
TOTAL	30			

Marks : 30
Time : 40 minutes
Instructions:

- a) Answer all questions.
- b) Write your answers in the space provided.
- c) Show all calculations where applicable.

Question 1: Data Structures [7]

a) What is **preorder** processing of a binary tree? What is **postorder** processing of a binary tree? [3]

b) State how the efficiency of searching a balanced binary search tree compares to that of searching a singly linked list, where both have 15 items stored in them. How is this efficiency affected by the order in which items arrive at the binary search tree? [4]

Question 2: GUIs [13]

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

public class TextFieldDemo extends JFrame
{
    public static final int WIDTH = 400;
    public static final int HEIGHT = 200;
    public static final int NUMBER_OF_CHAR = 30;

    private JTextField info;

    public static void main(String[] args)
    {
        TextFieldDemo gui = new TextFieldDemo( );
        gui.setVisible(true);
    }

    public TextFieldDemo( )
    {
        super("Text Field Demo");
        setSize(WIDTH, HEIGHT);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new GridLayout(2, 1));

        JPanel infoPanel = new JPanel( );
        infoPanel.setLayout(new BorderLayout( ));

        info = new JTextField(NUMBER_OF_CHAR);

        infoPanel.add(info, BorderLayout.SOUTH);
        JLabel infoLabel = new JLabel("Enter your information here:");
        infoPanel.add(infoLabel, BorderLayout.CENTER);

        add(infoPanel);

        JPanel buttonPanel = new JPanel( );
        buttonPanel.setLayout(new FlowLayout( ));
        JButton actionButton = new JButton("Print");
        buttonPanel.add(actionButton);

        JButton clearButton = new JButton("Clear");
        buttonPanel.add(clearButton);

        add(buttonPanel);
    }
}
```


Question 3: Ethics [10]

- a) Why does James Moor believe that Computer Ethics forms a new field of problems for ethics? [4]

- b) Discuss the two fundamentally different ways of tackling the ethical problem of how one should *act*. In other words what are the two different action-based approaches to ethics? Name them, say what they are about and then give an example of how they might lead to different conclusions about how to act. [6]
