

University of Cape Town
Department of Computer Science

Computer Science CSC116S

Test 2 - 14 September 2005

- Answer all questions.
- All questions that refer to elements of programming make reference to the Java programming language as studied in class.
- Good luck !

Marks: 30

- Approximate marks per question are shown in brackets

Time: 40 minutes

- The use of calculators is permitted

NAME:

Surname	Initials
---------	----------

STUDENT NO: **COURSE CODE:**

This paper consists of 3 questions and 7 pages (including this cover page).

Mark Allocation							
Quest	Marks	Internal	External	Quest	Marks	Internal	External
1	[12]			3	[8]		
2	[10]						
Total				Total			
Grand Total							
Final Mark							
Internal Examiner:				External Examiner:			

Section 1. Graphical User Interfaces

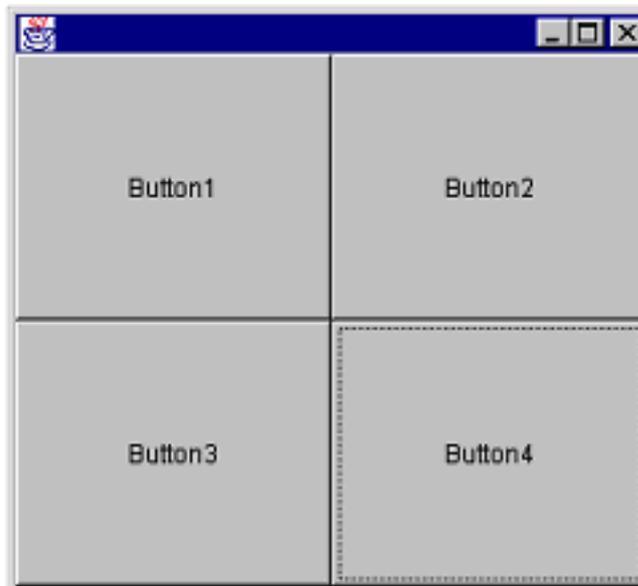
Question 1. [12 marks]

a) Draw the component hierarchy diagram for the figure below.

[1]



b) Using GridLayout Manager please write the Java code to implement the GUI below.



Preorder

[2]

Postorder

[2]

Inorder

[2]

- c) Given an empty binary search tree of integers, show the structure of the tree after each of the values 5, 2, 4, 7, 8, 1, 3 is inserted. Show the steps not just the final solution. [2]

Section 3. Graphics in Java

Question 3. [8 marks]

For the following questions, assume the Java2D graphics primitives:

Arc2D.Float (x, y, width, height, start, extent, type)

Ellipse2D.Float (x, y, width, height)

Line2D.Float (x1, y1, x2, y2)

Rectangle2D.Float (x, y, width, height)

RoundRectangle2D.Float (x, y, width, height, arcwidth, archeight)

- a) Draw the figure that results from the following sequence of drawing statements in Java2D.

```
canvas.draw (new RoundRectangle2D.Float (100, 100, 200, 200, 5, 5));  
canvas.draw (new Line2D.Float (100, 130, 300, 130));  
canvas.draw (new Rectangle2D.Float (275, 105, 20, 20));  
canvas.draw (new Line2D.Float (278, 108, 292, 122));  
canvas.draw (new Line2D.Float (278, 122, 292, 108));  
canvas.draw (new Ellipse2D.Float (105, 105, 20, 20));
```

[6]

- b) Why must we use the paintComponent method to draw graphics instead of drawing them from the containing Frame's constructor?

[2]