University of Cape Town
Department of Computer Science

Computer Science CSC115F

Supplementary Exam

- 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: 25

Time: some minutes

- Approximate marks per question are shown in brackets

- The use of calculators is permitted

NAME: | Surname | Initials |

STUDENT NO: | | **COURSE CODE:** CSC

This paper consists of 2 questions and 5 pages (including this cover page).

Mark Allocation							
Quest	Marks	Internal	External	Quest	Marks	Internal	External
1	[10]			2	[15]		
	Total				Total		

	Internal	External
Grand Total		
Final Mark		

Internal Examiner:	**External Examiner:**

Section 1. Basic Java Concepts

Question 1.   **[10 marks]**

Study the following program and answer the questions that follow.

```
public class someprogram
{
public static void main (String [] args)
   throws java.io.IOException
{
int a = Keyboard.readInt ("Enter a number: ");
int b = 0;

while ( a != 0)
{
int digit = a % 10;
a = a / 10;
b = (b * 10) + digit;
}

System.out.println (b);
}
}
```

  a) What is a **method**?   [2]

  _____

  _____

  b) Is *digit* an instance variable or a local variable? Briefly explain why you believe
     this is so.   [2]

  _____

  _____

  _____

  c) What is the output of the program if the input is "123"? In general, what does this
     program do?   [2]

  _____

  _____

  _____

  d) The program will not work for numbers of 12 digits. How can it be modified to
     allow for this?   [2]

  _____

e) Assuming you want to use statement coverage as a testing approach, provide a set
   of test values to be used as input.   [2]

Section 2. Problem Solving

Question 2.   **[15 marks]**

a) Complete the following program to draw an inverted right-handed right-angle tri-
angle of height *height* on the screen in text mode, similar to the one depicted:
[7]

```
****
 ***
  **
   *

public class tri
{
   public static void main ( String [] args )
      throws java.io.IOException
   {
      int height = Keyboard.readInt("Enter height: ");

      // write your code here







   }
}
```

b) Write a method **calcChange** to calculate the minimum number of each coin needed to sum up to a given amount. For example, the change for 41c is 2x20c and 1x1c, instead of 7x5c and 3x2c. Use the variables already defined to store the numbers of each coin. Assume the largest denomination is 50c. [8]

```
public class change
{
   public static void main ( String [] args )
   {
      changeCalc s = new changeCalc ();
      s.calcChange (10);
      s.calcChange (26);
      s.calcChange (74);
   }
}

class changeCalc
{
   public void calcChange ( int amount )
   {
      int c50, c20, c10, c5, c2, c1;

      // write your code here
```

```
      System.out.println ("50c:" + c50 + " 20c:" + c20 +
                          " 10c:" + c10 + " 5c:" + c5 +
                          " 2c:" + c2 + " 1c:" + c1);
   }
}
```