

Please fill in your Student Number and Name.

Student Number : _____

Name:

Student Number:

University of Cape Town ~ Department of Computer Science
Computer Science 1015F ~ 2008
Test 1

Question	Max	Mark	Internal	External
1	10			
2	10			
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 [10]

a) Match each of the following computing devices to a concept below: [2]

abacus, slide rule, difference engine, punched cards

- _____ logarithms
- _____ lots of friction
- _____ census
- _____ balls and rods

b) What are the 5 main components of the Von Neumann architecture? [2]

c) Why is a dual-core CPU not exactly Von Neumann? [1]

d) What is the difference between an algorithm and a computer program? [2]

e) What is a compiler? [1]

f) What is the primary advantage of Java bytecode, as opposed to machine code? [1]

g) Provide 2 examples of low level programming languages. [1]

Question 2 [10]

Consider the following program and answer the questions that follow.

```
import java.util.Scanner;

class test
{
    public static void main ( String [] args )
    {
        Scanner input = new Scanner (System.in);

        int a = input.nextInt();
        int b = input.nextInt();
        int c = input.nextInt();

        float x = (a+b+c)/3;

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

a) What does this program do? [2]

b) What is the output if the input is the numbers 3, 5 and 5? [1]

c) Give an example of an identifier from the program. [1]

d) Give an example of a name that is not a legal identifier in Java. [1]

e) How would you fix the calculation of the variable **x** so that the answer is not rounded off? [1]

f) Give an example of the name of a variable that contains an object in the program. [1]

g) What is a method? [1]

h) Although this program will compile and run, what critical element is missing? [1]

i) If a program does not compile, what type of error probably exists in the program? [1]

Question 3 [10]

- a) Briefly describe an algorithm to buy bread from a supermarket. Assume you are already in the supermarket. There should be at most 6 steps. [3]

- b) Write the Java statement to input the number of loaves to buy into the variable **N**. You may assume **N** is already declared as an int and there is already a Scanner object named **input**. [2]

- c) Write the Java statement to calculate **totalPrice** as the price of **N** loaves of bread at a cost of **pricePerLoaf** for each loaf. You may assume **totalPrice** and **pricePerLoaf** are already declared as float variables and **N** is declared as an int. [1]

- d) Write the Java statement to output "Pay for bread now". [2]

- e) Briefly describe an algorithm to minimise the cost of packets you need at the supermarket when you buy a month's groceries. [2]
