Name:

_____

_____

Student Number:

_____

Please fill in your Student Number and 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

slide rule = logarithms

difference engine = lots of friction

punched cards = census

abacus = balls and rods [½ x 4]

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

Control Unit, Arithmetic Logic Unit, Memory, Input, Output [-½ for any missing]

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

it executes instructions in parallel, it has 2 control units, etc.

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

an algorithm is any sequences of instructions but a program is a sequence of instructions given to a computer

e) What is a compiler? [1]

translates high level language to low level language

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

bytecode is platform independent, can be run anywhere, etc.

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

machine code [½], assembly language [½]

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]

calculates the average of 3 integers

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

4

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

a,b,c,x,main,test ...

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

123,+1+2, etc.

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

change 3 to 3.0f (exactly 3.0f, not 3.0)

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

System.out, input

g) What is a method? [1]

named sequence of instructions (in a class)

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

comments

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

syntax error

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]

find aisle with bread, pick up bread, take bread to cashier, wait in queue until your turn, give bread to cashier, pay for bread when asked

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]

N = input.nextInt();

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]

*totalPrice = N * pricePerLoaf;*

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

System.out.println ("Pay for bread now");

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

Take enough of your own reusable packets!