

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

Supplementary 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]
IBM PC = standardised component interconnection
analytical engine = Babbage
punched cards = loom
ENIAC = vacuum tubes [$\frac{1}{2} \times 4$]
- b) What is the difference between computer hardware and computer software? [2]
hardware is the physical parts while software is the instructions
- c) What is the difference between RAM and ROM? [2]
RAM is volatile while ROM is not
- d) Why can computers not directly understand human language? [1]
ambiguous, vague, etc.
- e) What is a computer program? [1]
sequence of instructions given to a computer
- f) What does the Java Virtual Machine do? [2]
interprets Java bytecode OR converts bytecode to machine code and executes it

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 = Math.min (Math.min (a,b), c);

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

- a) What does this program do? [2]
calculates the minimum of 3 integers
- b) What is the output if the input is the numbers 3, 3 and 5? [1]
3
- c) Give an example of an identifier from the program. [1]
a,b,c,x,main,test ...
- d) How would you change the program so it performs the same task on 4 numbers instead of 3?[2]
add a variable d [1/2], input the value of d [1/2] and change the "c" in the calculation of x to Math.min (c,d)
- e) Give an example of the name of a method from the program. [1]
main, println, etc.
- f) In object-oriented programming, what is an object? [1]
computer representation of real world object, data+methods, etc.
- g) Although this program will compile and run, what critical element is missing? [1]
comments

h) If a program compiles, but gives you the wrong answer, what type of error probably exists in the program? [1]

logic error

Question 3 [10]

- a) Briefly describe an algorithm to boil water on the stove in a pot. Assume you are in the kitchen. There should be at most 6 steps. [3]

get a pot, fill it with water, place it on the stove, turn stove on, wait until water boils, turn stove off

- b) Write the Java statement to input the number of cups of tea to make 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 **totalWater** based on **N** - the number of cups of tea - and **waterPerCup** - the amount of water per cup. You may assume **totalWater** and **waterPerCup** are already declared as float variables and **N** is declared as an int. [1]

*totalWater = N * waterPerCup;*

- d) Write the Java statement to output “Water is boiled - make tea now”. [2]

System.out.println (“Water is boiled – make tea now”);

- e) Briefly describe an algorithm to minimise the time taken to boil water for tea. Assume you are using a pot on a stove. [2]

Make less (or no) tea., or boil just enough water for the tea you are making. Less tea = less time to boil!