University of Cape Town ~ Department of Computer Science

Computer Science 1015F ~ 2009

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) What is the difference between computer hardware and computer software?   [2]

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b) What is the purpose of the CPU in a typical Von Neumann architecture?   [1]

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c) What is a variable?   [1]

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

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e) Why are modern computer programs written in high level languages?   [1]

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f) Give 3 examples of high level programming languages other than Java.   [1]

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g) JGrasp is an example of an IDE. Briefly explain what an IDE is.   [2]

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Question 2 [10]

Consider the following program and answer the questions that follow.

```java
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();

      if (a % b == 0)
         System.out.println ("yes");
      else
         System.out.println ("no");
   }
}
```

a) What is the output of this program if the input is the numbers 8 and 4?   [1]

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b) Give an example of an identifier, that is not the name of a variable, from the program.   [1]

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c) What real-world hardware does the **out** object correspond to?   [1]

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d) What is the purpose of the **println** method?   [1]

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e) In general, what is the purpose of an **if** statement.   [1]

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f) In the if statement above, there are no curly braces – why is this not a problem?   [1]

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g) What is the dangling else problem?   [2]

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h) Comments are missing in this program. Write out typical comments to be inserted at the top of the program.   [2]

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Question 3 [10]

a) Briefly describe an algorithm to find both the maximum and minimum of a set of 3 integers. You may write a textual description of the solution or a fragment of a program. Assume the numbers have been input already and are stored as variables a, b and c. Do not assume the existence of algorithms/methods to find the minimum or maximum of 3 numbers! [3]

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b) Write the Java statement to input the first integer into the variable **a**. You may assume **a** is already declared as an int and there is already a Scanner object named **scan**. [1]

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c) Write the Java statement to calculate **minimum** as the minimum of the 2 floating point values **a** and **b**. You may assume **a**, **b** and **minimum** are already declared as float variables. [2]

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d) Write the Java statement to output "The minimum is " followed by the value of the variable **minimum**. [2]

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e) Is your algorithm the most efficient solution? Explain why or why not. [2]

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