Please fill in your Student Number and, optionally, Name.	For Official Use
Student Number : _____	**Mark** : _____
Name : _____	**Marker** : _____

University of Cape Town ~ Department of Computer Science

Computer Science 1015F ~ 2007

Theory Test 1A Solution

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: Introduction to Computing [10]

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

Hardware refers to the physical parts of the computer [1] while software refers to the programs and data. [1]

b) What is the purpose of each of the following hardware components of a modern computer: [2]

i. CPU

Executes instructions and performs computation/calculation [1]

ii. Hard drive

Stores programs and data permanently [1]

c) What is the difference between a low-level language and a high-level language? [2]

Low level languages are understood more easily by machines [1] while high level languages are understood more easily by humans. [1]

d) Give 2 examples of low-level programming languages. [1]

Machine language [1/2], assembly language [1/2]

e) In your own words, describe an algorithm for answering this test paper. List at most 6 steps. [3]

1 Write name and student number on front cover

2 Open to first question

3 Read question and ponder on answer

4 Write answer

5 If there are still unanswered questions, repeat steps 3-4 for next unanswered question

6 Close test paper and hand in when time is up

(marks: 3- reasonable algorithm, 2- some steps are unclear, 1- some idea but mostly unclear, 0-no clear steps in the algorithm)

Question 2: Multiple Choice. [10]

For each question, write down just the letter of the correct answer.

a) The Java compiler: [1]

A. Translates object code to source code.

B. Is another name for the Java Virtual Machine.

C. Translates byte-code into machine language.

D. Translates source code into object code.

D

b) Examine the following Java expression: [1]

```
char initial = 'M';
```

The ***identifier*** in this expression is:

A. 'M'

B. char

C. initial

D. ;

C

c) Examine the following Java expression: [1]

```
char initial = 'M';
```

The ***constant*** in this expression is:

A. 'M'

B. char

C. initial

D. ;

A

d) Which of the following Java expressions shows an example of *initializing a variable*? [1]

A. int count = 15;

B. interest *= 2.2;

C. count= (int) interest;

D. count++;

A

e) Which of the following Java expressions shows an example of *type casting*? [1]

A. int count = 15;

B. interest *= 2.2;

C. count= (int) interest;

D. count++;

C

f) Which of the following Java expressions shows *the increment operator* ? [1]

A. int count = 15;

B. interest *= 2.2;

C. count= (int) interest;

D. count++;

D

g) Which of the following operators has the *highest precendence*? [1]

A. --
B. *
C. %
D. A and C

A

h) Examine the following Java expression:

```
String str1 = "Buffy the vampire slayer";
```

What is the ***object*** in this expression? [1]

A. "Buffy the vampire slayer"
B. String
C. str1
D. ;

C

i) Examine the following Java expression:

```
double mystery =  5/2 + 3.0/2.0;
```

What will be the value of `mystery` after executing this expression? [1]

A. `3.5`
B. `2.75`
C. 4.0
D. none of the above

A

j) Which of the following people was the first Computer Science Man of the Year? [1]

A. Charles Babbage
B. Alan Turing
C. Grace Hopper
D. Howard Aiken

C

Question 3: Java Basics [5]

a) What is *byte-code*? [1]

Byte-code is the machine language for a ficticious compute/Java Virtual Machine

b) Explain briefly why Java byte-code makes a Java program very portable. [2]

"compile-once, run anywhere". After you compile a Java program into byte-code , you can run it on any computer that has a Java Virtual Machine installed without recompiling

c) Explain the difference between a *class* and an *object*, giving an illustrative example of each. [2]

A class is a category of objects. Objects store data and can take actions. (or similar) [1]

e.g. Orc pedro; Orc is the class, pedro an object of the class.

Question 4: Strings [5]

For each question below, write down just the output produced by the listed lines of program code.

a)
```
String greeting = "Hey diddle diddle!";
String testStr = "did";
int count = greeting.indexOf(testStr);
System.out.println("The string is at " + count);
```
[2]

"The string is at 4"

(1/2 for getting position wrong by 1)

b)
```
str1+=str1;
System.out.println(str1);
str1 += str2;
System.out.println(str1);
int count = str1.length();
System.out.println("Size:" + count);
```
[3]

BaBa

BaBaNa

Size:6

(One mark for each correct line)