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Student Number : _____

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University of Cape Town ~ Department of Computer Science

Computer Science 1015F ~ 2007

Supplementary 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) Name two non-electrical historical computing devices and describe what each was used for. [4]

Abacus [1] – did basic arithmetic [1]

Slide rule [1] – provided answers to pre-calculated logarithms and other functions. [1]

etc.

- b) In a modern electrical computer, what is the purpose of the Operating System? [1]

Manages the resources and applications.

- c) What is the difference between an algorithm and a program? [2]

An algorithm is any set of steps to accomplish a task, while a program is an algorithm specified for a computer.

- d) In your own words, describe an algorithm for making a telephone call using a fixed line (i.e., not a cellphone). List at most 6 steps. [3]

1- Pick up receiver

2- Check for a dial tone – if there is no dial tone, put down receiver and start again

3- Dial number

4- Wait for call to be answered

5- Talk to person

6- Put down receiver

(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) A “.class” file is written in:

[1]

- A. byte-code
- B. machine language
- C. Java
- D. source code

Answer: A

b) The Java interpreter:

[1]

- A. Translates object code to source code.
- B. Is a low-level language
- C. Translates byte-code into machine language.
- D. B and C

Answer: C

c) Examine the following Java expression:

[1]

```
System.out.println("Hello world!");
```

The *method* in this expression is:

- A. “Hello world”
- B. System.out
- C. println
- D. ;

Answer: C

- d) Which of the following Java expressions shows an example of *initializing a variable*? [1]
- A. String str1;
 - B. str1="New York";
 - C. int count = str1.length();
 - D. System.out.println(str1+str1+count);

Answer: C

- Which of the following Java expressions shows an example of *concatenation*? [1]
- A. String str1;
 - B. str1="New York";
 - C. int count = str1.length();
 - D. System.out.println(str1+str1+count);

Answer: D

- e) Which of the following Java expressions shows an example of a *primitive type*? [1]
- A. String str1;
 - B. str1="New York";
 - C. int count = str1.length();
 - D. System.out.println(str1+str1+count);

Answer: C

- f) Examine the following Java expression:

```
double mystery = 3/2 + 5/2.0;
```

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

- A. 3.5
- B. 3.0
- C. 4.0
- D. none of the above

Answer: A

- g) Which of the following operators has the *highest precedence*? [1]
- A. --
 - B. *
 - C. ++
 - D. A and C

Answer: D

- h) Which of the following expressions shows an example of a syntax error? [1]
- A. `Int j = 15;`
 - B. `int i = 5.5;`
 - C. A and B
 - D. none of the above

Answer: C

- i) Examine the following Java expression: [1]
- ```
int mystery = (int)2.5 * 5 % 2;
```
- What will be the value of `mystery` after executing this expression?
- A. 2.5
  - B. 2
  - C. 0
  - D. none of the above

Answer:   C  

- j) Which of the following people designed a “Difference Engine”? [1]
- A. Charles Babbage
  - B. Alan Turing
  - C. Grace Hopper
  - D. Howard Aiken

Answer:   A

### Question 3: Java Basics [5]

a) What is *Unicode*? [2]

*A character set used by the Java language that includes all the ASCII characters plus many of the characters used in languages with a different alphabet from English (or similar answer)*

b) Explain briefly the difference between syntax errors, runtime errors and logic errors. [3]

*Syntax error: A grammatical mistake in a program, detected by the compiler.*

*Run-time error: An error that is not detected until a program is run*

*The compiler cannot detect these errors: an error message is not generated after compilation, but after execution*

*Logic error: A mistake in the underlying algorithm for a program*

*The compiler cannot detect these errors, and no error message is generated after compilation or execution, but the program does not do what it is supposed to do*

#### Question 4: Strings [5]

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

a) `String greeting = "Mr";`  
`String testStr = "Toad";`  
`System.out.print(greeting.length());`  
`System.out.println(testStr.length());`

[2]

Answer:

24

*(only ½ if put 2 ad 4 on separate lines)*

```
String greeting = "Mr";
String testStr = "Toad";
int count = 0;
System.out.println(count);
count=greeting.length();
System.out.println(count);
System.out.println(testStr.charAt(count));
```

[3]

0  
2  
a

*(one mark for each correct line of output)*

