

Please fill in your Student Number and, optionally, Name.

Student Number : _____

Name : _____

University of Cape Town ~ Department of Computer Science

Computer Science 1015F ~ 2007

Supplementary Theory Test 2A

Question	Mark	Max	Initials
1		4	
2		4	
3		12	
4		5	
5		5	
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: Multiple Choice. [4]

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

a) The Java branching mechanisms are:

[1]

- A. `if-else` statements
- B. `switch` statements
- C. `while` statements
- D. A and B

Answer: _____

b) A mystery Java operator, called '☆', has the following truth table:

[1]

A	B	A☆B
true	true	true
true	false	true
false	true	true
false	false	false

This operator is actually:

- A. `!`
- B. `||`
- C. `&&`
- D. None of the above

Answer: _____

c) Which of the following operators has the *highest precedence*?

[1]

- A. `!`
- B. `||`
- C. `&&`
- D. `==`

Answer: _____

d) Examine the following Java code:

[1]

```
boolean A=false, B=false, C=false, D=true;  
System.out.print( ! D || C);  
System.out.print(A || B == C && D);
```

When executing this code, the output is:

- A. true>true
- B. true>false
- C. false>true
- D. false>false

Answer: _____

Question 2: Selection and Iteration I [4]

a) What is *short-circuit evaluation* and why is it useful?

[2]

a) Write down the exact output of the following code.

```
public static void main(String[] args)
{
    int a = 3;
    switch (a)
    {
        case 2:
            System.out.println( "Me" );
            break;
        case 3:
        case 1:
            System.out.println( "Do" );
        default:
            System.out.println( "Re" );
    }
}
```

[2]

Question 3: Selection and Iteration II [12]

a) Examine the main method listed below:

```
public static void main(String[] args)
{
    for ( int i=1; i<=100; i++ )
    {
        int res = i*5;
        if ((res % 4 > 0) && (res % 3 > 0)) continue;
        System.out.println (i + " times 5 = " + i*5);
    }
}
```

i. Describe what this method does – i.e., the output that it produces.

[2]

ii. Convert the method above to use a *for* loop instead of a *while* loop.

[4]

Question 4: Testing [5]

a) In the context of testing, explain what an equivalence class is. [1]

b) Suppose you are testing the following code. Indicate a set of test values that may be used if you are enforcing statement coverage. Then indicate what additional test values may be used to check path coverage. [4]

```
if (x < 100)
    y = 1;
else
    y = 2;
if (a < 200)
    b = 1;
else
    b = 2;
```

Question 5: Object Oriented Programming [5]

a) What is the difference between an object and an instance? [1]

b) Write a statement to invoke the **subtract** method on an instance named **calculator**, with a single integer parameter with value **17**. [2]

c) How do instance variables differ from local variables? [2]
