University of Cape Town
Department of Computer Science

Computer Science CSC115F

Class Test 2

- Answer all questions.

- All questions that refer to elements of programming make reference to the Java programming language as studied in class.

- Good luck !

Marks: 40

Time: 40 minutes

- Approximate marks per question are shown in brackets

- The use of calculators is permitted

	Surname		Initials
NAME:			

STUDENT NO: | **COURSE CODE:** CSC

This paper consists of 1 questions and 3 pages (including this cover page).

Mark Allocation							
Quest	Marks	Internal	External	Quest	Marks	Internal	External
1	[10]						
Total				**Total**			

Grand Total		
Final Mark		

Internal Examiner:	**External Examiner:**

Section 1. Selection

Question 1. **[10 marks]**

a) Write a method for the NAND operation, which is false if and only if both arguments are true, using only "if" statements, tests for equality where needed and "return" statements. Use the following template:

Solution

```
public boolean nand ( boolean a, boolean b )
{
   if (a) if (b) return false;            [1]
   return true;                           [1]
}
```

[2]

b) The following code fragment sets prerequisites for a hypothetical set of courses. Rewrite the code to use a "switch" statement, with the order of cases optimised to use a minimal number of "break"s.

```
if (course == 201)
{
   needMATH101 = true;
}
else if (course == 202)
{
   needPHYS201 = true;
   needMATH101 = true;
}
```

Solution

```
switch (course)
{
   case 202 : needPHYS201 = true;
   case 201 : needMATH101 = true;
}
```

Marked negatively: -1 for each of {wrong switch variable, error in switch structure, use of break whether correct or not, wrong constant(s), wrong statements}

[3]

c) The intent of the following erroneous code fragment is to flag an error if a mark does not lie in the range 0-100.

```
if (myMark>=0)
    if (myMark>100)
        invalidMark = true;
else
    invalidMark = true;
```

Without changing the intent, fix and rewrite the code in 3 different ways as indicated below:-

i. The order of statements remains the same - insert a single pair of curly braces to prevent the dangling "else" problem.
Solution

```
if (myMark>=0)
{
    if (myMark>100)
        invalidMark = true;
}
else
    invalidMark = true;
```

[1] for correctly positioned braces

ii. Swap the "if" and "else" portions of the outer "if" statement to prevent the dangling "else" problem - the result should be an "if ladder".
Solution

```
if (myMark<0)
    invalidMark = true;
else
    if (myMark>100)
        invalidMark = true;
```

[1] for correct swapping of statements
[1] for correctly inverting conditional

iii. Combine the conditions with a boolean operator, thus avoiding duplication of the assignment statement and ultimately avoiding the dangling "else".
Solution

```
if (myMark<0 || myMark>100)
    invalidMark = true;
```

[1] for correct boolean expression
[1] for correct statement structure / only one assignment

[5]