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

Student Number : _____

Name : _____

University of Cape Town ~ Department of Computer Science

Computer Science 1015F ~ 2007

Theory Test 2A

Question	Mark	Max	Initials
1		5	
2		6	
3		9	
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. [5]

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

a) The while stament is [1]

A. A branching mechanism

B. A loop statement

C. A Boolean expression

D. All of the above

Answer: _____

b) Examine the following Java code: [1]

```
String a = "right",b= "left" ;
b = (a.length() <10) ? a : "overrun";
System.out.println(b);
```

After executing this code, the value of the variable **`b`** is:

A. “right”

B. “left”

C. “overrun”

D. “a.length()”

Answer: _____

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

A. &

B. ||

C. &&

D. =

Answer: _____

d) Examine the following Java code: [1]

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

When executing this code, the output is:

A. truetrue

B. truefalse

C. falsetrue

D. falsefalse

Answer: _____

e) Examine the following Java code: [1]

```
int i=4;
System.out.print(i++ + " ");
System.out.println(++i);
```

When executing this code, the output is:

A. 5 5

B. 5 6

C. 4 4

D. 4 6

Answer: _____

Question 2: Selection and Iteration I [6]

a) Explain why the following Java code does NOT result in a run-time error.

```
int apples =0;
double horses =15.0;
if((apples>0)&&(horses/apples>1))
    System.out.println("Every horse has an apple!");
```

[2]

b) What is an *infinite loop*?

[1]

c) Write down an example of Java code that will result in an *infinite loop*.

[1]

a) Describe how you would rewrite the following code to use a `while` statement instead of a `do-while` statements. Note that the new code must behave exactly as the old version.

```
double x;
do {
  x = Math.random();
  if(x<0.5)
    System.out.println("Heads");
  else
    System.out.println("Tails");
} while (x<0.5);
```

[2]

Question 3: Selection and Iteration II [9]

a) Rewrite the following `switch` statement as nested `if-else` statements.

```
switch(choice)
  {
  case 1: System.out.println("A");
        break;
  case 2:
  case 3: System.out.println("B");
         break;
  case 4: System.out.println("C");
         break;
  default: System.out.println("Z");
  }
```

[3]

b) Write a program to draw an arrow of a certain height, supplied by the user.

e.g. If the user supplied a height of 1, the output will be:

```
*
```

If the user supplied a height of 2, the output will be:

```
***
 *
```

If the user supplied a height of 3, the output will be:

```
*****
 ***
  *
```

And so on. You are given the outline of the program, just supply the missing lines of code.

```
import java.util.Scanner;
  public class mystery
  {
    public static void main(String[] args)
    {
      Scanner keyboard = new Scanner(System.in);
      System.out.println("Enter the height of the triangle:");
```

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

```
}
}
```

[6]

Question 4: Testing [5]

a) Explain the difference between path coverage and statement coverage? [2]

b) Suppose you are testing the following program. Based on equivalence classes and boundary values, provide a set of 9 test values that may be used. [3]

```
if (x<100)
   // do something
else if (x<200)
   // do something else
else
// do something completely different
```

Question 5: Object Oriented Programming [5]

a) Why do we use object oriented programming? [1]

b) What is the difference between a class and an instance? [2]

c) What is a method? How is a method invoked on a method? [2]