INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 1
Semester	Semester 1 Repeat
Date of Examination	**Thursday 18th August 2011**
Time of Examination	**1.00pm - 3.00pm**

Prog Code	BN002	**Prog Title**	Higher Certificate in Science in Computing in Information Technology	**Module Code**	COMP H1030
Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H1030
Prog Code	BN104	**Prog Title**	Bachelor of Science (Hons.) in Computing	**Module Code**	COMP H1030

Module Title	Fundamentals of Programming 1 (Repeat)

Internal Examiner(s): *Dr. Simon McLoughlin*
External Examiner(s): *Mr. John Dunnion*
Dr. Richard Studdert

Instructions to candidates:

1) To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.
2) This paper consists of four questions
3) Candidates should answer all of question 1 and any two other questions
4) Question 1 is worth 40 marks, questions 2, 3 and 4 are worth 30 marks each.

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO

Question 1 (40 marks)

Attempt **ALL** parts, 4 marks each.

a) Briefly explain the following terms:

i. High level language
ii. Interpreter
iii. Platform Independence
iv. Software

b) Explain the meaning of the term 'pseudocode'. In your answer use an example to aid your explanation.

c) Write java code to declare variables for the following scenarios. Be sure to choose the appropriate type.

i. To store the validity of an assertion, i.e. true or false.
ii. To store the initial of you first name, e.g. S.
iii. To store a currency value, e.g. 1.50
iv. To store a number between 1 and 100 on a memory starved device.

d) Evaluate the following boolean expressions to true or false. Show ALL steps.

i. 5 + 10 * 3 / 2 – 1 < 100 % 80
ii. 36 / (4 + 2) != 30 / (4 + 1) || 10 % 3 == 2

e) Write a Java code segment to swap the values of two integer variables.

f) What would be the output of the following Java code segment:

```
int count = 5;

for (int x = 1; x <= 5; x++)
{
        for (int y = 1; y <= count; y++)
                System.out.print("*");

        System.out.println();
        count--;
}
```

g) Rewrite the code segment in part (f) above using while loops instead of for loops.

h) Write a Java code segment that asks somebody for their age and informs them whether they are eligible for free bus travel. Those 12 and under and 65 and over are eligible for free travel.

i) Write a Java method to accept two integers and return the smallest of the two. Show how this method can be called.

j) Correct the compile time errors in the following Java code segment by writing out a corrected version:

```
class YearWhenBorn
{
        public static void main (String args[])
        {
                final int YEAR = 2010;
                int age, born In;
                System.out.println(How old are you?);
                int age = Keyboard.readInt();
                bornIn = = year – age;
                system.out.println("I think you were born in " + bornIn);
        }
}
```

CANDIDATES SHOULD ANSWER ANY TWO OF THE FOLLOWING THREE QUESTIONS

Question 2 (30 marks)

a) What is the purpose of selection statements in the context of computer programming? Give an example of how the IF/ELSE statement is used in Java.
You may NOT use an example from question 1.

(5 marks)

b) The average male height reported in Ireland is 1.774 metres and the average female height is 1.644 metres among 21-25 year olds.

Write a Java program that reads in a person's age, height and gender ('m' or 'f') and reports back whether they are above average, average or below average height. If their age is outside the 21-25 year old bracket they should be informed that the result is uncertain because their age is outside the sample population range.

(15 marks)

c) Assuming the 12 months of the year are divided into seasons as follows:

Spring	**Summer**	**Autumn**	**Winter**
March	June	September	December
April	July	October	January
May	August	November	February

Write a Java program that reads in a value from 1-12 representing a month and uses a switch statement to say what month and season it is.

(10 marks)

Question 3 (30 marks)

a) Describe the circumstances when you would use a for loop, a while loop and a do…while loop.

(6 marks)

b) Explain the difference between sentinel controlled repetition and counter controlled repetition.

(4 marks)

c) Write a Java program that randomly generates one thousand whole numbers between 1 and 1,000,000 and displays the largest number generated.

(10 marks)

d) Write a Java program that reads in a number between 1 and 12 from the user and displays the times tables for that number up to 12. You are required to use a loop to do this.

Sample output for an input of 5 would be:

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
…
…
…
11 x 5 = 55
12 x 5 = 60

(10 marks)

Question 4 (30 marks)

a) Briefly explain each of the following terms:

i. Procedure
ii. Function
iii. Modular Programming
iv. Method call
v. Parameter

(10 marks)

b) Write a method in Java called vowelCount() that repeatedly reads in characters from the user until they enter a full stop, '.'. The method should count the number of vowels ('a', 'e', 'i', 'o', 'u') entered and return this to the calling method (e.g. main).

(10 marks)

c) Write a method in Java called callCost() that determines and returns the price of a phone call by accepting the number of minutes call time as an argument and calculating the cost according to the following criteria:

The first 10 minutes are charged at 1 cent per second of talk time.
The next 10 minutes are charged at 2 cents per second of talk time.
All subsequent minutes are charged at 3 cents per second of talk time.

(10 marks)