University of Technology
Computer Science Department
Class: 1st
Branches: Computer Security, and A.I.

Subject: C++
Examiner: Anmar Ali
Time: 3 hours
Date of exam: 29/5/2011

Final Exam / First Trail / 2010 -2011

Note: Answer only four questions.

Q1. (a) Write C++ program to find the value of (y) from:

\[
\begin{aligned}
    y &= \begin{cases} 
    \frac{x^2 + 5x - 20}{\sqrt{2x}} & \text{if } x > 0 \\
    0 & \text{if } x = 0 \\
    x^2 + (5x)2 - 10 & \text{if } x < 0 
    \end{cases}
\end{aligned}
\]

(b) Write C++ program using function to count upper and lower case letters in 50 letters entered by the user in main program. Print the required values in the main program.

Q2. (a) Find the output:

```cpp
#include <iostream.h>
int main ()
{
    int *x, *p, *q;
    int c=100,a;
    x=&c;
    p=x+2;
    q=x-2;
    a=p-q;
    cout << "The address of x : " << x << endl;
    cout << "The address of p after incrementing x by 2: " << p << endl;
    cout << "The address of q after decrementing x by 2: " << q << endl;
    cout << "The value of a is: " << a << endl;
    return(0);
}
```

(b) Let x be a positive integer consisting number of digits: (d1 d2 d3 ... dn-1 dn).
Write C++ program counting these digits, and find the smallest digit in between.

Q3. (a) Write C++ program which input the values of 2-dimensional array A(3,4) and perform the following:

1. Replace each element in the first row by the constant (9).

To be continued
2. Exchange the values of the second column with the values of the last column.

(b) Write C++ program that declares a structure called students which have (name, degree), then read this information for 7 students and find the largest degree in between. (6.5 Marks)

Q4. (a) The Fibonacci Series is: 0, 1, 1, 2, 3, 5, 8, 13, 21, ... It begins with the terms 0 and 1 and has the property that each succeeding term is the sum of the two preceding terms. Write a C++ program to calculate the \( n \)th Fibonacci number. (6 Marks)

(b) Write C++ program to calculate the summation of the following series. Do not use \( (pow) \) function: (6.5 Marks)

\[
\text{Sum} = (-1)^4 + (-4)^4 + ... + (-25)^4 + (-28)^4
\]

Q5. (a) Write C++ program to find the summation of student’s marks, and it’s average, assume the student have 9 marks. (6 Marks)

(b) Write a program to display the following board pattern: (6.5 Marks)

- Good Luck -