

The American University in Cairo
Department of Computer Science & Engineering
CSCI 106-05&09

Dr. KHALIL	Exam-I	Fall 2010
Last Name :		ID:
First Name:		Form – I

EXAMINATION INSTRUCTIONS

- * Do not turn this page until asked to do so.
- * Exam time is **75** minutes.
- * Put the answers on the same question sheet, do not use any additional papers, even for scratch.
- * Write your name, ID, section no. in the indicated places.
- * Read the exam instructions.
- * Read the honesty policy.
- * Sign the following statement.

Academic Integrity Policy

Cheating in Exams is a violation of the Academic Integrity policy of AUC. Whispering, talking, looking at someone else's paper, or copying from any source is considered cheating. Any one who does any of these actions or her/his answers indicates that she/he did any of them, will receive a punishment ranging from zero in this exam to failing the course. If repeated, it may lead to dismissal from AUC.

I have read the honesty policy and exam instructions and I am presenting this exam as entirely my effort.

Signature: _____

DO NOT USE THIS SECTION

Question	Points	Grade
1	25	
2	25	
3	20	
4	30	
Total	100	

Question 1 (25 points)

Trace the following C++ program; i.e., show the effect of each numbered statement using the given table.

```
#include <iostream>
#include <iomanip>
#include <cmath>
using namespace std;

void main () {
    float a = 2.5, b = 4.0, c = 1.5, k = 125.789;           // statement 1
    int x = 7.5, y = 4, z, s;                               // statement 2
    const int two = 2;                                       // statement 3
    c = x / (x + y) * a + sqrt(b - 3) * c;                 // statement 4
    z = y % x + sqrt(b) / two * two;                       // statement 5
    if (x % y != 0)                                          // statement 6
        s = (two * b + pow(y, two)) / (two * b);          // statement 7
    else
        s = (two * b + pow(y, x)) / (two * b);             // statement 8
    cout << setiosflags (ios::fixed | ios::showpoint | ios::right); // statement 9
    cout << "The Final value of z = " << setw(5) << z << endl; // statement 10
    cout << "The Final value of c = " << setw(5) << c << endl; // statement 11
    cout << "The Final value of s = " << setw(5) << s << endl; // statement 12
    cout << setprecision(2);                                   // statement 13
    cout << "The Final value of k = " << setw(8) << k << endl; // statement 14
}
```

Use the following table to trace the given program (i.e., to plot the value of different variables as instructions are executed one after the other and finally showing the output).

Statement Number	a	b	c	x	y	z	s
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

Question 2 (25 points)

Show the output of the following program:

Program	Output
<pre># include <iostream> using namespace std; void main() { int num = 1110, d, s = 0; const int ten = 10; d = num % ten; s = s + d; num = num / ten; d = num % ten; s = s + 2 * d; num = num / ten; d = num % ten; s = s + 4 * d; d = num / ten; s = s + 8 * d; cout << "The final result is " << s << endl; }</pre>	

[illegible]

Question 3 (20 points)

The following C++ program takes a large positive integer number (secs) representing a time of an experiment measured in seconds and displays it as a number of hours (hh), number of minutes (mm), and number of seconds (ss). The program notifies the user with an error message if the entered value for the time is negative. There are some missings (represented by dots) in the given program. Complete these missings such that the program could be compiled and run correctly.

```
# include <iostream>
#include <iomanip>
using namespace std;
void main ()
{   // Declaration
    ..... secs;
    int hh, mm, ss, rem;
    const int hs = 3600;
    const int ms = 60;
    // Input
    cout << "Enter the time in seconds: ";
    cin >> secs;
    // Processing
    if (secs ..... )
    {
        hh  = .....;
        rem = .....;
        mm  = .....;
        ss = .....;

        cout << "Hourse = " << setw(8) << hh << endl;
        cout << "Minutes = " << setw(8) << mm << endl;
        cout << "Seconds = " << setw(8) << ss << endl;
    }
    else
        cout << "Error!! time value should not be negative!!" << endl;
}
```

Write a C++ program that gets the coefficients of a quadratic equation $ax^2 + bx + c = 0$ and prints out its two real roots (if any). Design your algorithm in a way to notify the user with an error message ("a should receive nonzero value!!") if the entered value for the coefficient "a" is zero and another error message if the real roots don't exist ("Imaginary roots!!").

The Analysis

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[illegible]

[illegible]

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