

The American University in Cairo
Department of Computer Science & Engineering
CSCI 106-07&09

Dr. KHALIL	Exam-I	Fall 2011
Last Name :		ID:
First Name:	Form – I	Section No.:

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	30	
2	15	
3	20	
4	35	
Total	100	

Question 1 (30 points)

Show the output of the following program:

Program	Output
<pre># include <iostream> # include <iomanip> using namespace std; void main() { int num = 1101, 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 = " << setw(4) << s << endl; }</pre>	
<pre>float a = 2, b = 2, c = 1.5, x = 45.5678, z; int d = 4, e = 2.5, y; z = a * b - c + (e + 1) / d + 2.235; y = a * (b - c) + d / (e + 1); cout << "x = " << setprecision(2) << x << endl; cout << " y = " << y << endl; cout << " z = " << setprecision(0) << z << endl;</pre>	
<pre>int a = 5, b = 3, c = 7; if ((a > b) && (false)) cout << "the required number = " << a << endl; else if ((b > c) (true)) cout << "The required number = " << b << endl; else cout << "The required number = " << c << endl;</pre>	
<pre>int a = .., b = .., c = ..; // a, b, and c are assigned some values if ((a > b) && (a <= b)) cout << "It is the first case!!" << endl; else if ((b == c) (b != c)) cout << "It is the second case!!" << endl; else cout << "It is the third case!!" << endl;</pre>	

.....

.....

Question 2 (15 points)

Draw the Flowchart of the following program and show its final output:

```
# include <iostream>
# include <iomanip>
using namespace std;
void main()
{ int a = 5, b = 7, c = 3, t;

    if ( b > a)
    {
        t = a;
        a = b;
        b = t;
    }
    if ( c > b )
    {
        t = b;
        b = c;
        c = t;
    }

    if ( b > a)
    {
        t = a;
        a = b;
        b = t;
    }

    cout << "a = " << setw(3) << a << endl;
    cout << "b = " << setw(3) << b << endl;
    cout << "c = " << setw(3) << c << endl;
}
```

FlowChart

Program Output

Question 3 (20 points)

The following C++ program takes the area of base and height of a pyramid and computes and prints out its volume rounded to the nearest hundredth. The program validates the user input to accept only values that are greater than 0 for both area and height and display an error message otherwise. The formula for computing the pyramid's volume is:

Volume of Pyramid = $\frac{1}{3}$ X area X height

There are some missings (represented by dots) in the given program. Complete these missings such that the program could be compiled and run correctly.

The Program

```
#include <iostream>

.....

using namespace std;
void main()
{

    float height, area, volume;

    cout << "Enter a value for the area : ";

    cin >> area;

    cout << "Enter a value for the height : ";

    cin >> height;

    .....

    .....

    volume = .....

    .....

    cout << "The Volume of Pyramid = " << setw(8) << ..... << endl;

    .....

    else

        cout << "Error, Invalid Input Values!!" << endl;

}
```

Question 4 (35 points)

A student takes three exams in a course and receives a score for each. Each score is an integer number between 0 and 100 (inclusive). The course instructor considers the sum of the best two scores to determine the letter grade of the student in the course according to the following rules:

Sum of the best two scores (Out of 200)	Letter Grade
Sum $\geq$ 180	A
160 $\leq$ Sum $<$ 180	B
140 $\leq$ Sum $<$ 160	C
120 $\leq$ Sum $<$ 140	D
Sum $<$ 120	F

Write a C++ program that takes the three scores of a student, computes the sum of the best two, and determines and displays the deserved letter grade. **The program should display an error message and terminate if the computed sum of the best two scores is less than 0 or greater than 200. Be sure to use proper formatting and appropriate comments in your code. The output should be clearly labeled. Show the three phases of software development: the analysis, design (draw a Flow Chart), and implementation. You have to write the program once using nested-if structure and second using the switch structure.**

The Analysis

[illegible]

The Flow Chart

[illegible]

[illegible]

This image shows a full page of a document template designed for handwriting practice. It consists of numerous thin, horizontal black lines spaced evenly across the entire page, providing a guide for letter height and placement. There are no margins, text, or other markings present.

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