

The American University in Cairo
Computer Science & Engineering Department
CSCE 106-03&08

Dr. Khalil	Exam III	Spring 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 honesty 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	20	
2	20	
3	15	
4	20	
5	25	
Total	100	

Question 1 (15 points)

Tick only one possible answer for each of the following:

- 1) The equivalent expression of **`((x <= y) || True)`** is:
 - a. **`( x > y )`** ☐
 - b. **`( x <= y )`** ☐
 - c. **`True`** ☐
 - d. **none of the above** ☐
- 2) The equivalent expression of **`! ( ( x <= y ) || ( s > t ) )`** is:
 - a. **`( ( x > y ) || ( s <= t ) )`** ☐
 - b. **`( ( x >= y ) && ( s <= t ) )`** ☐
 - c. **`False`** ☐
 - d. **none of the above** ☐
- 3) The value of **`((x - 4) != 4) && ((x - 4) == 4)`** is:
 - a. **`(x - 4)`** ☐
 - b. **`True`** ☐
 - c. **`(x + 4)`** ☐
 - d. **none of the above** ☐
- 4) The equivalent expression of **`! ( x < y )`** is:
 - a. **`(x > y)`** ☐
 - b. **`False`** ☐
 - c. **`(x >= 4)`** ☐
 - d. **none of the above** ☐
- 5) The value of **`((x <= y) || False)`** is:
 - a. **`( x > y )`** ☐
 - b. **`( x <= y )`** ☐
 - c. **`False`** ☐
 - d. **none of the above** ☐
- 6) The value of **`( (y+4) == (y+4) )`** is:
 - a. **`y - 4`** ☐
 - b. **`True`** ☐
 - c. **`y + 4`** ☐
 - d. **None of the above** ☐
- 7) The value of **`((x = y) && False)`** is:
 - b. **`(y = x)`** ☐
 - c. **`( x <= y )`** ☐
 - d. **`False`** ☐
 - d. **none of the above** ☐
- 8) In C++, the statement: **`if (1 != 1) cout << 1; else cout << 0;`** will produce:
 - c. **`1`** ☐
 - d. **`( 1 != 1 )`** ☐
 - e. **`0`** ☐
 - d. **none of the above** ☐
- 9) In C++, the statement: **`if (4 == 5) cout << "true";`** will produce:
 - d. **`4`** ☐
 - e. **`true`** ☐
 - f. **`5`** ☐
 - d. **none of the above** ☐

Question 2 (20 points)

Show the output of each of the following program segments:

```
x = 5; y = 30;
while (x > y)
    x += 2;
cout << setw(3) << x << setw(3) << y << endl;
```

```
int x = 1, y = 1;
while (x < 4)
{
    y = y * x++;
    cout << "x = " << setw(2) << x << "y = " <<
    setw(2) << y << endl;
}
```

```
int d;  
const int two = 2;  
int n = 9;  
do  
{  
    d = n % two;  
    cout << d;  
    n /= two;  
} while (n != 0);  
cout << endl;
```

```
x = 5; y = 30;
while (x <= y)
    x *= 2;
cout << setw(3) << x << setw(3) << y << endl;
```

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

Write a C++ program that uses **only two nested loops** and **nested-if structure** to produce the following output:
(A bonus of 3 points for using **nested loops** with **switch** structure)

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

Write a C++ main function to print the **count** and **sum** of all the integer numbers that are divisible by 7 but not divisible by 5 in the range 1 to 200.

[illegible]

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A country charges its citizens an income tax each year. The tax rate is based on the Income of the year according to the following table:

Income (\$)	Tax Rate
Income < 10000	5.5%
10000 <= Income < 20000	10.4%
20000 <= Income < 40000	15.6%
Income >= 40000	23.7%

Draw a flow chart and write a program in C++ that reads a person's income, prints the tax owed rounded to the nearest dollar. **Show the three phases of software development: the analysis, design, and implementation. Implement your solution in C++ using nested-if structure, and second using the switch structure (bonus of 5 points). Enforce validation on the input Income such that it is not less than 0 and not greater than 100000.**

The Analysis

The Flow Chart

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

The Program Using nested-if structure

The Equivalent switch structure

Question 5 (25 points)

Write a **modular** C++ program using functions to generate a table showing the area of a circle for a sequence of radius values (integer values). The program should read the start integer number (startNum), the end integer number (endNum) and the step value (stepVal). The program should validate the user input through enforcing the following conditions:

- The start integer number should be greater than 0 and less than 100.
- The difference between the end integer number and the start integer number should not be less than 10.
- The step value should be greater than 0 and not greater than the difference between the end integer number and the start integer number.

The computed area value should be printed rounded to the **nearest hundredth**.

(**Hint:** define a function to print the header of the table, a second function to get the area value for a given radius value, a third function to print the footer of the table)

An Example: Start Integer Number (**startNum**) = 1, End Integer Number (**endNum**) = 10, Step Value (**stepVal**) = 1

Number	Area of Circle
1	3.14
2	12.57
3	28.29
...	
10	314.29

Good Luck