

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

Dr. KHALIL	Exam II	Fall 2009
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	20	
3	20	
4	10	
5	25	
Total	100	

Question 1 (25 points)

Show the output of each of the following program segments:

```
const int ten = 10;
int d;
int n = 57089;
do
{
    d = n % ten;
    cout << d;
    n /= ten;
} while (n != 0);
```

```
int x = 1, y = 2;
while (x < 3)
    y /= x++;
cout << "x = " << setw(3) << x << " " << "y = " << setw(3) << y << endl;
```

```
# include <iostream>
# include <iomanip>
using namespace std;
void main()
{
    int a = 5, b = 7, c = 3, t;
    do
    {
        if ( b > a )
        {
            t = a;
            a = b;
            b = t;
        }
        if ( c > b )
        {
            t = b;
            b = c;
            c = t;
        }
    } while (( b > a ) || ( c > b ));
    cout << "a = " << setw(3) << a << endl;
    cout << "b = " << setw(3) << b << endl;
    cout << "c = " << setw(3) << c << endl;
}
```

```
int x = 1, y = 1;
while (x < 4)
{
    y *= x++;
    cout << "x = " << setw(3) << x << "y = " << setw(3) << y << endl;
}
```

```
int F[6] = {1, 1};
const int zero = 0;
const int one = 1;
cout << setw(3) << zero << setw(3) << F[0] << endl;
cout << setw(3) << one << setw(3) << F[1] << endl;
for (int k = 2; k < 6; k++)
{
    F[k] = F[k-1] + F[k-2];
    cout << setw(3) << k << setw(3) << F[k] << endl;
}
```

Question 2 (20 points)

A Prime number is a positive integer number greater than 1 which is only divisible by itself (and eventually by 1). The first prime number is 2, and the next is 3, and so on. The following C++ program takes a positive integer number greater than 1 and less than 100 and prompts the user whether the entered number is prime or nonprime. 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 does not accept any integer number outside the given range (greater than 1 and less than 100).

The Program

```
#include <iostream>
#include <iomanip>
using namespace std;
void main ()
{ int num, c;
  bool prime;
  do
  {
    cout << "Enter a positive integer greater than 1 and less than 100: " << endl;
    cin >> num;
  } while (.....);
  .....;
  .....;
  while ( ..... )
  {
    if ( ..... )
      .....;
    else
      .....;
  }
  if ( ..... )
    cout << "The number  " << setw(4) << num << "is Prime" << endl;
  else
    cout << "The number  " << setw(4) << num << "is Nonprime" << endl;
}
```

Question 3 (20 points)

Write a program that uses *nested loops* to produce the following output:

```
1 1 1 1 1 1 1 1
0 1 1 1 1 1 1 1
0 0 1 1 1 1 1 1
0 0 0 1 1 1 1 1
0 0 0 0 1 1 1 1
0 0 0 0 0 1 1 1
0 0 0 0 0 0 1 1
0 0 0 0 0 0 0 1
```

Question 4 (10 points)

1. Rewrite the Boolean expression eliminating the not operator.

`! ( ( x <= 5 ) || ( s > 9 ) )` _____

2. What is the value of the following expressions:

`(x - 5 != 5) && (x - 5 == 5)` _____

`! ( 1 == 1 )` _____

`(x - 5 != 5) || (x - 5 == 5)` _____

A Perfect integer number is a positive integer number where the sum of its factors (including 1) is equal to the number itself (for example, 6 is the first perfect number because $1 + 2 + 3$ (the factors of 6) = 6). The next perfect number is 28 because $28 = 1 + 2 + 4 + 7 + 14$ where 1, 2, 4, 7, 14 are the factors of 28. Write a C++ program to print out all the perfect integer numbers in the range 1 to 1000.

[illegible]

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