Ain Shams University Faculty of Science. Computer Science Division Level: One		Course Code: COMP 104 Time Allowed: Two Hours. Date: : 23 /7/2020 الخميس No. of Pages: 2

Computer Programming(1) (Total Marks: 90 Marks)

Answer The Following Questions

Question (1) [22 points]

a- **[11 points]** Write C++ program to compute the following *f(n)* for a given *n*

$$f(n) = \begin{cases} \sum_{i=1}^{n} cos(i), & if\ n\ is\ even \\ \sum_{i=1}^{n} sin(i), & if\ n\ is\ odd \end{cases}$$

b- **[11 points]** Trace the following C++ code and conclude the output:

```
int i=1, f=3, n=10, s=0;
while( i <= n){
        if (i%3==0){
                f*=i;
                s+=f;
                cout<<"i="<<i<<", f="<<f <<", s="<<s<<endl;
        }
        i++;
}
```

Question (2) [23 points]

a- **[11 points]** Write the body of the main of a C++-program that reads an integer *n* and then gets the sum of the series:

$$sum = 2^2 - 4^2 + 6^2 - 8^2 + \cdots + (-1)^{n+1} n^2$$

b- **[12 points]** Write a C++ program to count the number of primes between two given numbers x and y. For Example, the number of primes between 4 and 18 is 5. Your code must keep the run using Do-While-loop.

Question (3) [20 points]

Magic square is an (n × n) matrix in which each of the integer values from 1 to n^2 appears exactly once and all rows, all columns, and both diagonals sum to the same constant. Write a C++ program that accepts a two-dimensional array and integer n from the user and the program checks if the n × n matrix stored in the array is a magic square or not.

Question (4)

[25 points]

a) Write a C++ user-defined function to convert a decimal number to binary number.

b) Write a C++ program that accepts from user two arrays (one-dimensional) A and B of integers. Then the program finds and displays all pairs of elements (a_i, b_j) such that a_i belongs to A and b_j belongs to Array B whose Greatest Common Divisor (GCD) of a_i and b_j is one ?

بالنجاح والتوفيق
د. أشرف مصطفى بحيرى
د. ضياء نصر