Future University in Egypt
Faculty of Computers and Information Technology

Department: Computer Science
Course Name: Computer Programming I
Course Code: CSC 112
Instructor: Dr. Awad Khalil **Date: Tuesday, Jan. 14, 2020**
Time Allowed: 120 minutes **Total Marks: 100**
No. of Pages: 7 (B) **Semester: Fall 2019**

Final Exam

Student Name: .....

Student ID: .....

Question No.	Question Mark	Student Mark	Marks in Words
1	20		
2	40		
3	15		
2	25		
Total	100		

Exam Committee Signature

Question 1 (20 points)
Select the correct answer from the following:

1. You have declared a pointer P to a memory location that stores an integer number: How would you declare a dynamic 1-D array P that stores n integer elements where n is a defined integer variable.
   a. P = new int[n] b. P = new double[n] c. int *P[n] d. int P[n]

2. Which of the following C++ statements guarantees the execution of the body of a loop at least one time:
   a. for b. while c. continue d. None of the above

3. The expression ((X > Y) || true) is
   a. False b. N/A c. True d. None of the above

4. The following declaration statements creates a 2D integer array A of 20 rows and 10 columns.
   a. int A[10][20] b. int A[20][10] c. int A(20)(10) d. int A[20, 10]

5. How do you declare an input object stream inS that reads from an input data file.
   a. ofstream inS b. fstream inS c. ifstream inS d. iostream inS

6. In C++, the value of the expression 5 / 9 * (64 – 32) is
   a. 17.78 b. 17 c. 1.55 d. 0

7. How do you declare a pointer to a memory location that stores an integer number:
   a. int *x b. &x c. float *x d. float x*

8. if p and q are two pointers and each points to a memory location, then *q = *p
   a. changes the location that q points to.
   b. changes the value at the location that q points to.
   c. changes the value at the location that p points to.
   d. changes the location that p points to.

9. A struct called *Plane* has a member variable called *maxSpeed*. An object called *b* is created from struct *Plane*. How do you set the value of *maxSpeed* to 900?
   a. Plane.maxSpeed = 900;
   b. b->maxSpeed=900;
   c. b.maxSpeed = 900;
   d. None of the above

10. The expression (X == Y) && (X != Y) is
    a. False b. True c. N/A d. None of the above

Question 2 (40 points)

The following code contains portions of a C++ program. They are assumed to exist inside a proper main function, and that all necessary libraries are included. There are no syntax errors in the code. Answer the questions accordingly.

1. What is the output of the call **PoP(24, 18)** of the following function?

```
int PoP ( int A, int B)
{
    int R = A % B;
    while ( R != 0 )
     {
         A = B;
         B = R;
         R = A % B;
      }
     return B;
}
```

a. 24
b. 18
c. 6
d. 42

2. What is wrong with the following C++ code?

```
//This code creates an array x populated with the series of values shown below

 //This series is called the Lucas series (as defined below).

 //2 1 3 4 7 11 18 29 47
```

$$L_n := \begin{cases} 2 & \text{if } n = 0; \\ 1 & \text{if } n = 1; \\ L_{n-1} + L_{n-2} & \text{if } n > 1. \end{cases}$$

```
int x[9];
 int i;
 int counter=0;

 x[0] = 1;
 x[1] = 1;
 for ( i=2; i < 9; i++)
{
     x[i] = x[i-1] + x[i-2];
 }
```

a. The for loop never stops iterating
b. Most of the values in the series are not set properly
c. The last element of the series is the only value not set properly
d. The array is accessed beyond bounds.

3. What is output of the following C++ code?

```
struct point
{       double x;
        double y;
};
void compute (point, point, point&);
int main ()
{         point p1, p2, p3;
          p1.x = 2.0;       p1.y = 3.0;
          p2.x = 1.0;       p2.y = 1.0;
          compute (p1, p2, p3);
          cout << p3.x << ' ' << p3.y << endl;
          return 0;
}  // end main function
void compute (point a, point b, point& c)
{         c.x = (a.x + b.x) / 2;  c.y = (a.y + b.y) / 2;
} // end compute function
```

a. 1.5 1.5 b. 2.0 1.5 c. 1.5 2.0 d. None of the above

4. What is the output of the following code?

```
int c , *x, y = 5;
x = &y;
for ( c = 10; c > 0; c--)
     {     if (( c % 2 ) == 0)
              *x = *x + 1;
      }
cout << y;
```

a. 15 b. 10 c. 160 d. 13

5. What is the output of the following C++ code?

```
int f(int n)
{ int p = 1;
  for ( int c = 2; c <= n; c++ )
       p = p * c;
  return p;
 }
int main()
{  cout << f(0) + f(3) << endl;
   return 0;
}
```

a. 1 b. 7 c. 8 d. None of the above

6. What is the output of the following C++ code?

```
void myFunction (int a, int& b)
{   int z = a;
    a = b;
    b = z;
}

int main()
{   int x = 45, y = 35;
    myFunction(x - y, y);
   cout << "x = " << x << " y = " << y << "\n";
}
```

a. x = 45 y = 10 b. 45 35 c. x = 45 y = 35 d. x = 35 y = 45

7. What is the output of the following C++ code?

```
int a = 1, b  = 2;
for (int i = 0; i < 6; i += 2)
      for (int j = 3; j <= 4; j++)
            a = a + 2;
b = a;
cout << a << endl;
```

a. 11 b. 12 c. 9 d. 13

8. What is the output of the following code?

```
int f(int A[], int n)
{  int s = A[0];
   for ( int c = 1; c < n; c++ )
     if ( A[c] < s )
       s = A[c]
return s;
}
 int main()
{ const int nn = 5;
  int AA[nn] = {4, 6, 7, 3, 5};
  cout << f(AA, nn) << endl;
return 0;
}
```

a. 0 b. 4 c. 3 d. 2

9. What is the output of the following code (this code is proper inside main)?

```
int *x,  *y, a = 5;
x = &a;
y = new int;
*x = 5;
*y = 10;
for (int i = 1; i < 10; i++)
    *x = *x + 10;
cout << *y << endl;
delete y;
```

a. 10 b. 5 c. 50 d. 15

10. What does the following C++ code do (in terms of its functionality)?

```
int a[5] = {1, 2, 3, 4, 5}, b[5];
for (int c = 0; c < 5; c++)
    b[10 - c - 1] = a[c];
```

a. It puts the contents of array b in array a
b. It puts half of the elements of array b in array a
c. It puts the contents of array a in array b but in reverse order
d. It puts the contents of array a in array b but in reverse order except the last element of array a.

Question 3 (15 points)

Define a C++ function that takes an array **A** of size **n** containing positive integer numbers to return back the **greatest** value in the array.

Question 4 (25 points)

You are to use **loops** to implement the following functions:

1. A function called void **initialize(int a[10][10])** that takes some int 2D array of size **10x10**, and initializes its contents such that:
   - The elements of the array at a location with both an even value for the row and column number will be initialized to the value 0.
   - The elements at all other locations are initialized to a random integer number between 1 and 6 (inclusive)
2. A function called void **sum(int a[10][10], int s[10])** that takes the array **a** of size 10x10 and computes the sum of each row to be stored in another 1D array **s** of size **10**.
   Also, write, the C++ main function that creates an array **A** of size **10x10** and **S** of size **10,** uses the **initialize** function to initialize the created array **A**, calls the function **sum,** passing to it the two arrays **A** and **S** and finally prints content of array **S** . Below is what the array **A** may look like after the function **initialize** is called.

0	3	0	2	0	2	0	6	0	4
4	1	6	2	2	1	3	5	5	6
0	5	0	4	0	1	0	3	0	2
2	2	4	3	5	5	6	1	6	5
0	3	0	4	0	1	0	5	0	6
1	6	1	6	4	2	1	5	5	3
0	5	0	3	0	5	0	2	0	6
3	5	5	2	4	6	3	3	2	5
0	3	0	1	0	4	0	2	0	1
4	4	1	5	6	3	3	2	2	6

// Definition of function **sum**:

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// Definition of function **initialize**:

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// main function:

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Best Wishes,,