Ain Shams University, Faculty of Science. Math. Dept.
Final Exam:
(2019/2020)
Date: /10/2020

1st level student
Course No. 104 comp
Time Allowed 2 Hours
Marks 90

Question one [22 Marks]

a) [10 Marks] Convert the following C++ switch statement into an if…else statement.

```
int option;
cin>>option ;
switch(option)
{  case 0:
   case 2: cout<<"Add process "<<endl;
   case 3: cout<<"Mult process"<<endl;
                  break;
   case 4:  cout<< "Div process <<endl;
   default:     "Invalid option";
 }
```

b) [12 Marks] Write a C++ program that reads large number of seconds, then convert this number into time format (hh:mm:ss).i.e., (hours:minutes:seconds).

Question Two [23 Marks]

a) [11 Marks] Trace the following C++ code and conclude the output:

```
int k,fact=1, sum=0;
for(k=1; k <= 12; k+=2){
     fact*=k;
    if(k%3==0){
        sum+=fact;
      cout<<" k="<< k <<" fact="<<fact <<"sum="<<sum<< endl;
    }
}
```

b) [12 Marks] Write C++ program to get the sum of the following series (using for-loop).

$$sum = \sqrt{1} - \sqrt{2} + \sqrt{3} - \sqrt{4} \ldots + \sqrt{(2n-1)}$$

Question Three [22 Marks]

Write a C++ program that reads an array of some integers (of length n ≥ 10). Then

a) [10 Marks] Print only the sum of even integers and their mean.

b) [12 Marks] Find out the maximum and minimum of all integers in the array and the difference between them.

Question Four [23 Marks]

a) [11 Marks] Trace the following C++ code and conclude the output:

```
int A[ ]={9, 21, 2, 10 ,3, 6};
int sum=0;
for (int i=5;i>=0;i--)
        if(A[i]%3==0)sum+= A[i]+ 2*i;
cout<<"sum="<<sum<<endl;
```

b) [12 Marks] Write a C++ program that reads a two dimensional array M of size (10 × 10). Then print out the sum of third column.

Question one [22 Marks]:

A) [10 Marks] Convert the following C++ Switch statement into an if … else statement.

```
int option;
cin >> option ;
    if (option == 0){
        cout << "Add process" << endl;
        cout << "Mult process" << endl;
    }
    else if ( option == 2){
        cout << "Add process" << endl;
        cout << "Mult process" << endl;
    }
    else if ( option == 3){
        cout << "Mult process" << endl;
    }
    else if ( option == 4 ){
        cout << "Div Process" << endl;
        cout << "Invalid option";
    }
    else
        cout << "invalid option";
```

b) [12 Marks] Write a C++ program that reads large number of seconds, then convert this number into time format (hh:mm:ss).i.e., (hours:minutes:seconds).

```
#include <iostream>
using namespace std;
    int main() {
        int Hours,Minutes,Seconds,X;
        cout << "Enter Large number of Seconds : ";
        cin >> X;
            Hours = X / 3600;
            Minutes = ( X % 3600 ) / 60;
            Seconds = ( X % 3600 ) % 60;
        cout << "(" << Hours << ":" << Minutes << ":" <<
Seconds << ")";
            return 0;
    }
```

Question two [22 Marks]:

a) [11 Marks] Trace the following C++ code and conclude the output:

```
First loop:          K = 3, Fact = 3, Sum = 3
Second loop:         K = 5, Fact = 15, Sum = 3
Third loop:          K = 7, Fact = 105, Sum = 3
Fourth loop:         K = 9, Fact = 945, Sum = 948
Fifth loop:          K = 11, Fact = 10395, Sum = 948

OUTPUT:

                K = 3 Fact = 3 Sum = 3
                K = 9 Fact = 945 Sum = 948
```

b) [12 Marks] Write C++ program to get the sum of the following series (using for-loop).

$$sum=\sqrt{1}-\sqrt{2}+\sqrt{3}-\sqrt{4}...+\sqrt{(2n-1)}$$

```
#include <iostream>
#include <math.h>
using namespace std;
    int main(){
        int N;
        float Sum;
    cout << "Enter the N-th term : ";
    cin >> N;
        for (int i=1; i <= (2*N) - 1;i++){
            Sum += sqrt(i);
        }
    cout << "Sum of the series = " << Sum;
    return 0;
}
```

Question Three [22 Marks]

Write a C++ program that reads an array of some integers (of length n ≥ 10). Then
a) [10 Marks] Print only the sum of even integers and their mean.
b) [12 Marks] Find out the maximum and minimum of all integers in the array and the difference between them.

```
#include <iostream>
using namespace std;
    int main(){
        int Max,Min,N,A[1000],Sum=0;
        float average,Counter=0;
            do {
                cout << "Enter the Size of the Array : ";
                cin >> N;
            } while (N < 10);
        for (int i=0; i < N; i++){
            cout << "Enter the A[" << i << "] : ";
            cin >> A[i];}
        for (int i=0; i < N; i++){
            if ( A[i] % 2 == 0 ){
                Sum += A[i];
                Counter++;}
        }
        average = Sum / Counter;
        cout << "Sum of even integers = " << Sum << endl;
        cout << "Mean (Average) of even integers = " <<
average << endl;
            Max = A[0];
            Min = A[0];
        for (int i=0; i < N; i++){
            if (A[i] > Max){
                Max = A[i];
            }
            if (A[i] < Min){
                Min = A[i];}
        }
        cout << "Max = " << Max << endl;
        cout << "Min = " << Min << endl;
        cout << "Diff between Max and Min = " << Max - Min;
    return 0;
     }
```

Question Four [23 Marks]

a) [11 Marks] Trace the following C++ code and conclude the output:

```
At i = 5, A[i] = 6
          Sum = 0 + ( 6 + 2 * 5 ) = 16
     At i = 4, A[i] = 3
          Sum = 16 + ( 3 + 2 * 4 ) = 27
     At i = 1, A[i] = 21
          Sum = 27 + ( 21 + 2 * 1 ) = 50
     At i = 0, A[i] = 9
          Sum = 50 + ( 9 + 2 * 0 ) = 59

     Output :
          Sum = 59
```

b) [12 Marks] Write a C++ program that reads a two dimensional array M of size (10 × 10). Then print out the sum of third column.

```
#include <iostream>
using namespace std;
     int main(){
         int A[10][10],Sum=0;
             for (int i=0; i < 10; i++){
                 for (int j=0; j < 10; j++){
             cout << "Enter A[" << i << "]" << "[" << j <<
"] : ";
             cin >> A[i][j];
                 }
             }
             for (int i=0; i < 10; i++){
                     Sum += A[i][3];
             }
             cout << "Sum of the third column = " << Sum;
         return 0;
     }
```