NATIONAL UNIVERSITY OF SCIENCES & TECHNOLOGY

SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERING

SEMESTER # 01

CLASS: - ME 15 [SEC A]

KASHIF NADEEM KAYANI

456466

Fundamentals of Programming

ASSIGNMENT No. 01

Date of Submission   29 NOV 2023

Submitted to   MUHAMMAD AFFAN

QUESTION NUMBER 01

/*_____

Write a C++ program to display factors of a number using for loops.

KASHIF NADEEM KAYANI   456466   ME-15 SEC A

*/

```cpp
#include<iostream>
using namespace std;
int main ()
{
int num;        //declaring number
cout<<"enter the number: ";     //input from user
cin>>num;
for(int i=1;i<num;i++)   //declaring i as for loop variable
{
        if (num%i==0)    //if entered number is divisible on any number less than itself
        {
        cout<<num<<" is divisible by "<<i<<" "<<endl;
        }

}
 return 0;
}
```

```
C:\Users\Dell\Desktop\C++\Lab\Assignment No. 01\Question No. 01.exe

enter the number: 256
256 is divisible by 1
256 is divisible by 2
256 is divisible by 4
256 is divisible by 8
256 is divisible by 16
256 is divisible by 32
256 is divisible by 64
256 is divisible by 128

--------------------------------
Process exited after 6.121 seconds with return value 0
Press any key to continue . . .
```

CPP

Question No.
01.cpp

QUESTION NUMBER 02

2. Write output to the following code.

```cpp
#include <iostream>

int main() {
    int x = 5;
    int y = 10;

    if (x == 5)
        if (y == 10)
            std::cout << "x is 5 and y is 10" << std::endl;
    else
        std::cout << "x is not 5" << std::endl;

    return 0;
}
```

ANSWER

The output of the given code will be <u>**x is 5 and y is 10**</u>**. As it was mentioned in the code that x=5 and y=10. So the output will be if statement.**

QUESTION NUMBER 03

/*_____

ASSIGNMENT No. 01   QUESTION No. 03
Write a C++ program, take an integer value from user and check if it's greater
than 10 and less thanequal to 20. Print 1 if yes and print 0 if no. Use
appropriate datatype for output.
KASHIF NADEEM KAYANI   456466   ME-15 SEC A
*/

```cpp
#include<iostream>
using namespace std;
int main() {
        cout<<"Question No.03"<<endl;
        int a;
        cout<<"Enter The Value Of a ";
        cin>>a;
        if(a>10&&a<=20)
                {cout<<"1"<<endl;}
        else
        cout<<"0"<<endl;
        return 0;
}
```

```
C:\Users\Dell\Desktop\C++\Assignment No. 01\Question No. 03.exe

Question No.03
Enter The Value Of a 20
1

--------------------------------
Process exited after 1.506 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\Dell\Desktop\C++\Assignment No. 01\Question No. 03.exe

Question No.03
Enter The Value Of a 13
1

--------------------------------
Process exited after 2.272 seconds with return value 0
Press any key to continue . . .
```

Cpp file

Question No. 03.cpp

QUESTION NUMBER 04

```
/*_____
Write a C++ program that uses a while loop to find the largest prime number
less than a given positive integer N. Your program should take the value of N as
input from the user and then find the largest prime number less than or equal to
N. You are not allowed to use any library or pre-existing functions to check for
prime numbers.
KASHIF NADEEM KAYANI          456466          ME-15 SEC A
*/

#include<iostream>
using namespace std;
int main (){
        int i, j, n, pnum;   //declaring 4 variables
        bool a;   //declaring flag for prime number
        a=false;   //initializing boolean as false
        cout<<"Please Enter a Number to Check: ";
        cin>>n;   //input from user
        i=n;   //declaring that i is equal to n
        while(i>1){
                        j=i-1;

                while(j>1){
                        if(i%j==0){    //if number n  is not prime prime
                                a=false;
                                break;
                        }
                        else{
                                a=true;   //otherwse bool is true
                                j--;
                                continue;
                        }
                }
                if(a==true){
                        pnum=i;
                        break;
                }

                i--;
        }
        cout<<"Largest Prime Number Below "<<n<<" is: "<<pnum<<endl;   ///printing largest prime
number.
        return 0;
}
```

Write a C++ program that uses a while loop to
find the largest prime number
less than a given positive integer N. Your
program should take the value of N as
input from the user and then find the largest
prime number less than or equal to
N. You are not allowed to use any library or
pre-existing functions to check for
prime numbers.

CPP

Question_No._04.cpp

```
C:\Users\HP\OneDrive\Desktop\LArgest Prime Number.exe

Please Enter a Number to Check: 30
Largest Prime Number Below 30 is: 29

--------------------------------
Process exited after 1.261 seconds with return value 0
Press any key to continue . . .
```

```cpp
/*
Write a C++ program that uses a while loop to find the largest prime number
less than a given positive integer N. Your program should take the value of N as
input from the user and then find the largest prime number less than or equal to
N. You are not allowed to use any library or pre-existing functions to check for
prime numbers.
KASHIF NADEEM KAYANI              456466              ME-15 SEC A
*/

#include<iostream>
using namespace std;
int main (){
    int i, j, n, pnum;    //declaring 4 variables
    bool a;     //declaring flag for prime number
    a=false;    //initializing boolean as false
    cout<<"Please Enter a Number to Check: ";
    cin>>n;    //input from user
    i=n;     //declaring that i is equal to n
    while(i>1){
        j=i-1;

        while(j>1){
            if(i%j==0){       //if number n  is not prime prime
                a=false;
                break;
            }
            else{
                a=true;     //otherwse bool is true
                j--;
                continue;
            }

        }
        if(a==true){
            pnum=i;
            break;
        }

        i--;
    }
    cout<<"Largest Prime Number Below "<<n<<" is: "<<pnum<<endl;   ///printing Largest prime num
    return 0;
}
```

QUESTION NUMBER 05

/*_____
Write a C++ program, take two string as input from user and check if both
strings are equal or not. If they are equal make them unequal by rotating string.
KASHIF NADEEM KAYANI   456466   ME-15 SEC A
*/

```cpp
#include<iostream>
using namespace std;
int main ()
{
 string a,b;  //declaring two strings
 cin>>a>>b;   //input from user
 for( int i=0;i<a.length() ;i++)   //declaring i is less than lenght of string a
 { cout<<i<<"th element of a is "<<a[i]<<endl;   //printing elements of a
   cout<<i<<"th element of b is "<<b[i]<<endl;   //printing elements of b
   if(a[i]==b[i])     //if a=b, print elements of a that are equal to b
 { cout<<endl;
 cout<<a[i]<<" is equal to "<<b[i]<<endl;}
 cout<<endl;
 }

if(a==b)
{
for(int i=a.length();i>=0;i--)
{b[i]=a[i] ;
cout<<b[i];}
}
return 0;

}
```

Question No.
05.cpp

```
boss
boss
0th element of a is b
0th element of b is b

b is equal to b

1th element of a is o
1th element of b is o

o is equal to o

2th element of a is s
2th element of b is s

s is equal to s

3th element of a is s
3th element of b is s

s is equal to s

 ssob
------------------------------
Process exited after 4.126 seconds with return value 0
Press any key to continue . . .
```

```cpp
/*
_____
Write a C++ program, take two string as input from user and check if both
strings are equal or not. If they are equal make them unequal by rotating string.
KASHIF NADEEM KAYANI          456466           ME-15 SEC A
*/

#include<iostream>
using namespace std;
int main ()

 string a,b;  //declaring two strings
 cin>>a>>b;    //input from user
 for( int i=0;i<a.length() ;i++)   //declaring i is less than lenght of string a
 { cout<<i<<"th element of a is "<<a[i]<<endl;    //printing elements of a
   cout<<i<<"th element of b is "<<b[i]<<endl;    //printing elements of b
    if(a[i]==b[i])        //if a=b, print elements of a that are equal to b
  { cout<<endl;
 cout<<a[i]<<" is equal to "<<b[i]<<endl;}
 cout<<endl;
 }

if(a==b)

for(int i=a.length();i>=0;i--)
{b[i]=a[i] ;
cout<<b[i];}
}
return 0;

}
```

QUESTION NUMBER 06

```
/*_____
Perform division in C++ without / using for loops. You can use / only to display
the final results. Your dividend must be greater than divisor.
KASHIF NADEEM KAYANI        456466          ME-15 SEC A
*/
```

Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor

```cpp
#include<iostream>
using namespace std;
int main ()
{
   int dividend,divisor,quotient;   //declaring dividend,divisor and quotient
   cout<<"enter the value of dividend: ";
   cin>>dividend;   //input dividend from user
   cout<<"enter the value of divisor: ";
   cin>>divisor;   //inout divisor from user
    quotient=0;   //declaring quotient, equal to 0


    if( divisor>dividend )   //if divisor is greater than dividend
    {cout<<"the dividend must be greater than divisor"<<endl;
           }
           else    //if dividend is greater than dividend
    for (int i=dividend;i>=divisor;i-- )   //using for loop for i
    {
    if (i%divisor==0)     //if divisor is divisible on dividend

    {
            quotient=quotient+1;   //increment in value of quotient
     }


            }
cout<<"the quotient is "<<quotient<<endl;     //printing quotient
int remainder;   //declaring remainder
remainder=dividend%divisor;    //remiander is equal to dividend % divisor
cout<<"the remainder is "<<remainder;   //printing remainder

return 0;
}
```

Question No. 06.cpp

```
C:\Users\HP\AppData\Local\Microsoft\Windows\INetCache\IE\TDWIGZFV\Question No. 06[1].exe
enter the value of dividend: 250
enter the value of divisor: 22
the quotient is 11
the remainder is 8
--------------------------------
Process exited after 3.9 seconds with return value 0
Press any key to continue . . .
```

```cpp
#include<iostream>
using namespace std;
int main ()
{
    int dividend,divisor,quotient;     //declaring dividend,divisor and quotient
    cout<<"enter the value of dividend: ";
    cin>>dividend;     //input dividend from user
    cout<<"enter the value of divisor: ";
    cin>>divisor;     //inout divisor from user
     quotient=0;     //declaring quotient, equal to 0


    if( divisor>dividend )   //if divisor is greater than dividend
    {cout<<"the dividend must be greater than divisor"<<endl;
    }
    else     //if dividend is greater than dividend
    for (int i=dividend;i>=divisor;i-- )     //using for loop for i
    {
    if (i%divisor==0)        //if divisor is divisible on dividend

    {
    quotient=quotient+1;     //increment in value of quotient
     }



        }
cout<<"the quotient is "<<quotient<<endl;     //printing quotient
int remainder;   //declaring remainder
remainder=dividend%divisor;     //remiander is equal to dividend % divisor
cout<<"the remainder is "<<remainder;   //printing remainder

return 0;
}
```

Compiler   Resources   Compile Log   Debug   Find Results

QUESTION NUMBER 07

```
/*_____
Write a C++program for a string which may contain lowercase and uppercase
characters. The task is to remove all duplicate characters from the string and find
the resultant string.
KASHIF NADEEM KAYANI      456466        ME-15 SEC A
*/
#include<iostream>
using namespace std;
int main ()
{
        string a;  //declaring stirng a.
        cin>>a;  //input from user
        for ( int i=0;i<a.length();i++)  //using for loop
        {

                for ( int j=0;j<a.length();j++ ){

                        if (i!=j)  //if i is not equal to j

                         {

                        if (a[i]==a[j])
        {
                        a[j]=a[j+1];  //move j to next place
                        a[j+1] = ' ';  //fill next place with space
        }


                        }

}
        }
        for (int i=0;i<a.length();i++)
        {
        cout<<a[i];   //print output.
        }
                return 0;

         }
```

```cpp
/*_____
Write a C++program for a string which may contain lowercase and uppercase
characters. The task is to remove all duplicate characters from the string and find
the resultant string.
KASHIF NADEEM KAYANI          456466          ME-15 SEC A
*/
#include<iostream>
using namespace std;
int main ()
{
    string a;    //declaring stirng a.
    cin>>a;  //input from user
    for ( int i=0;i<a.length();i++)   //using for loop
    {

        for ( int j=0;j<a.length();j++ ){

            if (i!=j)   //if i is not equal to j

                {

                if (a[i]==a[j])
            {
            a[j]=a[j+1];   //move j to next place
            a[j+1] = ' ';   //fill next place with space
            }


            }

    }
        }
    for (int i=0;i<a.length();i++)

    cout<<a[i];     //print output.
    }
        return 0;

    }
```
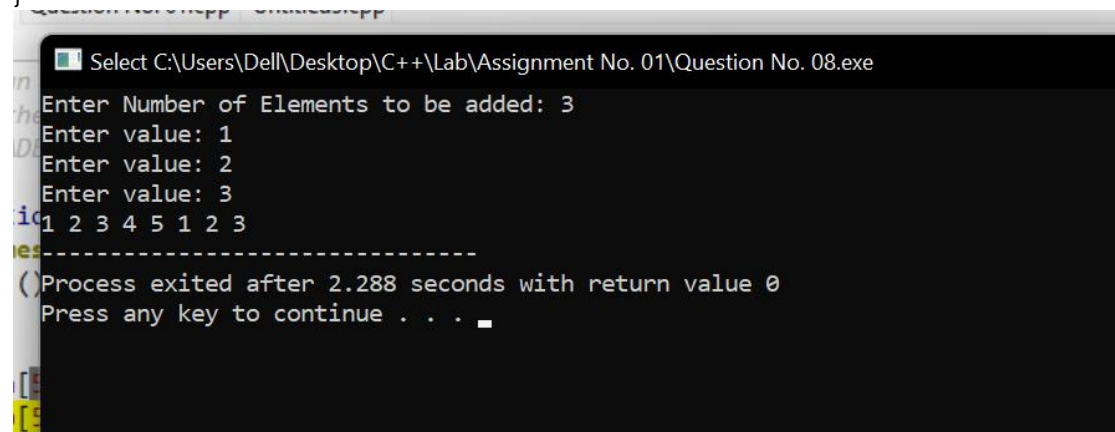
QUESTION NUMBER 08

/*_____

Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and
display them in C++.

KASHIF NADEEM KAYANI   456466   ME-15 SEC A

*/

```cpp
#include<iostream>
using namespace std;
int main ()
{

        int a[5]={1,2,3,4,5};   //declaring array a with 5 elements
        int b[5];       //declaring array b
        int n;      //declaring number of elements to be added

        for (      int i=0;i<5;i++)  //using for loop
        {
                b[i]=a[i];   //inputting values of a into b
        }
    cout<<"Enter Number of Elements to be added: ";
                cin>>n;  //input number of elements
        for ( int i=5;i<n+5;i++)
        {
    cout<<"Enter value: ";
                cin>>b[i];   //input elements of array b

}
for(int i=0; i<n+5; i++){
                cout<<b[i]<<" ";  //print array b
}


        return 0;
}
```



```
Select C:\Users\Dell\Desktop\C++\Lab\Assignment No. 01\Question No. 08.exe
Enter Number of Elements to be added: 3
Enter value: 1
Enter value: 2
Enter value: 3
1 2 3 4 5 1 2 3
-------------------------------
Process exited after 2.288 seconds with return value 0
Press any key to continue . . .
```

```cpp
/*_____
Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and
display them in C++.
KASHIF NADEEM KAYANI          456466          ME-15 SEC A
*/
#include<iostream>
using namespace std;
int main ()
{

    int a[5]={1,2,3,4,5};     //declaring array a with 5 elements
    int b[5];                 //declaring array b
    int n;                    //declaring number of elements to be added

    for (   int i=0;i<5;i++)   //using for loop
    {
        b[i]=a[i];     //inputting values of a into b
    }
    cout<<"Enter Number of Elements to be added: ";
        cin>>n;    //input number of elements
    for ( int i=5;i<n+5;i++)
    {
    cout<<"Enter value: ";
        cin>>b[i];     //input elements of array b

}
for(int i=0; i<n+5; i++){
        cout<<b[i]<<" ";   //print array b
}


    return 0;
}
```

QUESTION NUMBER 09

```
/*_____
Given an integer array and an integer X. Find if there's a triplet in the array
which sums up to the given integer X.
KASHIF NADEEM KAYANI      456466      ME-15 SEC A
*/


#include<iostream>
using namespace std;
int main ()
{
        int a[11] = {0,1,2,3,4,5,6,7,8,9,10};  //declaring array of 11 elements.
int X;     //declaring number to find triplet.
cout<<"enter the value to find triplet: ";
cin>>X;   //input from user.
for ( int i=0;i<=10;i++)      //declaring i with limit of 10.
{
        for(int j=0;j<=10;j++)      //declaring j with limit of 10.
        {for(int k=0;k<=10;k++){     //declaring k with limit of 10.
                if(a[i]+a[j]+a[k]==X)
                {cout<<a[i]<<" "<<a[j]<<" "<<a[k]<<endl;   //print triplets.
                }
        }
        }
}
return 0;
 }
```

```
C:\Users\Dell\Desktop\C++\Lab\Assignment No. 01\Question No. 09.exe
enter the value to find triplet: 23
3 10 10
4 9 10
4 10 9
5 8 10
5 9 9
5 10 8
6 7 10
6 8 9
6 9 8
6 10 7
7 6 10
7 7 9
7 8 8
7 9 7
7 10 6
8 5 10
8 6 9
8 7 8
8 8 7
8 9 6
8 10 5
9 4 10
9 5 9
9 6 8
9 7 7
9 8 6
9 9 5
9 10 4
10 3 10
10 4 9
10 5 8
10 6 7
10 7 6
10 8 5
10 9 4
10 10 3

--------------------------------
Process exited after 0.8157 seconds with return value 0
```
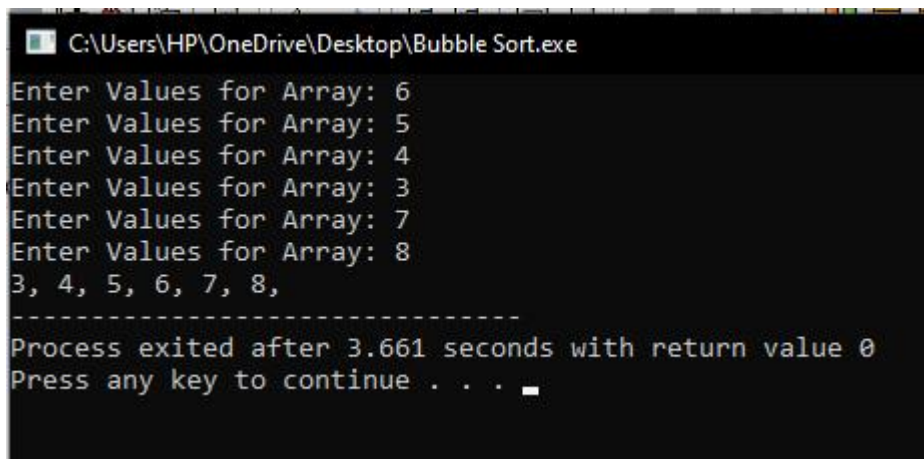
Question No. 09.cpp

QUESTION NUMBER 10

```
/*_____
. Implement Bubble Sort on an array of 6 integers.
KASHIF NADEEM KAYANI        456466        ME-15 SEC A
*/

#include <iostream>
using namespace std;
int main(){
        int i,j,temp;   //declaring three variables
        int a[6];    //declaring aray a with 6 elements
        for(i=0; i<6; i++){   //using for loop
                cout<<"Enter Values for Array: ";
                cin>>a[i];    //input from user
        }
        for (int i=0; i<5; i++)    //again using for loo[
        {
        for(j=0; j<5; j++){   //using nested for loop
                        if(a[j]>a[j+1]){   //if previous number is greater than following number
                                temp=a[j];
                                a[j]=a[j+1];
                                a[j+1]=temp;
                        }
                }}
        for(i=0; i<6; i++){   //using for loop for printing
                cout<<a[i]<<", ";   //printing results
        }
        return 0;
}
```

```
C:\Users\HP\OneDrive\Desktop\Bubble Sort.exe

Enter Values for Array: 6
Enter Values for Array: 5
Enter Values for Array: 4
Enter Values for Array: 3
Enter Values for Array: 7
Enter Values for Array: 8
3, 4, 5, 6, 7, 8,
---------------------------------
Process exited after 3.661 seconds with return value 0
Press any key to continue . . . _
```

Question_No._10.cpp

```cpp
/*
. Implement Bubble Sort on an array of 6 integers.
KASHIF NADEEM KAYANI              456466              ME-15 SEC A
*/

#include <iostream>
using namespace std;
int main(){
    int i,j,temp;   //declaring three variables
    int a[6];     //declaring aray a with 6 elements
    for(i=0; i<6; i++){    //using for loop
        cout<<"Enter Values for Array: ";
        cin>>a[i];    //input from user
    }
    for (int i=0; i<5; i++)   //again using for Loo[
    {
    for(j=0; j<5; j++){    //using nested for loop
            if(a[j]>a[j+1]){    //if previous number is greater than following number
                temp=a[j];
                a[j]=a[j+1];
                a[j+1]=temp;
            }
        }}
    for(i=0; i<6; i++){   //using for loop for printing
        cout<<a[i]<<", ";   //printing results
    }
    return 0;
}
```