School of Mechanical & Manufacturing Engineering (SMME),

National University of Science and Technology (NUST),

Sector H-12, Islamabad

Program: BE-Aerospace   Section: AE-01

Session: Fall 2023   Semester: 1st

Course Title: Fundamentals of Programming (CS-109)

" _Assignment no 1_ "

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Assignment no 1.

Tasks

Question no 1.

Write a C++ program, take two strings as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

Solution

```cpp
#include <iostream>
using namespace std;
int main()
{
int str1= 0, str2 = 0,i,j,k;
char a1[100];
char a2[100];
cout << "enter string 1 and to end the string add 4 at the end = ";
for ( i = 0;; i++)
{
cin >> a1[i];
 if (a1[i] == '4') {
break;
}
str1++;
   }
cout << "enter string 2 and to end the string add 4 at the end = ";
for ( j = 0;; j++)
```

```cpp
{
cin >> a2[j];
if (a2[j] == '4')
 break;
str2++;
}
if (str1 != str2) {
cout << "strigs are not equal";
    }
else {
   for ( k = 0; k < str1; k++) {
   if (a1[k] != a2[k])
   break;
   }
    if (k == str1) {
   for (int m = 0, n = str1 - 1; m < n; m++, n--) {
      char temp = a2[m];
      a2[m] = a2[n];
      a2[n] = temp;
      }
      for (k = 0; k <str1; k++)
      cout << a2[k];
      }
      else {
      cout << "strings are not equal";
      }
      }
```

return 0;

}

```
enter string 1 and to end the string add 4 at the end = awais4
enter string 2 and to end the string add 4 at the end = awais4
siawa
---------------------------------
Process exited after 12.34 seconds with return value 0
Press any key to continue . . . ▪
```

Question no 2.

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.

Solution

```
#include <iostream>

#include <string>

using namespace std;

int main()

{

 string sb;

cout << "Enter a string of your choice = ";

cin >> sb;

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

{

char x = sb[i];

for (int j = i + 1; j < sb.length();)

{

 if (sb[j] == x)
```

```
{
sb.erase(j, 1); }
 else
{ ++j; }
}
}
```

cout << "Resultant string after removing duplicates is = " <<sb<<endl;

return 0;

```
}
```

```
Enter a string of your choice = hahahahaha
Resultant string after removing duplicates is = ha

----------------------------------
Process exited after 5.649 seconds with return value 0
Press any key to continue . . .
```

Question no 3.

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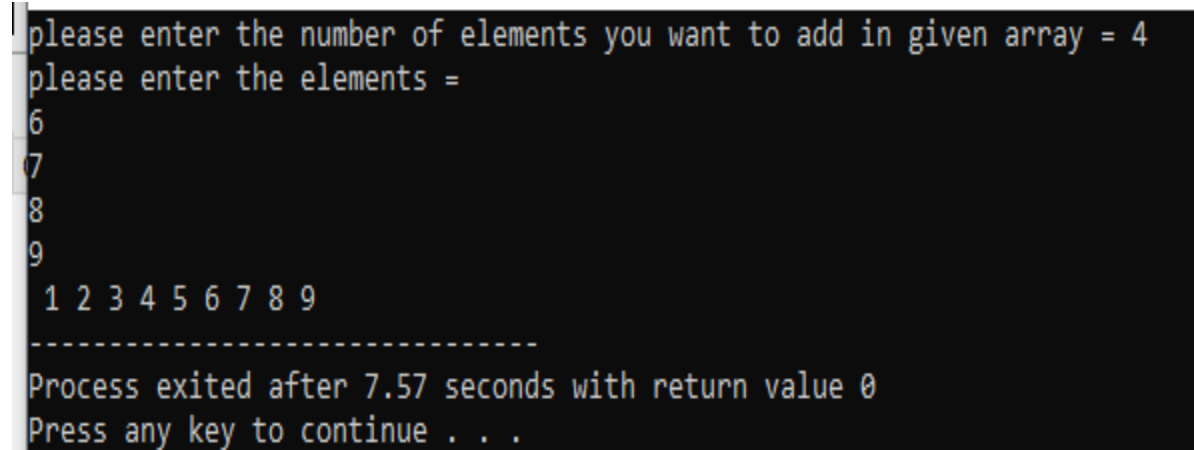
Solution

```
#include<iostream>
using namespace std;
int main()
{
 int a[100] = {1,2,3,4,5};
   int i,n;
   cout << "please enter the number of elements you want to add in given array = ";
   cin >> n;
```

```cpp
        cout << "please enter the elements = "<<endl;

        for (i=0;i<n;i++)

        {

        cin >> a[i+5];

        }

        for (int j=0;j<n+5;j++)

        cout << " "<<a[j];

        return 0;

}
```

```
please enter the number of elements you want to add in given array = 4
please enter the elements =
6
7
8
9
 1 2 3 4 5 6 7 8 9
---------------------------------
Process exited after 7.57 seconds with return value 0
Press any key to continue . . .
```

Question no 4.

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.

Solution

```cpp
#include<iostream>

using namespace std;
```

```cpp
int main()

{

    int p,count,n;

    cout<<"enter the integer for which largest prime number needs to be found = ";

    cin>>n;

    for(int i=1; i<=n; i++){

    count = 0;

    for(int j=1;j<=i;j++){

    if (i%j==0){

    count++;}}

    if (count==2){

    p=i;}}

    cout<<"the largest prime number less than or equal to "<<n<<" is "<<p;

    return 0;

}
```

```
enter the integer for which largest prime number needs to be found = 9
the largest prime number less than or equal to 9 is 7
--------------------------------
Process exited after 3.769 seconds with return value 0
Press any key to continue . . .
```

Question no 5.

Implement Bubble Sort on an array of 6 integers.

Solution

```cpp
#include <iostream>
#include <climits>
using namespace std;
int main ()
{
int a[10]={5,19,15,17,99,77,65,43},temp;
for (int i=0;i<10;i++)
{
      for (int j=i+1;j<10;j++)
      {
            if (a[i]<a[j])
            {
                  temp=a[i];
                  a[i]=a[j];
                  a[j]=temp;
            }
      }
}
for (int k=0;k<9;k++)
{
      cout<<a[k]<<endl;
}
return 0;
```

```
}
```

```
99
77
65
43
19
17
15
5
0


------------------------------
Process exited after 0.3053 seconds with return value 0
Press any key to continue . . . _
```

Question no 6.

Solve any Aerospace/Real Life Problem using C++ Programming.

Solution

I have written a program that will get the lift and drag force from user and it will show the required gliding angle of the aircraft.

```cpp
#include <iostream>
#include <cmath>
using namespace std;
int main ()
{double l,d,x,result;
cout<<"enter the lift of the aircraft =  ";
cin>>l;
cout<<"enter the drag force on the aircraft = ";
cin>>d;
x=1/(l/d);
```

```cpp
result=atan(x);

cout<<"the gliding angle in the radian is "<<result<<" radians"<<endl;

cout<<"the gliding angle in the degrees is "<<result*180/3.1415<<" degrees"<<endl;

return 0;

}
```

```
enter the lift of the aircraft =  70
enter the drag force on the aircraft = 50
the gliding angle in the radian is 0.620249 radians
the gliding angle in the degrees is 35.5387 degrees


---------------------------------
Process exited after 6.193 seconds with return value 0
Press any key to continue . . .
```