National University of Science and Technology

School of Mechanical and Manufacturing Engineering

Assignment #1

CS-114 Fundamentals of Programming

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Lab Instructor: Muhammad Affan

Introduction:

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Section: ME-15B

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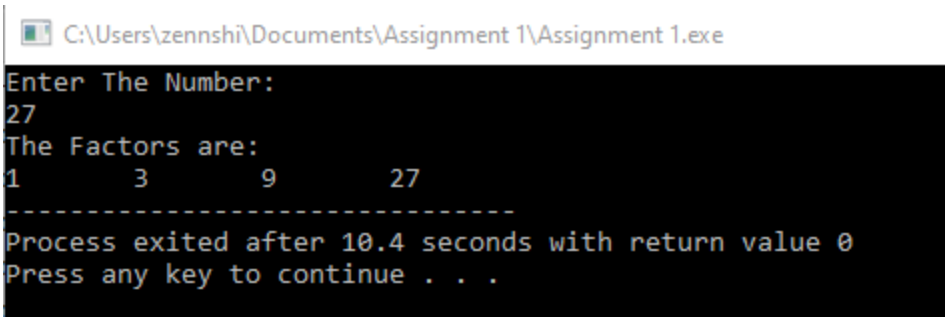
Question 1:

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

Solution:

```
//Question 1
#include <iostream>
using namespace std;
int main(){
int num;
cout<<"Enter The Number: "<<endl;
cin>>num;
cout<<"The Factors are: "<<endl;
for(int i=1;i<=num;i++){
if(num%i==0){
cout<<i<<"\t";
}
}

return 0;
}
```

Result:



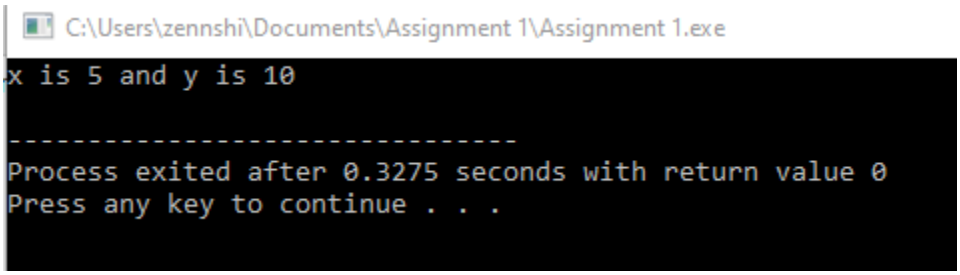
Question 2:

Write Output to the following code:

Solution:

```
#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;

}
```

Result:



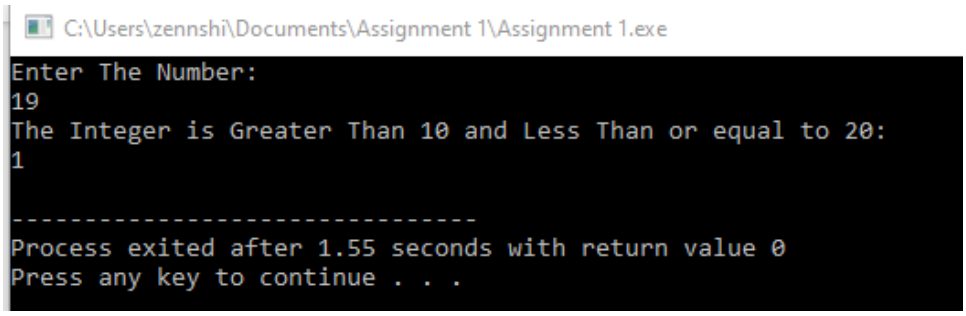
Question 3:

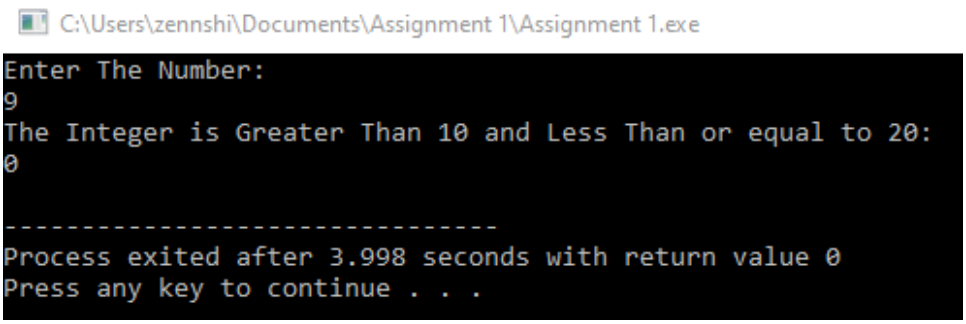
Write a C++ program, take an integer value from user and check if it's greater than 10 and less than or equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

Solution:

```
//Question 3

#include <iostream>

using namespace std;

int main(){

int num;

bool is_true=1,is_false=0;

cout<<"Enter The Number: "<<endl;

cin>>num;

cout<<"The Integer is Greater Than 10 and Less Than or equal to 20: "<<endl;

if(num>10&&num<=20){

cout<<is_true<<endl;

}

else{

cout<<is_false<<endl;

}

return 0;

}
```

Result:





Question 4:

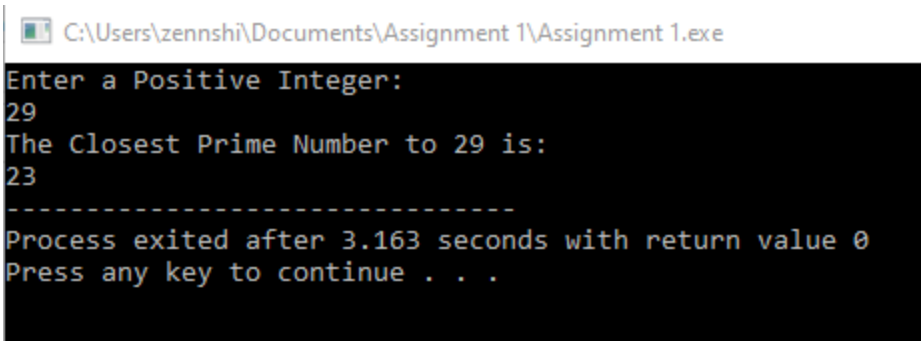
Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing functions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

Solution:

```
//Question 4

#include <iostream>

using namespace std;

int main(){

int num1,num2=1,i;

cout<<"Enter a Positive Integer: "<<endl;

cin>>num1;

i=num1-1;

if(num1<=0){

cout<<"Invalid!Please enter a Positive Integer."<<endl;
```

```
}
else {

cout<<"The Closest Prime Number to "<<num1<<" is: "<<endl;
while(i>=2){
int j=2;
num2=1;
while(j*j<=i){
if(i%j==0){
num2=0;
break;
}
j++;
}
if(num2==1){
cout<<i<<"  ";
break;
}
--i;
}         }
return 0;
}
```

Result:



Question 5:

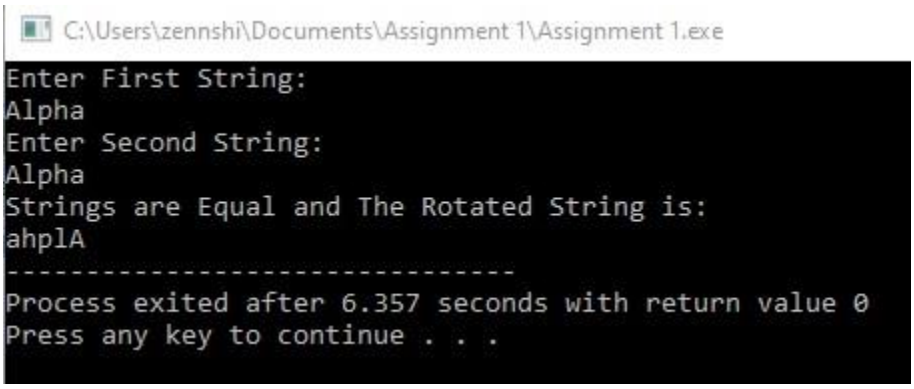
Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

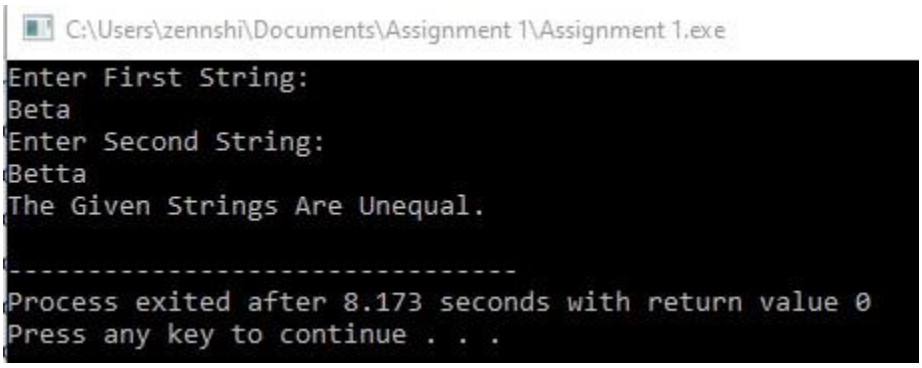
Solution:

```
//Question 5

#include <iostream>

#include <string>

using namespace std;

int main(){

    string str1,str2;

    cout<<"Enter First String: "<<endl;

    cin>>str1;

    cout<<"Enter Second String: "<<endl;

    cin>>str2;

    string rot="";

    if(str1==str2){

    for(int i=0;i<str1.length();i++){

          rot=str1[i]+rot;

 }         cout<<"Strings are Equal and The Rotated String is: "<<endl;
```

```
 cout<<rot;}
else{
        cout<<"The Given Strings Are Unequal."<<endl;
}
return 0;}
```

Result:





Question 6:

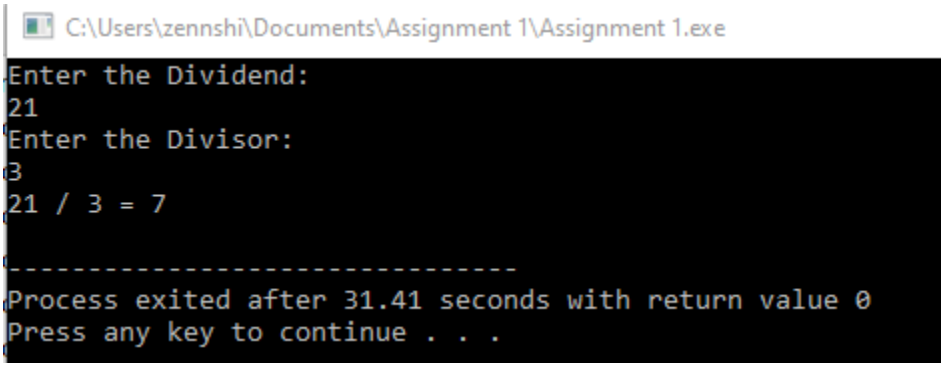
Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor.

Solution:

```
//Question 6
#include <iostream>
using namespace std;
```

```
int main(){
int q=0,dd,dr;
cout<<"Enter the Dividend: "<<endl;
cin>>dd;
cout<<"Enter the Divisor: "<<endl;
cin>>dr;
if(dd<=dr){
cout<<"The Dividend must be greater than the Divisor."<<endl;
}
else {
for(int i=dd;i>0;i=i-dr){
q++;
}
cout<<dd<<" / "<<dr<<" = "<<q<<endl;
}
return 0;
}
```

Result:



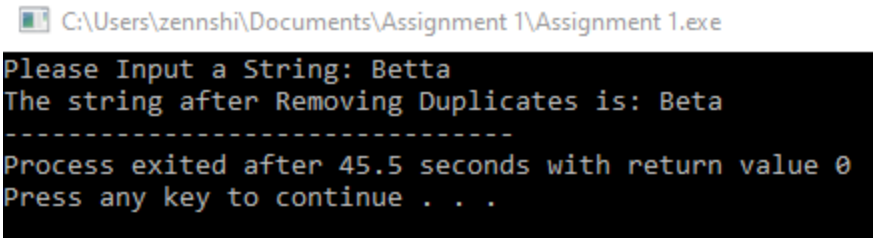
Question 7:

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:

```
//Question 7

#include <iostream>

#include<string.h>

using namespace std;

int main(){

int i,j;

string str1,str2="";

cout<<"Please Input a String: ";

getline(cin,str1);

for(i=0;i<str1.length();i++){

for(j=0;j<str1.length();j++){

if(str1[i]==str1[j]){

break;

} }

if(i==j){

str2=str2+str1[i];

} }

cout<<"The string after Removing Duplicates is: "<<str2;

return 0;}
```

Result:



Question 8:

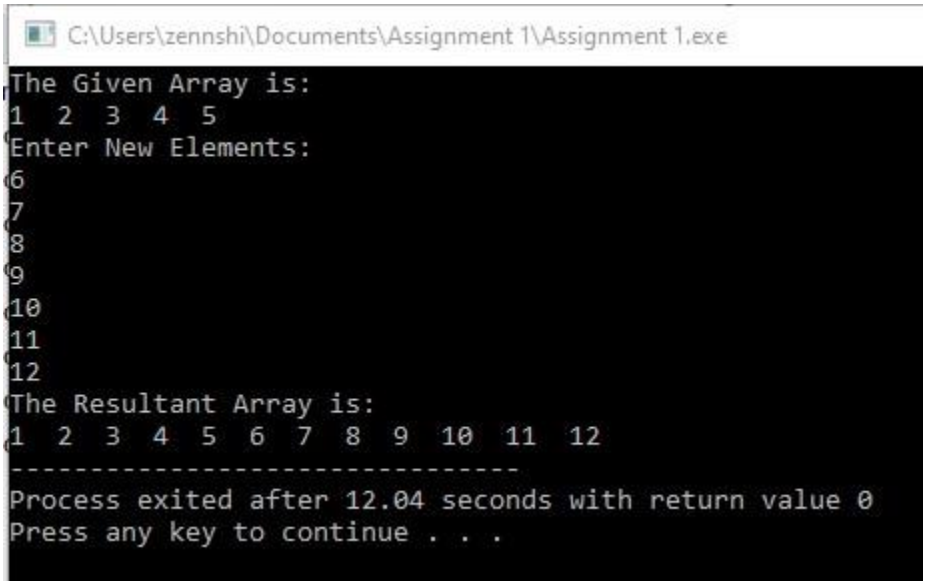
Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and display them in C++.

Solution:

```
//Question 8

#include <iostream>

using namespace std;

int main(){

int a[5]={1,2,3,4,5};

cout<<"The Given Array is: "<<endl;

for(int i=0;i<5;i++){

cout<<a[i]<<"  ";

}

cout<<endl;

int Arr[12];

for(int i=0;i<5;i++){

Arr[i]=a[i];

}

cout<<"Enter New Elements: "<<endl;

for(int j=5;j<12;j++){

cin>>Arr[j];
```

```
}
cout<<"The Resultant Array is: "<<endl;
for(int k=0;k<12;k++){
cout<<Arr[k]<<"  ";
}

return 0;}
```

Result:



Question 9:

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.

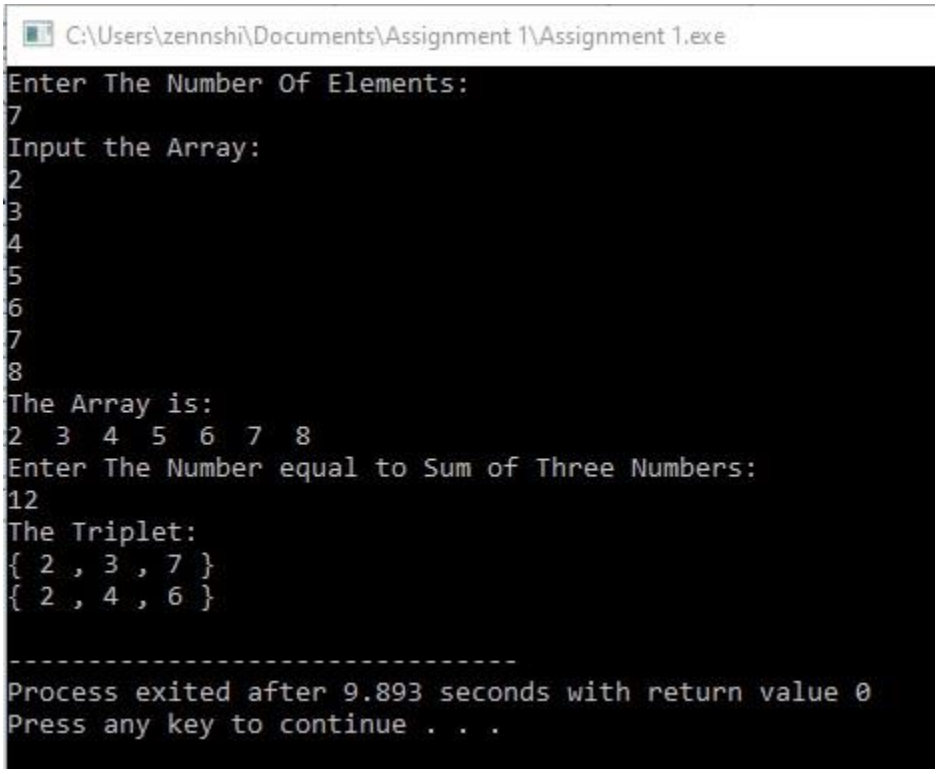
Solution:

```
//Question 9
#include <iostream>
using namespace std;
```

```
int main(){
int a,b=0,trip;
int n;
int Arr[n];
cout<<"Enter The Number Of Elements: "<<endl;
cin>>n;
cout<<"Input the Array: "<<endl;
for(int i=0;i<=n-1;i++){
cin>>Arr[i];
}
cout<<"The Array is: "<<endl;
for(int j=0;j<=n-1;j++){
cout<<Arr[j]<<"  ";
}
cout<<endl;
cout<<"Enter The Number equal to Sum of Three Numbers:  "<<endl;
cin>>trip;
cout<<"The Triplet:"<<endl;
for(int j=0;j<=n-1;j++){
for(int k=k+1;k<n-1;k++){
for(int u=k+1;u<n-1;u++){
a=Arr[j]+Arr[k]+Arr[u];
if(a==trip){
cout<<"{ "<<Arr[j]<<" , "<<Arr[k]<<" , "<<Arr[u]<<" }"<<endl;
b=1;
}
```

```
}

}

}

return 0;}
```

Result:



Question 10:

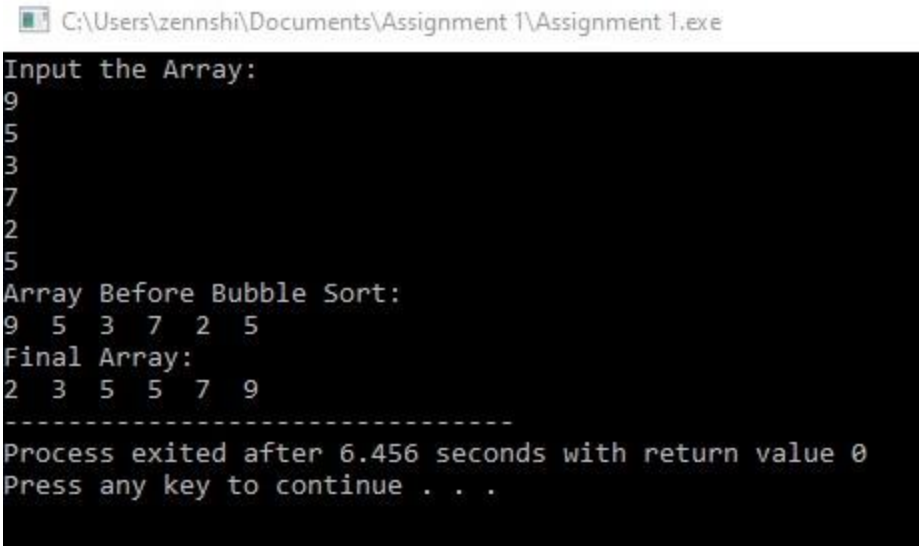
Implement Bubble Sort on an array of 6 integers.

Solution:

```
//Question 10

#include <iostream>

using namespace std;

int main(){

int GA[6];
```

```
int n=5;
cout<<"Input the Array: "<<endl;
for(int a=0;a<=n;a++){
cin>>GA[a];
}
cout<<"Array Before Bubble Sort: "<<endl;
for(int i=0;i<=n;i++){
cout<<GA[i]<<"  ";
}
cout<<endl;
for(int j=0;j<n;j++){
for(int k=0;k<n-j;k++){
if(GA[k]>GA[k+1]){
int temp=GA[k];
GA[k]=GA[k+1];
GA[k+1]=temp;
}
}
}
cout<<"Final Array: "<<endl;
for(int u=0;u<=n;u++){
cout<<GA[u]<<"  ";
}
return 0;}
```

Result:


C:\Users\zennshi\Documents\Assignment 1\Assignment 1.exe
Input the Array:
9
5
3
7
2
5
Array Before Bubble Sort:
9 5 3 7 2 5
Final Array:
2 3 5 5 7 9

Process exited after 6.456 seconds with return value 0
Press any key to continue . . .