Fundamentals of Programming

Assignment 1

Tasks 1-10

ME-15

Name: Faizan Ahmad

Qalam ID: 476602

Section: A

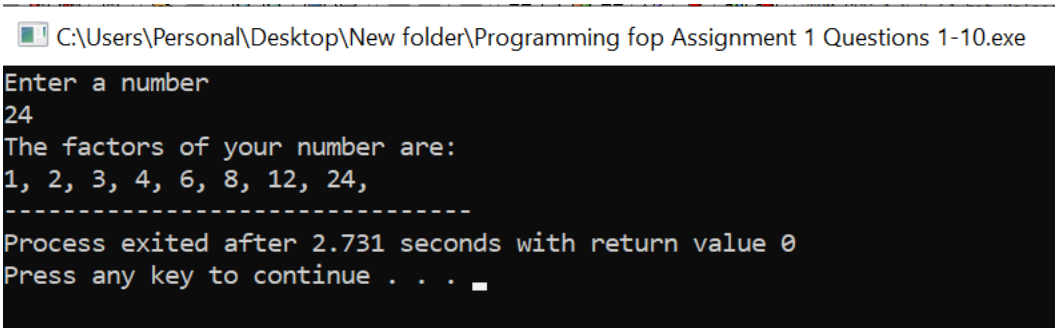
Task 1:

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

Code:

```
#include<iostream>

using namespace std;

int main() {

int num, factor;

        cout<<"Enter a number"<<endl;

        cin>>num;

        cout<<"The factors of your number are:"<<endl;

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

                if ( num % i == 0 ) {

                        cout<<i<<", ";

                }

                else {

                        continue;

                }

        }

        return 0;

}
```

Execute:



Task 2:

Write output to the following code.

Code:

#include 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; }

Execute:

X is 5 and y is 10

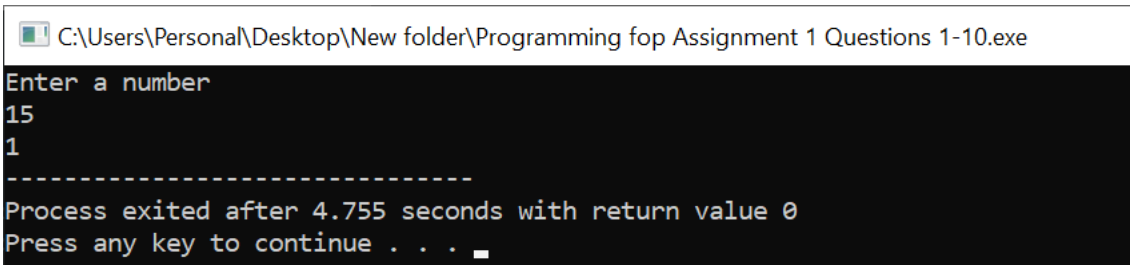
Task 3:

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

Code:

```
#include<iostream>

using namespace std;

int main() {

int num, ans;


cout<<"Enter a number"<<endl;

cin>>num;


ans = ( num > 10 && num <= 20 ) ? 1 : 0;


cout<<ans;

return 0;

}
```

Execute:



Task 4:

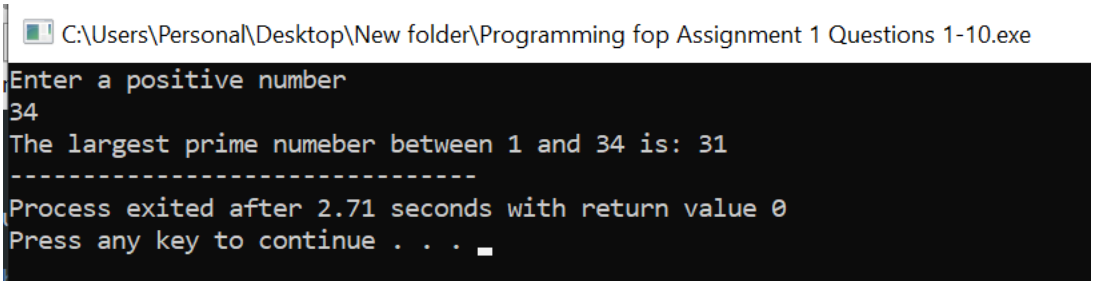
Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing functions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

Code:

```
#include<iostream>

using namespace std;

int main() {


int N, num1, maxprime;


cout<<"Enter a positive number"<<endl;

cin>>N;


if ( N <= 1 ) {

        cout<<"Please enter a positive integer greater than 1"<<endl;

        return 1;

}


num1 = N;


while ( num1 > 1 ) {

        int i;

        for ( i = 2; i <= num1/2; i++) {


                if ( num1 % i == 0 ) {

                        break;

                }

        }


        if ( i > num1 / 2 ) {

                maxprime = num1;

                break;

        }
```

```
            num1--;
}

            cout<<"The largest prime numeber between 1 and "<<N<<" is: "<<maxprime;
return 0;
}
```

Execute:



Task 5:

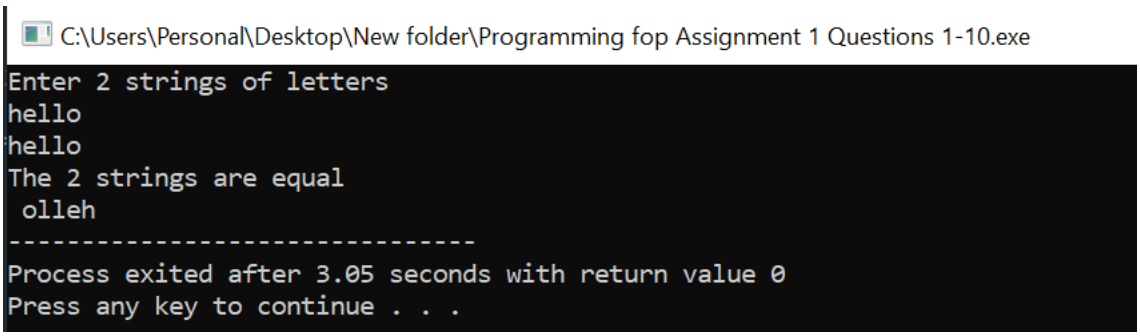
Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

Code:

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

string a;
string b;
cout<<"Enter 2 strings of letters"<<endl;
cin>>a>>b;

int x;
x = a.length();

if ( a == b ) {
```

```
        cout<<"The 2 strings are equal"<<endl;

        for ( int i=x; i >= 0; i-- ) {

                cout<<a[i];

        }

}
else {
        cout<<"The 2 strings are not equal"<<endl;
}
return 0;
}
```

Execute:



Task 6:

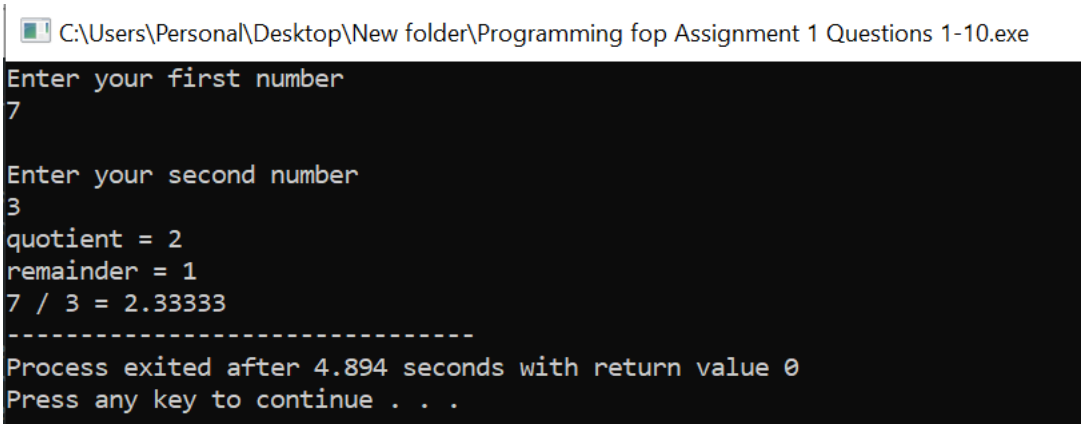
Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor.

Code:

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

```
long double divident, divisor, remainder, answer;
int quotient=0;

cout<<"Enter your first number"<<endl;
cin>>divident;
cout<<endl<<"Enter your second number"<<endl;
cin>>divisor;

if ( divident < divisor || divisor == 0 ) {
        cout<<"Invalid input, insure that the first number is greater than the second and that the secound number is not 0";
}
else {

int i;
for ( int i = divisor; i <= divident; i = i + divisor ) {
        quotient++;
}

cout<<"quotient = "<<quotient<<endl;

remainder = fmod( divident, divisor );

cout<<"remainder = "<<remainder<<endl;

answer = quotient + remainder / divisor;
cout<<divident<<" / "<<divisor<<" = "<<answer;

}
return 0;
}
```

Execute:



Task 7:

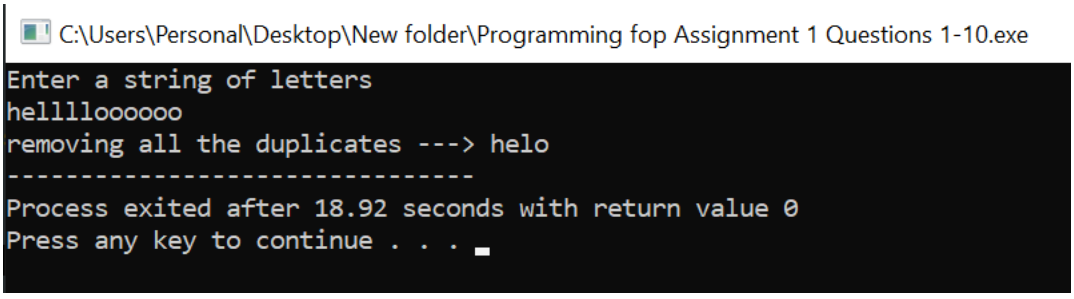
Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.

Code:

```
#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

int x;

string a;

string b;


cout<<"Enter a string of letters"<<endl;

cin>>a;


x = a.length();


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


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


                if ( tolower( a[i] ) == tolower ( a[j] )   && i < j) {

                        for ( int k = j; k < x-1; k++ ) {
```

```
                                        a[k] = a[k + 1 ];


                                    }

                                    a[x-1] = ' ';

                                    x--;

                                    j--;


                            }


                }

}

cout<<"removing all the duplicates ---> ";

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

                cout<<a[i];

}

return 0;

}
```

Execute:



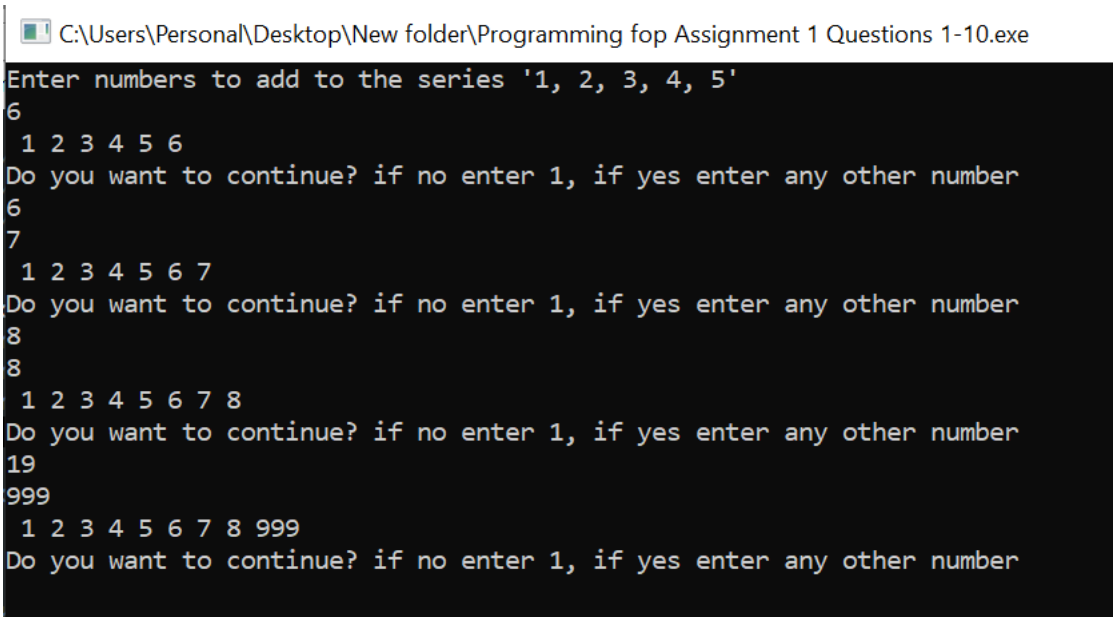
Task 8:

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

Code:

```
#include<iostream>
#include<string>
#include<cmath>
using namespace std;
int main() {
cout<<"Enter numbers to add to the series '1, 2, 3, 4, 5' "<<endl;
int x=4, choice;
int a[5] = {1,2,3,4,5};
int b[99];



for (int i = 0; i<5; i++) {
		b[i] = a[i];
}


while (  choice != 1 ) {


		cin>>b[x + 1];
		x++;


		for (int i = 0; i<=x; i++) {
		cout<<" "<<b[i];


}
		cout<<endl<<"Do you want to continue? if no enter 1, if yes enter any other number"<<endl;
		cin>>choice;


}
return 0;
}
```

Execute:



Task 9:

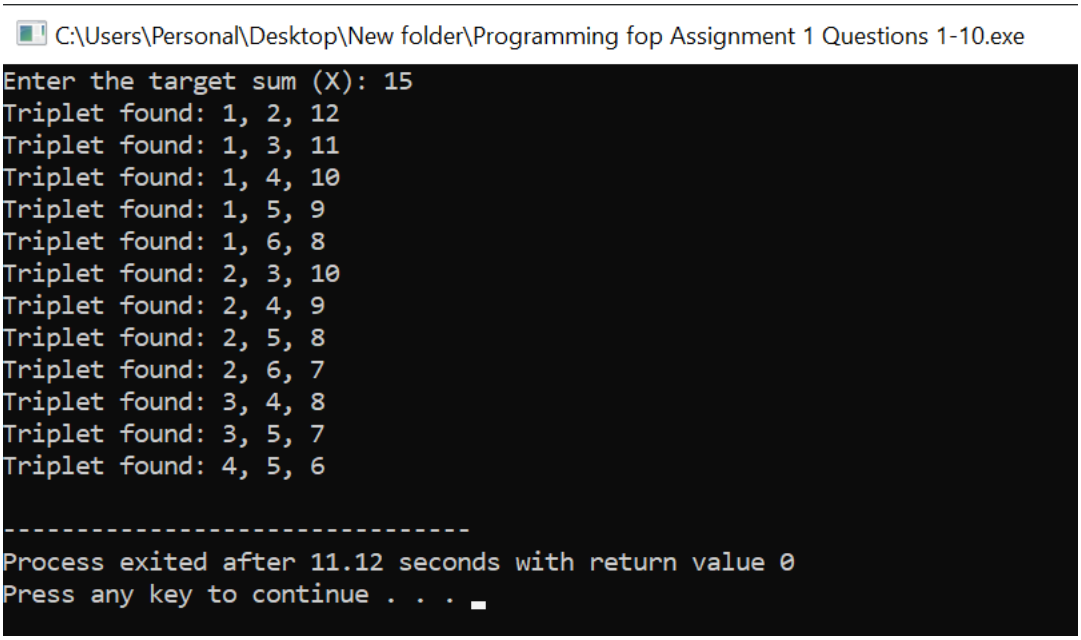
Given an integer array and an integer X. Find if there's a triplet in the array which sums up to the given integer X.

Code:

```
#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

  int a[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15};

  int n = 14;


  int X;

  cout << "Enter the target sum (X): ";

  cin >> X;


  int tripletFound = 0; // 0 represents false, 1 represents true


  for (int i = 0; i < n - 2; i++) {

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

```
        for (int k = j + 1; k < n; k++) {
            if (a[i] + a[j] + a[k] == X) {
                // Triplet found
                cout << "Triplet found: " << a[i] << ", " << a[j] << ", " << a[k] << endl;
                tripletFound = 1;
            }
        }
    }
  }

  if (!tripletFound) {
    cout << "No triplet found." << endl;
  }
return 0;
}
```

Execute:



Task 10:

Implement Bubble Sort on an array of 6 integers.

Code:

```
#include<iostream>
#include<string>
#include<cmath>
using namespace std;
int main() {
int temp;
cout<<"Enter 6 numbers"<<endl;

int a[6];

for (int i = 0; i < 6; i++) {
		cin>>a[i];

}

for (int i = 0; i<5; i++) {
		for (int j = i + 1; j<6; j++) {

			if ( a[i] > a[j] ) {
				temp = a[i];
				a[i] = a[j];
				a[j] = temp;
			}
		}
}

for ( int i = 0; i<6; i++ ) {
		cout<<endl<<a[i];

}
```

```
        return 0;
}
```

Execute: