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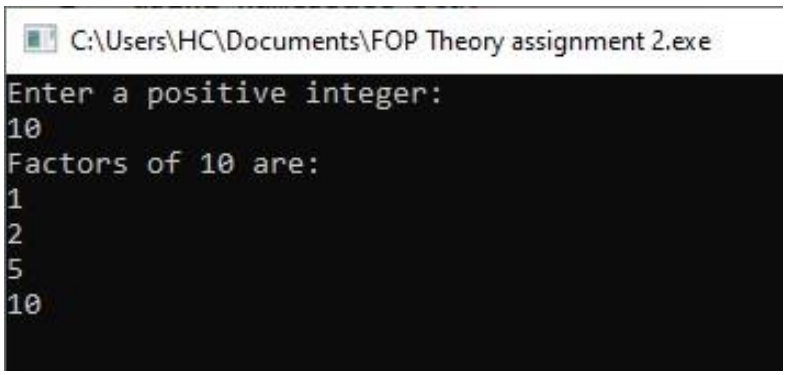
Fundamentals of Programming

Assignment no. 1

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

```
#include <iostream>
#include <string>
using namespace std;

//Task 1
int main () {
int INT;
cout<<"Enter a positive integer: "<<endl; cin>>INT;

if (INT<=0) {
cout<<"Invalid input, enter a positive integer: "<<endl;
 }
else {
cout<<"Factors of "<<INT<<" are: "<<endl;
for (int i=1; i<=INT; i++) {
    if (INT%i==0 ) {
          cout<<i<<endl;
           }
}
cout<<endl;
}
return 0;
}
```

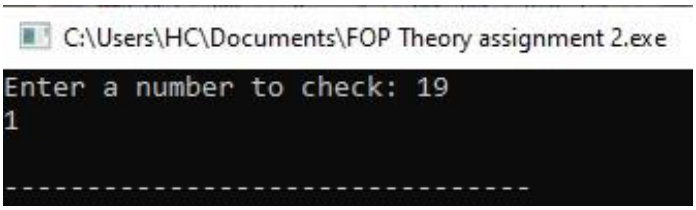


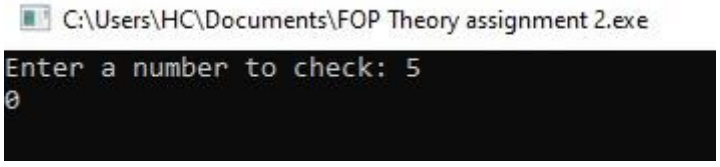
2. Write output to the following code.

```
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;
}
```

3. 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.

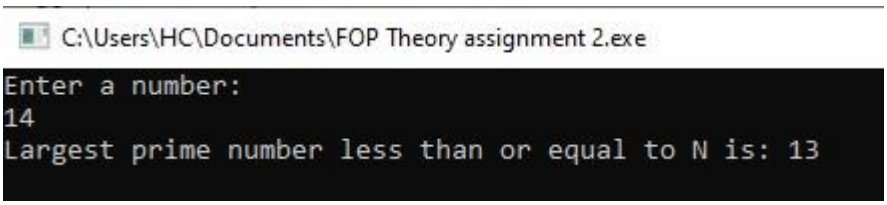
```
int main () {

int num;
cout<<"Enter a number to check: ";
cin>>num;
int res;
res= (num>10 && num<=20) ? 1:0;
cout<<res<<endl;
return 0;
}
```





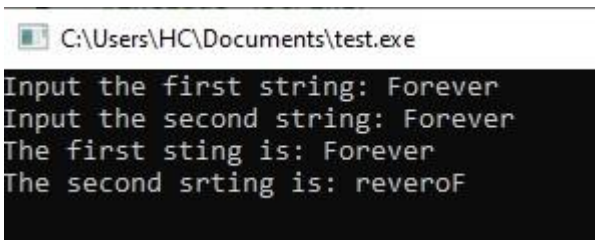
4. **Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing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

```
bool isPrime(int num) {
		if (num<=1) {
			return false;
		}
		for (int i=2; i*i<=num; i++) {
			if (num%i==0) {

			return false;
		}
		}
		return true;
}
	int main () {

	int N;
	cout<<"Enter a number: "<<endl; cin>>N;
	while (N>1) {
		if(isPrime(N)) {
			cout<<"Largest prime number less than or equal to N is: "<<N<<endl;
			break;
		}
		--N;
	}
	return 0;
}
```



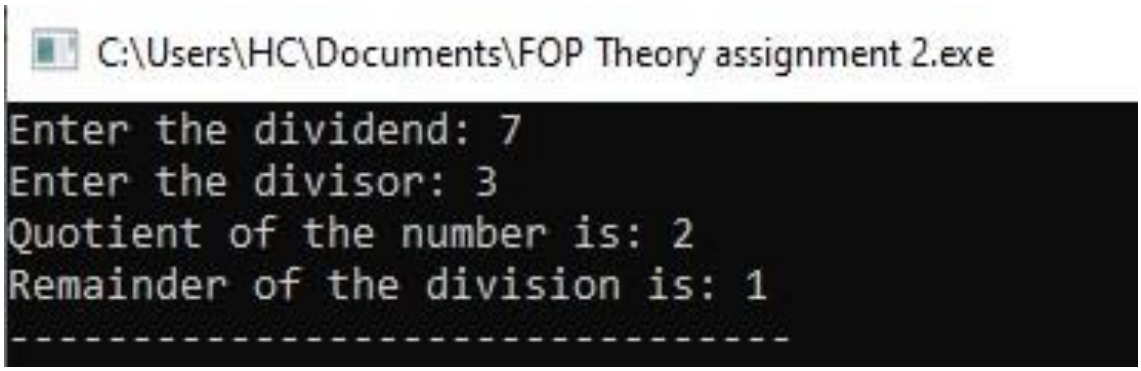
5. **Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.**

```
int main () {


string str1, str2;


int len;
cout<<"Input the first string: ";
getline(cin, str1);
cout<<"Input the second string: ";
getline(cin, str2);
        if (str1==str2){
                len=str1.length();
        for (int i=0; i<len/2; i++){
                        swap(str2[i], str2[len-i-1]);
        }
        }
        cout<<"The first sting is: "<<str1<<endl;


        cout<<"The second srting is: "<<str2<<endl;


return 0;
}
```



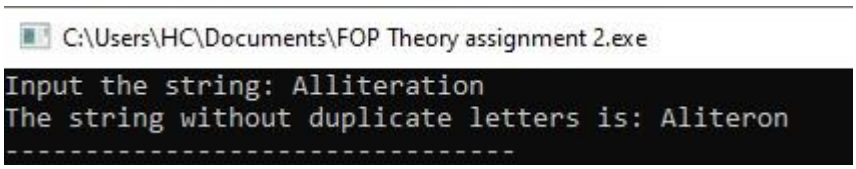
6. **Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor.**

```
int main () {

int dividend,divisor;
cout<<"Enter the dividend: "; cin>>dividend;
cout<<"Enter the divisor: "; cin>>divisor;

int quotient=0,remainder=0;
while (dividend>=divisor) {
        dividend-=divisor;
        quotient++;
}
remainder=dividend;
cout<<"Quotient of the number is: "<<quotient<<endl;
cout<<"Remainder of the division is: "<<remainder;

return 0;
}
```



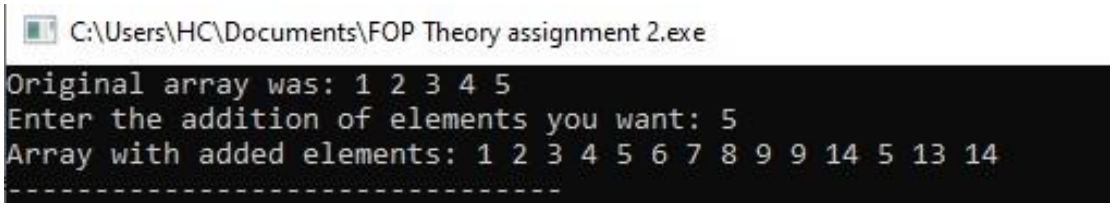
7. **Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.**

```
int main(){
	string string1;
	int length;
	cout<<"Input the string: ";
	getline(cin, string1);
	length= string1.length();
	for (int i=0; i<=length; i++){
		for (int j=0; j<=length; j++){
			if (tolower(string1[i])==tolower(string1[j]) && i!=j){
				string1.erase(j, 1);
				j--;
				length=string1.length();
			}
		}
	}
	cout<<"The string without duplicate letters is: "<<string1;
	return 0;
}
```



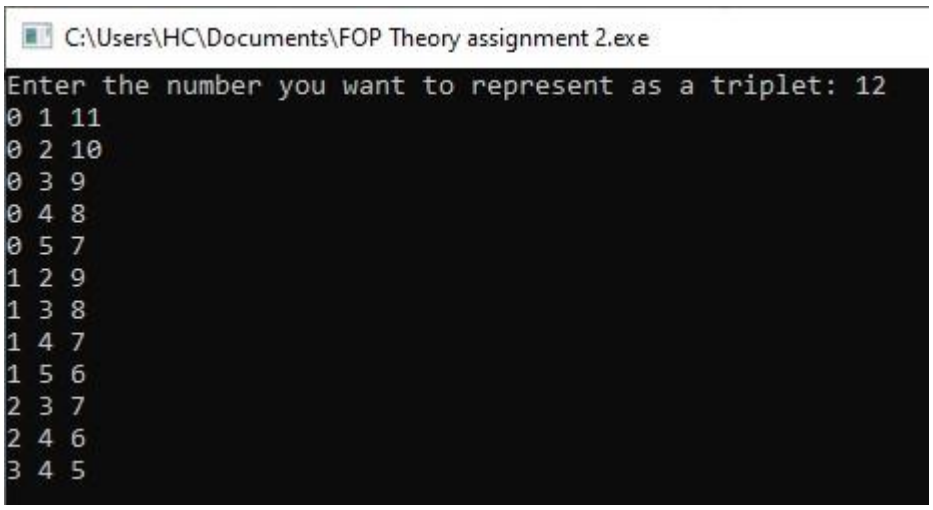
8. **Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and display them in C++.**

```
int main () {
	int n,a[5]={1,2,3,4,5};
	cout<<"Original array was: ";
	for (int i=0;i<5; i++) {
		cout<<a[i]<<" ";
	}
	cout<<endl;
	cout<<"Enter the addition of elements you want: ";
	cin>>n;
	for (int i=5;i<5+n;i++) {
		a[i]=i+1;
	}
	cout<<"Array with added elements: ";
	for (int i=0;i<5+n;i++) {
		cout<<a[i]<<" ";
	}
	return 0;
}
```



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.

```
int main() {
   int X;
   cout << "Enter the number you want to represent as a triplet: "; cin >> X;


for (int i=0; i<=X; i++) {
        for (int j=i+1;j<=X;j++) {
                for (int k=j+1;k<=X;k++) {
                int     a[3]={i,j,k};
                        int sum=a[0]+a[1]+a[2];
                        if (sum==X) {
                                cout<<a[0]<<" "<<a[1]<<" "<<a[2]<<endl;
                        }
                }
        }
}
return 0;
}
```



10.Implement Bubble Sort on an array of 6 integers.

```
int main() {

    int Array[6];
    cout <<"Enter 6 different terms for sorting: " <<endl;
    for (int i=0;i<6;i++)
        cin>>Array[i];

    cout<<"Original array was: ";
    for (int j=0;j<6;j++)
        cout<<Array[j]<< " ";

    for (int i=0;i<6-1;i++) {
        for (int j=0;j<6-i-1;j++ ) {
            if (Array[j]>Array[j+1]) {
                int Swap=Array[j];
            Array[j]=Array[j+1];
            Array[j+1]=Swap;
    }
    }
    }

    cout<<"\nThe sorted array is: "<<endl;
    for (int i=0;i<6;i++) {
        cout<<Array[i]<< " ";
    }

    return 0;
}
```