Fundamental of Programing

Assignment #1

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

ANSWER:

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

int main(){
int count, num;
cout<<"Please Enter a Number to Check Factors: ";
cin>>num;
for(count=1; count<=num; count++){
        if(num%count==0){
                cout<<count<<endl;
                continue;
        }
}
        Return 0;
                                                }
```

```
Please Enter a Number to Check Factors: 64
1
2
4
8
16
32
64

--------------------------------
Process exited after 0.8941 seconds with return value 0
Press any key to continue . . .
```

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2. Write output to the following code.

```
#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:

x is 5 and y is 10

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.**

ANSWER:

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

int main(){
int num;
bool flag;
cout<<"Enter a Value: ";
cin>>num;
if(num>10 && num<=20){
	flag=true;
}
else{
	flag=false;
}
cout<<static_cast<int>(flag)<<endl;

}
```

```
Enter a Value: 11
1

--------------------------------
Process exited after 3.174 seconds with return value 0
Press any key to continue . . .
```

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.

ANSWER:

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

int main(){
int N, i, j;
bool flag=false;
cout<<"Enter a Number to Check: ";
cin>>N;
i=N;
while(i>1){
        j=i-1;
        flag=false;
        while(j>1){
                if(i%j==0){
//                                      cout<<i<<"  "<<j<<endl;
                        flag=false;
                        break;
                }
                else if(i%j==1){
                        flag=true;
                }
                j--;
        }


        if(flag==true){
                cout<<"Largest Prime Number Below "<<N<<" is: "<<i;
                break;
}
i--;
}
}
```

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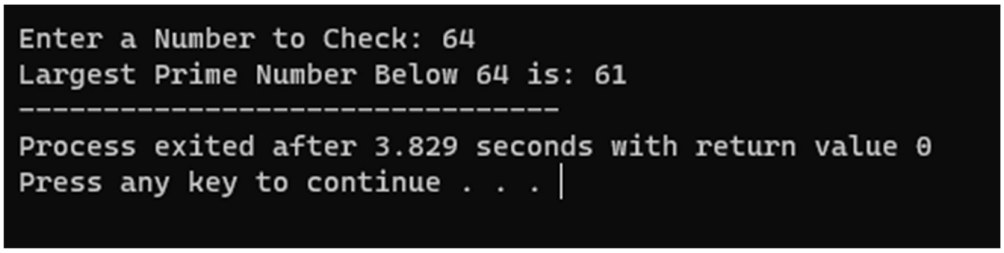

Enter a Number to Check: 64
Largest Prime Number Below 64 is: 61

Process exited after 3.829 seconds with return value 0
Press any key to continue . . .

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.**

ANSWER:

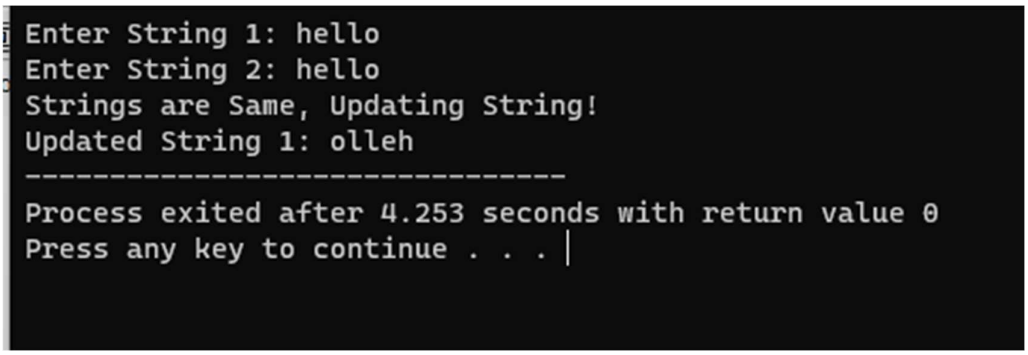
```
#include <iostream>
#include <string>
using namespace std;
int main(){
int i, length, j, length1;
string letter, letter1;
char temp;
bool flag=false;
cout<<"Enter String 1: ";
cin>>letter;
cout<<"Enter String 2: ";
cin>>letter1;
	length=letter.length();
length1=letter1.length();
if(length1==length){

for(i=0; i<letter.length(); i++){
	if(letter[i]==letter1[i]){
		flag=true;
		continue;
	}
	else{
		flag=false;
		cout<<"Both Strings are Not the Same!"<<endl;
		break;
}
	}
	if(flag==true){
		cout<<"Strings are Same, Updating String!"<<endl;
		length=length-1;
		for(i=0; i<=length/2; i++){
			temp=letter[i];
			letter[i]=letter[length-i];
			letter[length-i]=temp;
		}

			cout<<"Updated String 1: "<<letter;
```

```
        }
        }
else{
        cout<<"Both Strings are not Equal!";
}

}
```



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.**

ANSWER:

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

int main(){
int dividend=0, divisor=1, remainder, qoutient, result, count;
while(divisor>dividend){
	cout<<"Dividend Must be Greater than the Divisor!"<<endl;
	cout<<"Enter the Dividend: ";
	cin>>dividend;
	cout<<"Enter the Divisor: ";
	cin>>divisor;
}
for(count=1; count<=dividend; count++){
	remainder=dividend%divisor;
	result=(divisor*count)+remainder;
	if(result==dividend){
		qoutient=count;
		break;
	}
}
cout<<dividend<<" / "<<divisor<<" = "<<qoutient<<endl;
if(remainder>0)
{
	cout<<"The Remainder is: "<<remainder;
}
return 0;
}
```

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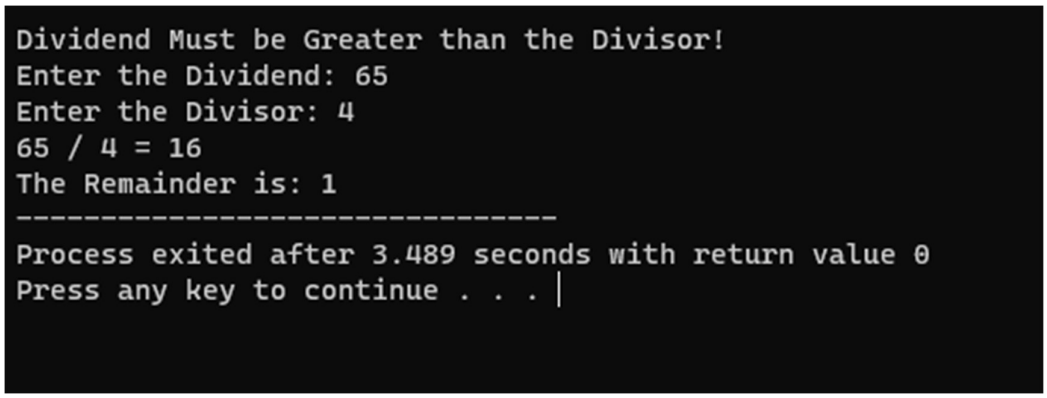

Dividend Must be Greater than the Divisor!
Enter the Dividend: 65
Enter the Divisor: 4
65 / 4 = 16
The Remainder is: 1

Process exited after 3.489 seconds with return value 0
Press any key to continue . . .

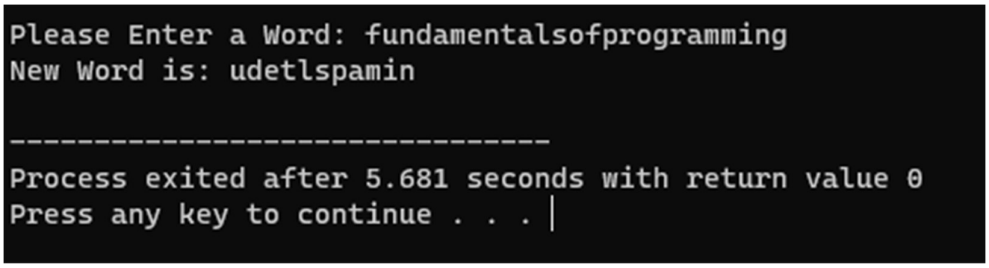
7. **Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.**

ANSWER:

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

int main(){
string letter, uletter;
int len, count, count2;
cout<<"Please Enter a Word: ";
cin>>letter;
uletter=letter;
for(count=0; count<letter.length(); count++){
	tolower(letter[count]);
	for(count2=count+1; count2<=letter.length(); count2++ ){
		if(letter[count]==letter[count2]){
			letter[count]=' ';
			letter[count2]=' ';

		}
	}
}
uletter="";
for(count=0; count<letter.length(); count++){
	if(isspace(letter[count])){
		continue;
	}
	else{
		uletter += letter[count];
	}
}
cout<<"New Word is: "<<uletter<<endl;
}
```


Please Enter a Word: fundamentalsofprogramming
New Word is: udetlspamin

Process exited after 5.681 seconds with return value 0
Press any key to continue . . .

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

ANSWER:

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

int main(){
int array[5]={1, 2, 3, 4, 5};
int array2[5];
int count, num=2, count2=5;
	for(count=0; count<5; count++){

	array2[count]=array[count];
}

while(num!= -1){
	cout<<"Enter Input into Array, Enter -1 to Quit!"<<endl;
	cin>>num;
	if(num==-1){
		break;
	}
	else{

	array2[count2]=num;
	count2++;
}
}

for(count=0; count<=count2-1; count++){

	cout<<array2[count]<<" ";
}


}
```

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```
Enter Input into Array, Enter -1 to Quit!
212
Enter Input into Array, Enter -1 to Quit!
43
Enter Input into Array, Enter -1 to Quit!
12
Enter Input into Array, Enter -1 to Quit!
52
Enter Input into Array, Enter -1 to Quit!
6
Enter Input into Array, Enter -1 to Quit!
2
Enter Input into Array, Enter -1 to Quit!
6
Enter Input into Array, Enter -1 to Quit!
1329
Enter Input into Array, Enter -1 to Quit!
-1
1 2 3 4 5 212 43 12 52 6 2 6 1329
--------------------------------
Process exited after 7.226 seconds with return value 0
Press any key to continue . . .
```

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.

ANSWER:

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

int main(){
int arr[10];
int X, inp=0, size, i=0;
bool flag=false;
while(inp != -1){
        cout<<"Enter a Value for Array, Press -1 to Quit!";
        cin>>inp;
        if(inp==-1){

                break;
        }
        else{
                arr[i]=inp;
                i++;
        }
}
cout<<"Enter Number for Which Triplet is Required: ";
cin>>X;
size=sizeof(arr)/sizeof(arr[0]);
 for (i = 0; i < size - 2; ++i) {
      for (int j = i + 1; j < size - 1; ++j) {
         for (int k = j + 1; k < size; ++k) {
            if (arr[i] + arr[j] + arr[k] == X) {
               cout << "Triplet: " << arr[i] << " " << arr[j] << " " << arr[k] << endl;
               flag=true;
            }
         }
      }
   }
if(flag==false){
        cout<<"Triplet not Found!";
}

}
```

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```
Enter a Value for Array, Press -1 to Quit!8
Enter a Value for Array, Press -1 to Quit!2
Enter a Value for Array, Press -1 to Quit!5
Enter a Value for Array, Press -1 to Quit!10
Enter a Value for Array, Press -1 to Quit!16
Enter a Value for Array, Press -1 to Quit!23
Enter a Value for Array, Press -1 to Quit!-1
Enter Number for Which Triplet is Required: 15
Triplet: 8 2 5
Triplet: 5 10 0
Triplet: 5 10 0

--------------------------------
Process exited after 6.926 seconds with return value 0
Press any key to continue . . .
```

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

ANSWER:

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

int main(){
int arr[6];
bool sort=false;
int i,temp;
for(i=0; i<6; i++){
        cout<<"Enter Value for Array: ";
        cin>>arr[i];
}
while(sort==false){
        for(i=0; i<6; i++){
                if(arr[i]>arr[i+1]){
                        temp=arr[i];
                        arr[i]=arr[i+1];
                        arr[i+1]=temp;
                }
        }
        for(i=0; i<6; i++){
                if(arr[i]>arr[i+1]){
                        sort=false;
                        break;
                }
                else{
                        sort=true;
        }
        }
}
cout<<"Sorted Array: { ";
for(i=0; i<5; i++){
        cout<<arr[i]<<", ";
}
cout<<arr[5]<<"}";
}
```

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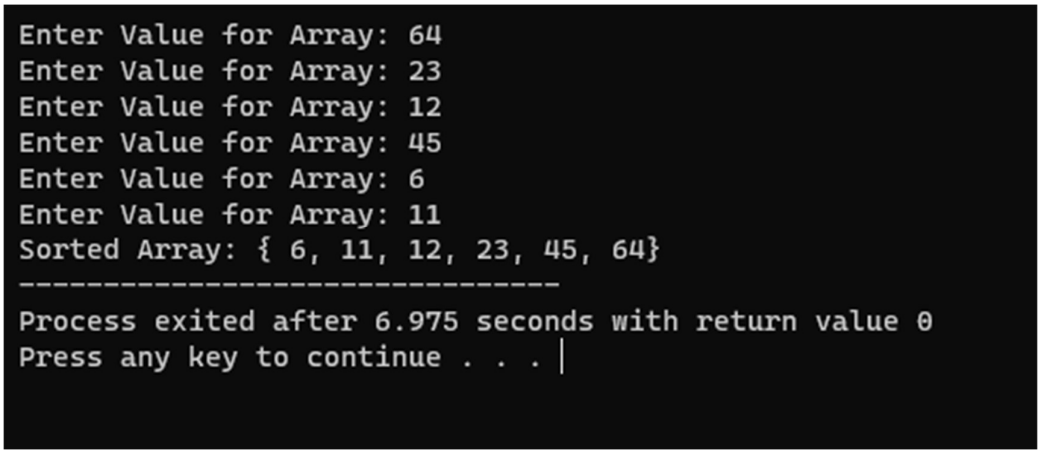

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