Assignment No.1

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Section : A

Course : Fundamentals Of Programming

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

```cpp
#include <iostream>
using namespace std;
int main(){
int x, num;
cout<<"Please Enter a Number to Check Factors: ";
cin>>num;
for(x=1; x<=num; x++){
 if(num%x==0){
 cout<<x<<endl;
continue;
 }
}
 return 0;
}
```

Output :

```
/tmp/9Jca3Cw2Um.o
Please Enter a Number to Check Factors: 52
1
2
4
13
26
52
```

2. Write output to the following code.

```cpp
#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.

```cpp
#include <iostream>

using namespace std;

int main(){

int num;

bool x;

cout<<"Enter a Value: ";

cin>>num;

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

 x=true;

}

else{

 x=false;

}

cout<<static_cast<int>(x)<<endl;

 }
```

Output :

```
/tmp/CDmzRXhieh.o
Enter a Value: 3
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.

```cpp
#include <iostream>
using namespace std;
int main(){
int x, y, z;
 bool flag=false;
cout<<"Enter a Number to Check: ";
cin>>x;
y=x;
 while(y>1){
 z=y-1;
 flag=false;
 while(z>1){
 if(y%z==0){
// cout<<y<<" "<<z<<endl;
 flag=false;
 break;
 }
 else if(y%z==1){
 flag=true;
 }
 z--;
 }
```

```
if(flag==true){

cout<<"Largest Prime Number Below "<<x<<" is: "<<y;

break;

}

y--;

}

}
```

Output :

```
/tmp/CDmzRXhieh.o
Enter a Number to Check: 34
Largest Prime Number Below 34 is: 31
```

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.

```cpp
#include <iostream>
#include <string>
using namespace std;
int main(){
 int x, length,y, 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(x=0; x<letter.length(); x++){
if(letter[x]==letter1[x]){
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(x=0; y<=length/2; y++){

temp=letter[x];

letter[x]=letter[length-x];

letter[length-x]=temp;

}


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


}
}
else{

cout<<"Both Strings are not Equal!";

}
}
```

Output :

```
/tmp/CDmzRXhieh.o
Enter String 1: hello
Enter String 2: hello
Strings are Same, Updating String!
Updated String 1: olleh
```

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.

```cpp
#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;
}
```

Output :

```
/tmp/CDmzRXhieh.o
Dividend Must be Greater than the Divisor!
Enter the Dividend: 26
Enter the Divisor: 5
26 / 5 = 5
The Remainder is: 1
```

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.

```cpp
#include <iostream>
#include <string>
using namespace std;
int main(){
string letter, xletter;
 int y, count, count2;
 cout<<"Please Enter a Word: ";
cin>>letter;
xletter=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]=' ';

 }
 }
 }
xletter="";
 for(count=0; count<letter.length(); count++){
 if(isspace(letter[count])){
 continue;
 }
 else{
 xletter += letter[count];
 }
```

```
    }
cout<<"New Word is: "<<xletter<<endl;

    }
```

Output :

```
/tmp/9Jca3Cw2Um.o
Please Enter a Word: mechanicalengineering
New Word is: mhlri
```

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

```cpp
#include <iostream>
using namespace std;
int main(){
 int array[5]={1, 2, 3, 4, 5};
 int array2[5];
 int x, num=2, y=5;
 for(x=0; x<5; x++){

 array2[x]=array[x];
 }

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

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

 for(x=0; x<=y-1; x++){

 cout<<array2[x]<<" ";
 }
```

}

Output :

```
/tmp/9Jca3Cw2Um.o
Enter Input into Array, Enter -1 to Quit!
14
Enter Input into Array, Enter -1 to Quit!
3
Enter Input into Array, Enter -1 to Quit!
254
Enter Input into Array, Enter -1 to Quit!
1980
Enter Input into Array, Enter -1 to Quit!
-1
1 2 3 4 5 14 3 254 1980
```

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.

```cpp
#include <iostream>

using namespace std;

int main(){

 int arr[10];

 int x, inp=0, size, y=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[y]=inp;

y++;

 }

 }

cout<<"Enter Number for Which Triplet is Required: ";

cin>>x;

 size=sizeof(arr)/sizeof(arr[0]);

 for (y = 0; y < size - 2; ++y) {

 for (int z = y + 1; z < size - 1; ++z) {

 for (int k = z + 1; k < size; ++k) {

 if (arr[y] + arr[z] + arr[k] == x) {

 cout << "Triplet: " << arr[y] << " " << arr[z] << " " << arr[k] << endl;

 flag=true;

 }
```

```
        }

        }

    }

    if(flag==false){

    cout<<"Triplet not Found!";

    }

}
```

Output :

```
/tmp/9Jca3Cw2Um.o
Enter a Value for Array, Press -1 to Quit!23
Enter a Value for Array, Press -1 to Quit!12
2
Enter a Value for Array, Press -1 to Quit!12

2
Enter a Value for Array, Press -1 to Quit!Enter a Value for Array, Press -1
    to Quit!-1
Enter Number for Which Triplet is Required: 19
Triplet not Found!
```

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

```cpp
#include<iostream>

using namespace std;

int main(){

 int arr[6];

bool flag=false;

int x,temp;

 for(x=0; x<6; x++){

 cout<<"Enter Value for Array: ";

 cin>>arr[x];

 }

 while(flag==false){

 for(x=0; x<6; x++){

if(arr[x]>arr[x+1]){

temp=arr[x];

arr[x]=arr[x+1];

arr[x+1]=temp;

}

}

 for(x=0; x<6; x++){

if(arr[x]>arr[x+1]){

flag=false;

break;

}

 else{

 flag=true;

}

}

}

cout<<"Sorted Array: { ";
```

```
for(x=0; x<5; x++){

cout<<arr[x]<<", ";

}

cout<<arr[5]<<"}";

}
```

Output :

```
/tmp/9Jca3Cw2Um.o
Enter Value for Array: 23
Enter Value for Array: 65
Enter Value for Array: 56
Enter Value for Array: 4
Enter Value for Array: 98
Enter Value for Array: 1
Sorted Array: { 1, 4, 23, 56, 65, 98}
```