Fop Assignment 1

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Section: B.

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

Solution:

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

   cout << "Enter a positive integer: ";
   cin >> number;

   cout << "Factors of " << number << " are: ";
   for (int i = 1; i <= number; ++i) {
      if (number % i == 0) {
         cout << i << " ";
      }
   }

   cout << endl;

   return 0;
}
```

Output:

```
Enter a positive integer: 8
Factors of 8 are: 1 2 4 8

--------------------------------
Process exited after 3.607 seconds
Press any key to continue . . .
```

Q#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;
}
```

Output: // x is 5 and y is 10.

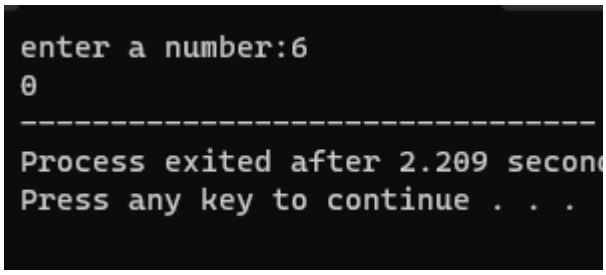
Q#3: Write a C++ program, take an integer value from user and check if it's greater than 10 and less than equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

Solution:

```
#include<iostream>
using namespace std;
int main()
{
	int number;
	cout<<"enter a number:";
	cin>>number;
	if(number>10 && number<=20)
	{
		cout<<"1";
	}
	else
	{
		cout<<"0";
```

```
        }
        return 0;
}
```

Output:



Q#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:

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

int main() {
   int h,a,t;
   cout<<"Enter a number: ";
   cin>>h;
   t=h-1;
   while(t>=2)
   {
      a=2;
      while(a<t)
      {
         if(t%a==0)
         {
         break;
         }
         a++;
      }
      if(a==t)
      {
         cout<<"The greatest prime number less than or equal to "<<h<<" is
"<<t<<endl;
         return 0;
      }
```

```
        t--;
    }
    cout<<"There is no prime number less than or equal to "<<h;
          return 0;
}
```

Output:

```
Enter a number: 8
The greatest prime number less than or equal to 8 is 7

--------------------------------
Process exited after 3.446 seconds with return value 0
Press any key to continue . . .
```

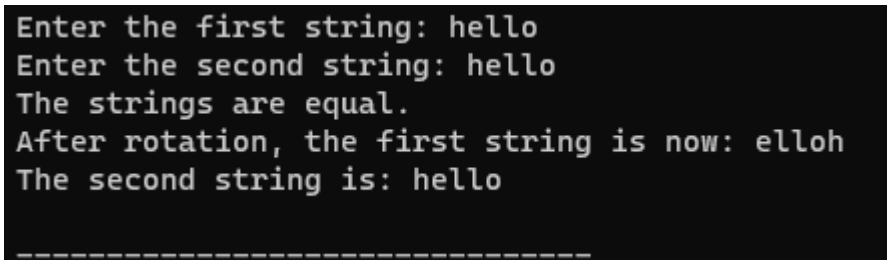
Q#5:Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

Solution:

```
#include <iostream>
#include <string>

using namespace std;

void rotateStringLeft(string& str) {
    char firstChar = str[0];
    str.erase(0, 1);
    str += firstChar;
}

int main() {
    string str1, str2;

    cout << "Enter the first string: ";
    cin >> str1;

    cout << "Enter the second string: ";
    cin >> str2;

    if (str1 == str2) {
        cout << "The strings are equal." << endl;

        rotateStringLeft(str1);
```

```
        cout << "After rotation, the first string is now: " << str1 << endl;
        cout << "The second string is: " << str2 << endl;
    } else {
        cout << "The strings are not equal." << endl;
    }

    return 0;
}
```

Output:



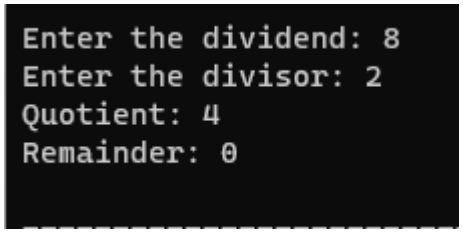
Q#6: Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor.

Solution:

```
#include<iostream>

using namespace std;

int main() {
    int dividend, divisor;

    cout << "Enter the dividend: ";
    cin >> dividend;

    cout << "Enter the divisor: ";
    cin >> divisor;

    if (divisor == 0) {
        cout << "Error: Division by zero is undefined." << endl;
        return 1;
    }

    int quotient = 0;
    while (dividend >= divisor) {
        dividend -= divisor;
        quotient++;
    }
```

```
    cout << "Quotient: " << quotient << endl;
    cout << "Remainder: " << dividend << endl;

    return 0;
}
```

Output:



Q#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:

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
	string str,res="";
	cout<<" enter your string:";
	getline(cin,str);
	int i,j;
	for(i=0;i<str.length();i++)
	{
		for(j=0;j<str.length();j++)
		{
			if(str[i]==str[j])
			{
				break;
			}
		}
		if(i==j)
		{
			res+=str[i];

		}

		}
	cout<<"Duplicate char remove str="<<res;
	return 0;
```

}

Output:

```
 enter your string:heelllllooooo
Duplicate char remove str=helo
--------------------------------
Process exited after 11.82 second
Press any key to continue . . .
```

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

Solution:

```
#include<iostream>
#include<conio.h>
using namespace std;
int main()
{
	int a[100]={1,2,3,4,5};
	int pos,num,i;
	cout<<"enter the position and number:";
	cin>>pos>>num;
	for(i=4;i>=pos;i--)
	{
		a[i+1]=a[i];
		a[pos]=num;
	}
	cout<<"New array:";
	for(i=0;i<6;i=i+1)
	{
		cout<<" "<<a[i];
	}
	return 0;
}
```

Output:

```
enter the position and number:2
23
New array: 1 2 23 23 4 5
--------------------------------
Process exited after 5.75 seconds
Press any key to continue . . .
```

Q#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:

```
#include <iostream>
using namespace std;
bool findTriplet(int arr[], int n, int X) {
    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 (arr[i] + arr[j] + arr[k] == X) {
                    cout << "Triplet found: " << arr[i] << ", " << arr[j] << ", " << arr[k]
<<endl;
                    return true;
                }
            }
        }
    }
    return false;
}

int main() {
    int arr[] = {1, 4, 45, 6, 10, 8};
    int n = sizeof(arr) / sizeof(arr[0]);
    int X = 22;

    if (!findTriplet(arr, n, X)) {
        cout << "No triplet found with sum equal to " << X <<endl;
    }

    return 0;
}
```

Output:

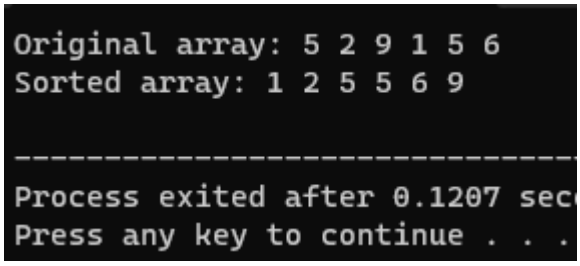
```
Triplet found: 4, 10, 8

--------------------------------
Process exited after 0.2219 second
Press any key to continue . . .
```

Q#10: Implement Bubble Sort on an array of 6 integers.

Solution:

```
#include <iostream>
using namespace std;
void swap(int &a, int &b) {
   int temp = a;
   a = b;
   b = temp;
}

void bubbleSort(int arr[], int n) {
   for (int i = 0; i < n-1; i++) {
      for (int j = 0; j < n-i-1; j++) {
         if (arr[j] > arr[j+1]) {
            swap(arr[j], arr[j+1]);
         }
      }
   }
}

int main() {
   const int size = 6;
   int arr[size] = {5, 2, 9, 1, 5, 6};

   cout << "Original array: ";
   for (int i = 0; i < size; i++) {
      cout << arr[i] << " ";
   }
   cout << endl;

   bubbleSort(arr, size);

   cout << "Sorted array: ";
   for (int i = 0; i < size; i++) {
      cout << arr[i] << " ";
   }
   cout <<endl;

   return 0;
}
```

Output:


Original array: 5 2 9 1 5 6
Sorted array: 1 2 5 5 6 9
Process exited after 0.1207 sec
Press any key to continue . . .