FUDAMENTALS OF PROGRAMMING (LAB)

Assignment # 01

SUBMITTED BY: - ABEER ZAHRA JAFARI (476474) ME-15(C)

TASK 1

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

main.cpp

Run

```cpp
// task 1
   #include<iostream>
   using namespace std;
int main (){
    int n; //declaring variables
cout<<"Enter an integer"<<endl;
cin>>n;   //taking input from users
cout<<"factors of "<<n<<" are: ";
for (int x=1;x<=n;x++){
     if (n%x==0){  //factors of a number divide it completely
     cout<<x<<",";
     }}
return 0;
}
```

Output

Clear

```
/tmp/eAovi8UM3b.o
Enter an integer
30
factors of 30 are: 1,2,3,5,6,10,15,30,
```

TASK 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

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.

main.cpp

Run

```
1  // task 3
2     #include<iostream>
3     using namespace std;
4  int main (){
5       int x;
6  cout<<"Enter an integer"<<endl;
7  cin>>x;
8
9     if (x>10&&x<=20){
10          cout<<"1"<<endl;}
11    else { cout<<"0"<<endl;}
12
13 return 0;
14 }
```

Output

Clear

```
/tmp/eAovi8UM3b.o
Enter an integer
34
0
```

Output

Clear

```
/tmp/eAovi8UM3b.o
Enter an integer
12
1
```

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.

main.cpp

Run

```
1          //TASK 04
2     #include<iostream>
3     using namespace std;
4  int main(){
5      int x,y,z,n,p;
6  cout<<"Enter an integer"<<endl; cin>>n;
7  cout<<"Prime numbers less than or equal to "<<n<<" are:"
       <<endl;
8   x=2;
9  while (x<n+1){
10    z=0;
11    y=2;
12      while (y<=x/2){
13          if (x%y==0){
14              z=1;
15              break;}
16       y=y+1;
17      }
```

Output

Clear

```
/tmp/xq0GPkR0eR.o
Enter an integer
50
Prime numbers less than or equal to 50 are:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47
The largest prime number less than or equal to  50 is: 47
```

TASK 4: CONTD

main.cpp

Run

```
15              break;}
16        y=y+1;
17       }
18  if (z == 0) {
19         p = x;
20        cout<<x<<" ";}
21       x=x+1;
22  }
23 if (p != 0) {
24       cout<<endl;
25       cout << "The largest prime number less than or equal to
             " << n << " is: " << p << endl;}
26   return 0;}
27
```

Output

Clear

```
/tmp/xq0GPkR0eR.o
Enter an integer
50
Prime numbers less than or equal to 50 are:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47
The largest prime number less than or equal to  50 is: 47
```

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.

main.cpp

Run

```cpp
#include<iostream>
#include<string>
using namespace std;
int main() {
    string p, q;
cout << "Enter the first string" << endl; cin >> p;
cout << "Enter the second string" << endl; cin >> q;
  if (p == q) {
        for (int i = 0; i < p.length(); i++) {
            q[i] = p[p.length() - 1 - i];}
cout << "rotated string: " << q << endl;}
   else {
        cout << "Strings are not equal." << endl; }
        return 0;}
```

Output

Clear

```
/tmp/FM866CjI5j.o
Enter the first string
abeer
Enter the second string
abeer
rotated string: reeba
```

Output

Clear

```
/tmp/FM866CjI5j.o
Enter the first string
abeer
Enter the second string
abeer
rotated string: reeba
```

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.

```cpp
#include<iostream>
using namespace std;
 int main(){
     int dividend,divisor,quotient,x;
quotient = 0;
  cout<<"Enter the dividend:";
  cin>>dividend;
  cout<<"Enter the divisor:";
  cin>>divisor;
if(dividend>=divisor&&divisor!=0){
 while(dividend>=divisor){
     dividend-=divisor;
     quotient=quotient+1;
 }
 cout<<"result: "<<quotient<<endl;
 cout<<"check"<<endl;
     x=quotient*divisor;
cout<<"quotient*divisor= "<<x<<" = dividend"<<endl;
if(x==dividend){
   cout<<"the division performed is correct"<<endl;}
else {cout<<"the division performed is  incorrect"<<endl;}}
return 0;}
```

```
/tmp/TmFPC7rkLy.o
Enter the dividend:35
Enter the divisor:7
result: 5
check
quotient*divisor= 35 = dividend
the division performed is correct
```

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.

main.cpp

Run

Output

Clear

```
#include<iostream>
#include<string>
using namespace std;
int main() {
    int i, j;
    string s;
cout << "Enter a string:" << endl;
cin >> s;
    int n = s.size();
    string a = "";
    string b = "";
   for (i = 0; i < n; i++) {
       for (j = 0; j < i; j++) {
           if (s[i] == s[j]) {
               b += s[i];
               break; }
       }
       if (j == i) {
```

```
/tmp/kDSDLEp9TW.o
Enter a string:
abeerzahrajafari
After removing duplicate characters: aberzhjfi
Repeated characters: earaaar
```

TASK 7: CONTD

```
16                  break; }
17              }
18              if (j == i) {
19                  a += s[i];}}
20    cout << " After removing duplicate characters: " << a <<
          endl;
21    cout << "Repeated characters: " << b << endl;
22  return 0;
23  }
24
25
26
27
```

```
Enter a string:
abeerzahrajafari
After removing duplicate characters: aberzhjfi
Repeated characters: earaaar
```

TASK 8

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

main.cpp

Run

Output

Clear

```cpp
#include<iostream>
using namespace std;
int main(){
    int n;
 cout<<"Enter the size of the new array"<<endl;
 cin>>n;
    int a[n]={1,2,3,4,5};
for (int i = 5; i < n; i++) {
   cout<<"Enter new elements into the array"<<endl;
       cin>>a[i]; }
for (int i = 0; i < 10; i++) {
       cout << a[i] << " ";}
return 0;}
```

```
/tmp/kDSDLEp9TW.o
Enter the size of the new array
10
Enter new elements into the array
21
Enter new elements into the array
34
Enter new elements into the array
56
7Enter new elements into the array
8
Enter new elements into the array
98
1 2 3 4 5 21 34 56 8 98
```

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**.

main.cpp

Run

```
1      #include<iostream>
2      using namespace std;
3  int main() {
4      int x;
5      int arr[7] = {1, 2, 3, 4, 5, 6, 7};
6  cout<<"Enter the required sum:";cin>>x;
7  for (int i = 0; i < 7; i++) {
8    for (int j = i + 1; j < 7; j++) {
9      for (int k = j + 1; k < 7; k++) {
10         if (arr[i] + arr[j] + arr[k] == x) {
11           if (arr[i] != arr[j] && arr[j] != arr[k]) {
12               cout << arr[i] << " " << arr[j] << " " <<
                     arr[k] << endl;}
13   } } } }
14 return 0;
15 }
```

Output

Clear

```
/tmp/bCJsRtzqaR.o
Enter the required sum:10
1 2 7
1 3 6
1 4 5
2 3 5
```

TASK 10

- Implement Bubble Sort on an array of 6 integers.

main.cpp

Run

Output

Clear

```cpp
#include<iostream>
using namespace std;
int main (){
int arr[6] = {24,43,16,78,45,10};
int a;
for (int x = 0; x<6; x++) {
for (int y = 0; y<6 ; y++) {
if (arr[y] > arr[y + 1]) {
a = arr[y];
arr[y] = arr[y + 1];
arr[y + 1] = a; } } }
cout<<"Arranging the array in ascending order:"<<endl;
for (int i = 0; i < 6; i++) {
cout << arr[i] << " ";}
return 0;
}
```

```
/tmp/PH2etCAHMy.o
Arranging the array in ascending order:
10 16 24 43 45 78
```