

Fundamentals of Programming

Assignment 1

Tasks 1-10

ME-15

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Section: A

Task 1:

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

Code:

```
#include<iostream>

using namespace std;

int main() {

    int num, factor;

    cout<<"Enter a number"<<endl;

    cin>>num;

    cout<<"The factors of your number are:"<<endl;

    for (int i = 1; i <= num; i++) {

        if ( num % i == 0 ) {

            cout<<i<<" ";

        }

        else {

            continue;


        }

    }

    return 0;

}
```

Execute:

 C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe

```
Enter a number
24
The factors of your number are:
1, 2, 3, 4, 6, 8, 12, 24,
-----
Process exited after 2.731 seconds with return value 0
Press any key to continue . . .
```

Task 2:

Write output to the following code.

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; }
```

Execute:

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.

Code:

```
#include<iostream>

using namespace std;

int main() {

    int num, ans;

    cout<<"Enter a number"<<endl;

    cin>>num;

    ans = ( num > 10 && num <= 20 ) ? 1 : 0;

    cout<<ans;

    return 0;

}
```

Execute:

```
C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe
Enter a number
15
1
-----
Process exited after 4.755 seconds with return value 0
Press any key to continue . . .
```

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.

Code:

```
#include<iostream>

using namespace std;

int main() {

    int N, num1, maxprime;

    cout<<"Enter a positive number"<<endl;
    cin>>N;

    if ( N <= 1 ) {
        cout<<"Please enter a positive integer greater than 1"<<endl;
        return 1;
    }

    num1 = N;

    while ( num1 > 1 ) {
        int i;
        for ( i = 2; i <= num1/2; i++) {

            if ( num1 % i == 0 ) {
                break;
            }
        }

        if ( i > num1 / 2 ) {
            maxprime = num1;
            break;
        }
    }
```

```

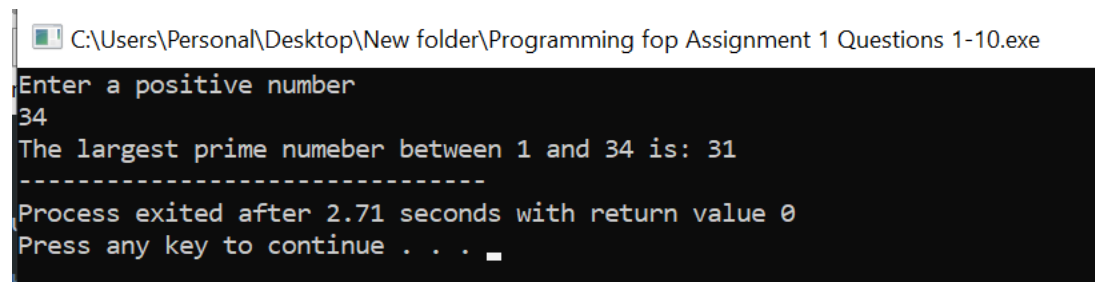
        num1--;
    }

    cout<<"The largest prime numeber between 1 and "<<N<<" is: "<<maxprime;

    return 0;
}

```

Execute:



```

C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe
Enter a positive number
34
The largest prime numeber between 1 and 34 is: 31
-----
Process exited after 2.71 seconds with return value 0
Press any key to continue . . .

```

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.

Code:

```

#include<iostream>

#include<string>

using namespace std;

int main() {

    string a;

    string b;

    cout<<"Enter 2 strings of letters"<<endl;

    cin>>a>>b;

    int x;

    x = a.length();

    if ( a == b ) {

```

```

        cout<<"The 2 strings are equal"<<endl;

        for ( int i=x; i >= 0; i-- ) {

            cout<<a[i];

        }

    }

else {

    cout<<"The 2 strings are not equal"<<endl;

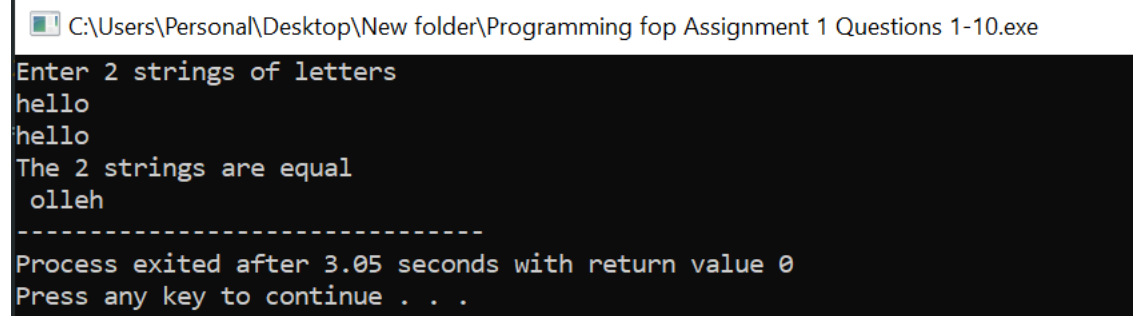
}

return 0;

}

```

Execute:



```

C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe
Enter 2 strings of letters
hello
hello
The 2 strings are equal
  olleh
-----
Process exited after 3.05 seconds with return value 0
Press any key to continue . . .

```

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.

Code:

```

#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

```

```
long double dividend, divisor, remainder, answer;
```

```
int quotient=0;
```

```
cout<<"Enter your first number"<<endl;
```

```
cin>>divident;
```

```
cout<<endl<<"Enter your second number"<<endl;
```

```
cin>>divisor;
```

```
if ( divident < divisor || divisor == 0 ) {
```

```
    cout<<"Invalid input, insure that the first number is greater than the second and that the second number is not 0";
```

```
}
```

```
else {
```

```
int i;
```

```
for ( int i = divisor; i <= divident; i = i + divisor ) {
```

```
    quotient++;
```

```
}
```

```
cout<<"quotient = "<<quotient<<endl;
```

```
remainder = fmod( divident, divisor );
```

```
cout<<"remainder = "<<remainder<<endl;
```

```
answer = quotient + remainder / divisor;
```

```
cout<<divident<<" / " <<divisor<<" = " <<answer;
```

```
}
```

```
return 0;
```

```
}
```

Execute:

```
C:\Users\Personal\Desktop\New folder\Programming for Assignment 1 Questions 1-10.exe
Enter your first number
7
Enter your second number
3
quotient = 2
remainder = 1
7 / 3 = 2.33333
-----
Process exited after 4.894 seconds with return value 0
Press any key to continue . . .
```

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.

Code:

```
#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

    int x;

    string a;

    string b;

    cout<<"Enter a string of letters"<<endl;

    cin>>a;

    x = a.length();

    for ( int i = 0; i < x; i++) {

        for (int j = i+1; j < x; j++) {

            if ( tolower( a[i] ) == tolower ( a[j] ) && i < j ) {

                for ( int k = j; k < x-1; k++ ) {
```



```

        a[k] = a[k + 1 ];

    }

    a[x-1] = ' ';

    x--;

    j--;

}

}

}

cout<<"removing all the duplicates ---> ";

for ( int i = 0; i <= x; i++) {

    cout<<a[i];


}

return 0;

}

```

Execute:

 C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe

```

Enter a string of letters
helllloooooo
removing all the duplicates ---> helo
-----
Process exited after 18.92 seconds with return value 0
Press any key to continue . . .

```

Task 8:

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

Code:

```
#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

cout<<"Enter numbers to add to the series '1, 2, 3, 4, 5' "<<endl;

int x=4, choice;

int a[5] = {1,2,3,4,5};

int b[99];


for (int i = 0; i<5; i++) {

    b[i] = a[i];

}


while ( choice != 1 ) {

    cin>>b[x + 1];

    x++;

    for (int i = 0; i<=x; i++) {

        cout<<" "<<b[i];

    }

    cout<<endl<<"Do you want to continue? if no enter 1, if yes enter any other number"<<endl;

    cin>>choice;

}

return 0;

}
```

Execute:

```
C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe
Enter numbers to add to the series '1, 2, 3, 4, 5'
6
1 2 3 4 5 6
Do you want to continue? if no enter 1, if yes enter any other number
6
7
1 2 3 4 5 6 7
Do you want to continue? if no enter 1, if yes enter any other number
8
8
1 2 3 4 5 6 7 8
Do you want to continue? if no enter 1, if yes enter any other number
19
999
1 2 3 4 5 6 7 8 999
Do you want to continue? if no enter 1, if yes enter any other number
```

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.

Code:

```
#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

    int a[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15};

    int n = 14;


    int X;

    cout << "Enter the target sum (X): ";

    cin >> X;


    int tripletFound = 0; // 0 represents false, 1 represents true


    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 (a[i] + a[j] + a[k] == X) {

            // Triplet found

            cout << "Triplet found: " << a[i] << ", " << a[j] << ", " << a[k] << endl;

            tripletFound = 1;

        }

    }

}

}

if (!tripletFound) {

    cout << "No triplet found." << endl;


}

return 0;

}

```

Execute:

 C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe

```

Enter the target sum (X): 15
Triplet found: 1, 2, 12
Triplet found: 1, 3, 11
Triplet found: 1, 4, 10
Triplet found: 1, 5, 9
Triplet found: 1, 6, 8
Triplet found: 2, 3, 10
Triplet found: 2, 4, 9
Triplet found: 2, 5, 8
Triplet found: 2, 6, 7
Triplet found: 3, 4, 8
Triplet found: 3, 5, 7
Triplet found: 4, 5, 6

-----
Process exited after 11.12 seconds with return value 0
Press any key to continue . . . █

```

Task 10:

Implement Bubble Sort on an array of 6 integers.

Code:

```
#include<iostream>

#include<string>

#include<cmath>

using namespace std;

int main() {

    int temp;

    cout<<"Enter 6 numbers"<<endl;


    int a[6];

    for (int i = 0; i < 6; i++) {

        cin>>a[i];

    }

    for (int i = 0; i<5; i++) {

        for (int j = i + 1; j<6; j++) {

            if ( a[i] > a[j] ) {

                temp = a[i];

                a[i] = a[j];

                a[j] = temp;

            }

        }

    }

    for ( int i = 0; i<6; i++ ) {

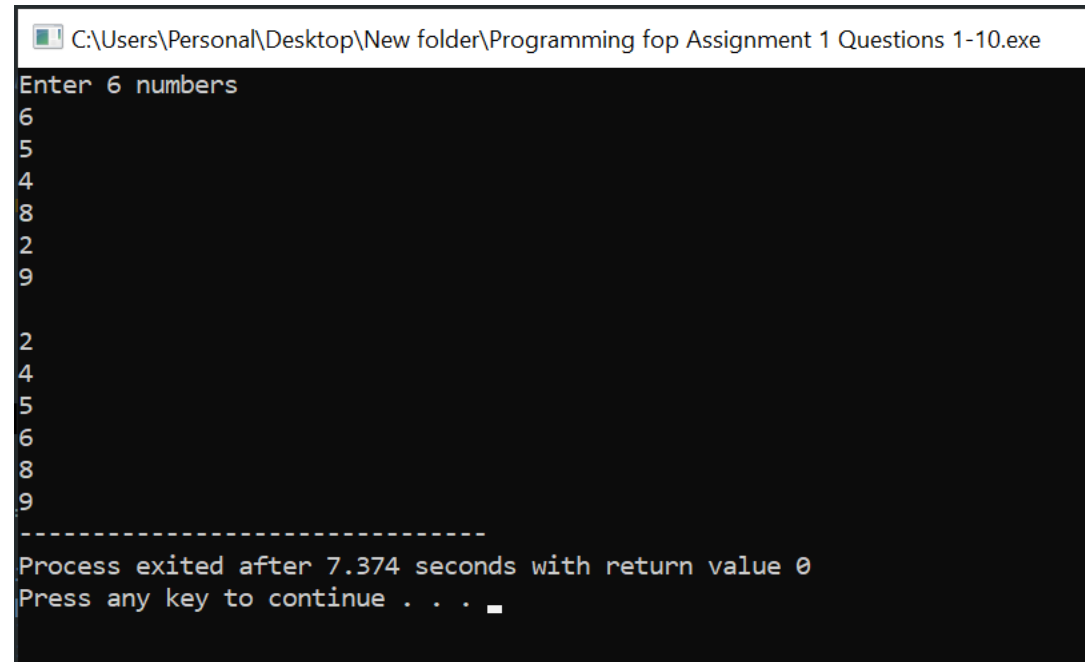
        cout<<endl<<a[i];

    }

}
```

```
    return 0;  
}
```

Execute:



The screenshot shows a Windows command prompt window with the title bar "C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe". The prompt displays the text "Enter 6 numbers" followed by a series of inputs: 6, 5, 4, 8, 2, and 9. These inputs are repeated twice. After the second set of inputs, a dashed line is shown, followed by the text "Process exited after 7.374 seconds with return value 0" and "Press any key to continue . . .".

```
C:\Users\Personal\Desktop\New folder\Programming fop Assignment 1 Questions 1-10.exe  
Enter 6 numbers  
6  
5  
4  
8  
2  
9  
  
2  
4  
5  
6  
8  
9  
-----  
Process exited after 7.374 seconds with return value 0  
Press any key to continue . . .
```