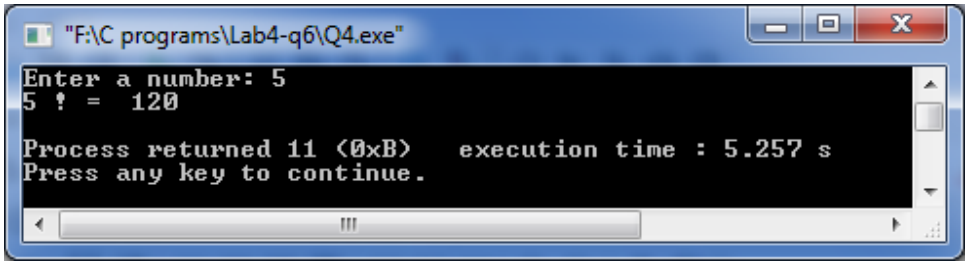
Lab 5

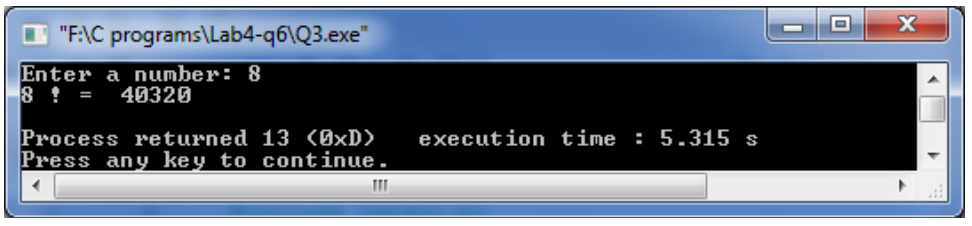
Objectives:

- Knowing how to use **for loop** statement
- Knowing how to use **while loop** statement
- Knowing how to use **do while** statement
- Applications on looping

1. Write a program that reads an integer, calculates, and prints its Factorial.
   Example:
   Enter a number:
   5
   5! = 120

```
#include <stdio.h>
void main(){
        int a, counter;
        long factorial = 1;
        printf("Enter a number: ");
        scanf("%d" , &a);
        counter = 1;
        do{
           factorial = factorial * counter;
           counter++;
           } while (counter <=a);
        printf("%d ! =  %ld\n", a , factorial);
}
```



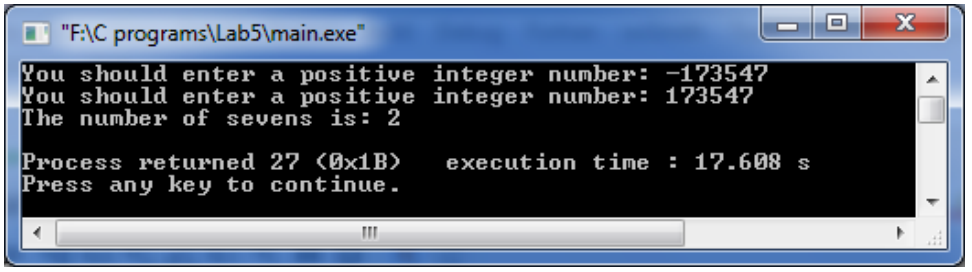


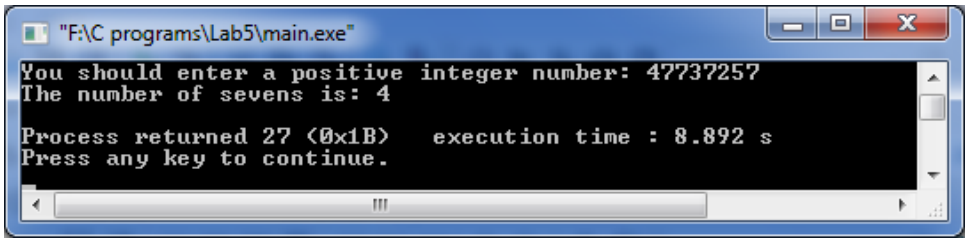
2. (Counting 7s) Write a program that reads a positive integer and determines and prints how many digits in the integer are 7s. [You must validate the input using do while statement until a positive integer is entered].

Example:

Enter a number: 12757
The number of sevens is: 2

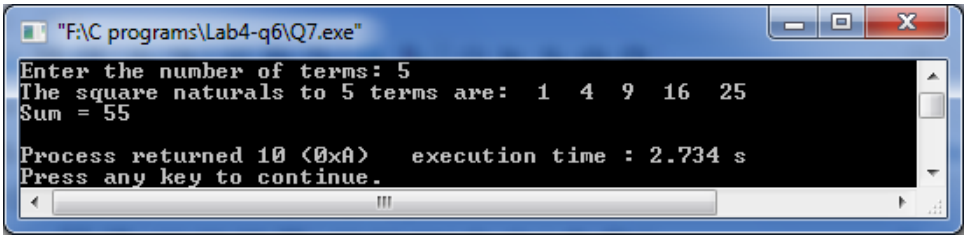
```
#include <stdio.h>
void main(){
        long a ;
        int count;
        do {
           printf("You should enter a positive integer number: ");
           scanf("%ld" , &a);
           } while (a <=0);
        count = 0;
        while (a > 0) {
           if ( (a % 10) == 7) {
           count++;}
           a = a / 10;
        }
        printf("The number of sevens is: %d\n", count);
}
```

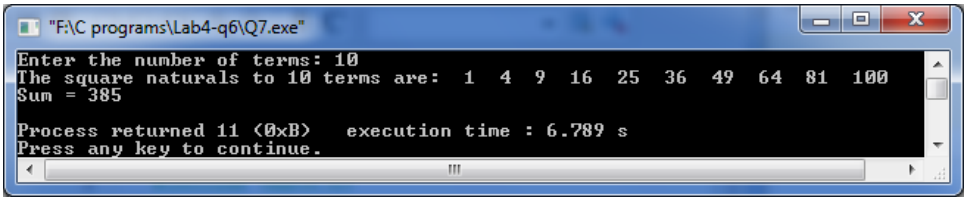




3. Write a program that displays the n terms of square natural number and their sum.
   The series is as below:
   1 4 9 16 … n terms
   Example:
   Enter the number of terms: 5
   The square naturals up to 5 terms are: 1 4 9 16 25
   Sum = 55

```
#include <stdio.h>
#include <math.h>
void main(){
        int n , term , sum = 0;
        printf("Enter the number of terms: ");
        scanf("%d" , &n);
        printf("The square naturals to %d terms are:" , n);
        for (int i=1 ; i <= n ; i++) {
        term = pow(i , 2);
            printf("%d ", term);
            sum = sum + term;
            }
    printf("\nSum = %d\n" , sum);
}
```



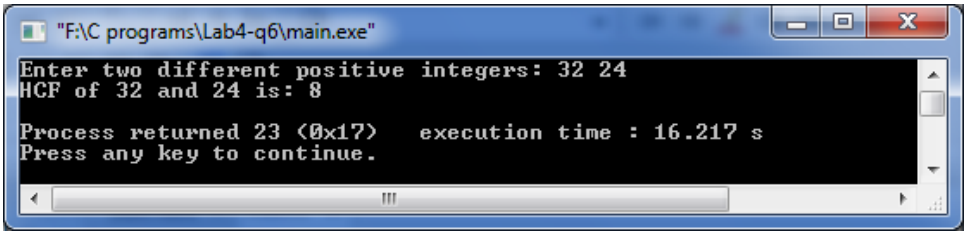


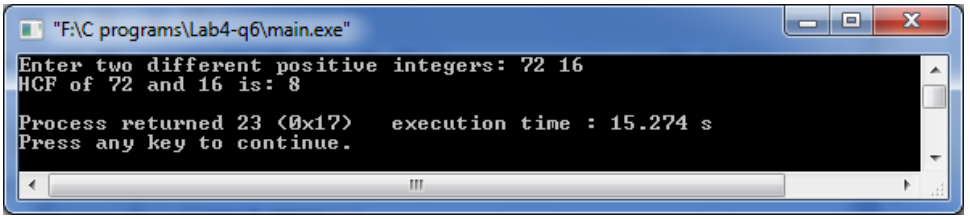
4. Write a program to find the highest common factor of two numbers.

Example:

Enter two different positive integers: 32 24
HCF of 32 and 24 is: 8

```
#include <stdio.h>
void main(){
        int x = 0 , y = 0 , min, hcf = 1;
        while (!(x > 0 && y > 0 && x != y)) {
           printf("Enter two different positive integers: ");
           scanf("%d%d" , &x,&y);
           }
        min = ( (x<y) ? x : y );
        for(int i=1 ; i <=min ; i++){
           if(x % i == 0 && y % i == 0) {
                   hcf = i;
                   }
           }
        printf("HCF of %d and %d is: %d\n", x , y, hcf);
   }
```





Assignment:

1. Write a program that reads N integers then finds and prints the average and the variance of the entered values.

2. Write a program to check whether a given number is a perfect number or not.
   [Perfect number is a positive number which sum of all its positive divisors excluding itself is equal to that number.]

   Example 1:
   Enter a number: 56
   The positive divisors: 1 , 2 , 4 , 7 , 8 , 14 , 28 ,
   The sum of the divisors is 64
   56 is not a perfect number

   Example 2:
   Enter a number: 28
   The positive divisors: 1 , 2 , 4 , 7 , 14 ,
   The sum of the divisors is 28
   28 is a perfect number

   Example 3:
   Enter a number: 496
   The positive divisors: 1 , 2 , 4 , 8 , 16 , 31 , 62 , 124 , 248 ,
   The sum of the divisors is 496
   496 is a perfect number