

ECE 175 Computer Programming for Engineering Applications

Lab Assignment #3

Relevant Programming Concepts:

- File I/O

1 Triangular Numbers

Develop a C program that reads one integer at a time from a file called numbers.txt and checks whether the number is “triangular”. Your program should print on the screen all numbers that are triangular. A number is called triangular if it can be arranged in a triangle

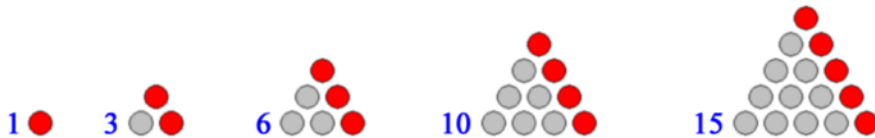


Figure 1: Triangular numbers.

The triangular numbers can be obtained by the following formula:

$$N = \frac{n^2 + n}{2}, \quad n = 1, 2, ?$$

Sample Code Execution:

Input file: 2 3 9 10 15 17 25 30 40 45 78 81 90

Output:

The set of triangular numbers is: 3 10 15 45

2 File Search

You are given a file of integers named *Fridays_Data.dat*. We would like to find the number of integers greater than or equal to a given value. Write a program that searches the file for integers that are greater than or equal to the integer entered by the user.

Sample Code Execution: Red text indicates information entered by the user

Count the number of integers above what threshold? 5

The number of integers ≥ 5 was found to be 663

Count the number of integers above what threshold? -2500

The number of integers ≥ -2500 was found to be 1276

Count the number of integers above what threshold? 2700

The number of integers ≥ 2700 was found to be 3

Count the number of integers above what threshold? 766

The number of integers ≥ 766 was found to be 484

3 Flight Status

A file called "flights.txt" maintains a list of flights that are departing and arriving at an airport in the following format: XX YYYY S. The XX is an abbreviation of the airlines name, the YYYY is the flight number, and S is the status of the flight which can take values D: departed, L: landed, or C: cancelled. Sample entries are as follows

BA 1234 D

DL 7897 L

MA 828 C

Develop a program that asks the user to enter the flight details and searches the file for a match. If a match is found, the flight details are printed on screen. Else the programs asks for the flight status and adds it at the end of "flights.txt."

Sample Code Execution: Red text indicates information entered by the user

Enter the airline and flight number:BA 1234

Flight BA 1234 has departed

Enter the airline and flight number:MA 828

Flight MA 828 was cancelled

Enter the airline and flight number:AA 1045

Flight AA 1045 was not found. What is the status?D

Flight AA 1045 has been added to the database