

# Spring 2017 CMSC 140 Programming Project 5: Absences

## Concepts tested by this program:

1. Learn to organize code within a function
2. Learn to pass data to and return data from a function
3. Use of loops
4. Use of output file processing

## Program

Write a program that calculates the average number of days a company's employees are absent during the year and outputs a report on a file named "employeeAbsences.txt". The program should have the following functions:

A function called by main that asks the user for the number of employees in the company. This value should be returned as an int. (The function accepts no arguments.)

A function called by main that accepts two arguments: the name of the file stream object as a reference parameter of type ofstream, and the number of employees in the company. The function should ask the user to enter as integers for each employee: the employee number (ID) and the number of days that employee missed during the past year. Each employee number and the number of days missed should be written to the report file in this function. The total of these days should be returned as an int. Assume the employee number (ID) is 4 digits or fewer, but don't validate it.

A function called by main that takes two arguments: the number of employees in the company and the total number of days absent for all employees during the year. The function should return, as a double, the average number of days absent. (This function does not perform screen or file output and does not ask the user for input.)

Input Validation: Do not accept a number less than 1 for the number of employees. Do not accept a negative number for the days any employee missed. Be sure to print appropriate error messages for these items if the input is invalid.

Note: both the screen and the output file need appropriate titles, and your name as programmer should appear on both. The average should always show one decimal place.

## Deliverables

1. A zip file named *LastNameFirstName\_Project5.zip* containing:
  - a. A Word document that includes:
    - Source code
    - Screen shots showing sample test data. (at least 2 of each--screen and file--different from those given.)
    - A flowchart showing your main function logic. Use a striped rectangle containing the name of the function for each function call.
  - b. Your source code file called `daysOut.cpp`
  - c. Output file called `employeeAbsences.txt`
  - d. Test plan (table) with at least 2 different data files
2. A zip file named *LastNameFirstName\_Project5\_MOSS.zip* containing ONLY `daysOut.cpp`

**\*\*Include the following header at the beginning of your program:**

```
/*  
 * Class: CMSC140  
 * Instructor: _____  
 * Description: (Give a brief description for Project 5)  
 * Due date: _____  
 * Platform/Compiler: (Windows 7, Microsoft Visual Studio 2013 for example)  
 * I pledge that I have completed the programming assignment independently.  
   I have not copied the code from a student or any source.  
   I have not given my code to any student.  
   Print your Name here: _____
```

Pseudocode for algorithm design (show logic in all functions)

```
*/
```

**Sample Screen Output:**

```
Mark C:\windows\system32\cmd.exe  
Calculate the average number of days a company's employees are absent.  
Please enter the number of employees in the company: 5  
Please enter an employee ID: 1234  
Please enter the number of days this employee was absent: 3  
Please enter an employee ID: 22  
Please enter the number of days this employee was absent: 0  
Please enter an employee ID: 667  
Please enter the number of days this employee was absent: -5  
The number of days must not be negative.  
Please re-enter the number of days absent: 5  
Please enter an employee ID: 4  
Please enter the number of days this employee was absent: 11  
Please enter an employee ID: 9876  
Please enter the number of days this employee was absent: 1  
Programmer: insert your name here  
Press any key to continue . . .
```

**Sample File Output:**

```
employeeAbsences.txt  daysOut.cpp  
EMPLOYEE ABSENCE REPORT  
employee id  days absent  
    1234      3  
     22      0  
    667      5  
     4      11  
   9876      1  
  
The 5 employees were absent a total of 20 days.  
The average number of days absent is 4.0 days.  
  
Programmer: insert your name here
```

## Grading Criteria for Project 5

The following are components on which the projects will be graded. If program does not compile, project will get grade "0". Contact your instructor prior to the project submission due date, if you have compilation issues.

Attributes	Value (points)
Functionality (If project does not compile, project will get grade "0")	Total 100
Displays the console input and report file output appropriately formatted	30
Calculates and displays the totals and averages correctly	30
Program executes correctly (produces expected output)	15
Meets all requirements	15
Overall Look-and-Feel	10
Total	Total 100 points

### Project General Requirements (points will be deducted)

Attributes	Value(points)
Programming Style and proper naming convention: (see coding standards)	(-20 pts maximum)
Curt or unclear variable names	-5
Long variable names should use camel case or underscores to separate words	-5
Comments and internal notes	
Sparse and inadequate comments. (Missing with blocks of code, before functions, or with variable definitions)	-5
File header is not included (project description, name, etc.)	-5
Essentially no comments	-10
Indentation and white spaces should be a visual aid to understanding code structure	
Indenting is mostly okay, but sometimes inconsistent.	-5
No indenting, or very inconsistent indenting that is a barrier to understanding the code	-10
Lack of white space separating variables and operators. Lack of white spaces separating functions and major code blocks	-5
Test Plan	(-20 pts maximum)
Missing Entirely	-20
Cursory or inadequate testing (at least 2 different data files in table form)	-10
Missing Required Items	(-20 pts maximum)
Pseudocode (with code), Flowchart missing	-20
Screen shots cursory or incomplete (at least 2 different from examples)	-5
Screen shots completely missing	-10
File "employeeAbsences.txt" not included as a separate file	-5
Average always shows one decimal place	-5
Awkward Code Internal Structure	(-10 pts maximum)
Error messages are missing when input items are not valid	-5 each
Poor structured programming: more than one "return" statement at end of each function ("break" and "continue" used)	-5 each
Other poor coding practices not mentioned	-5

### Template of the Test Plan (Table)

Input	Expected Output	Actual Output	Did Test Pass?