# COP3014-Foundations of Computer Science
# Assignment #6

## 100 points

## ALL COMPLETE AND SUBMIT YOU PROGRAM EVEN IF IT IS LATE!

**Objectives:**

1. **Read the contents of a datafile one record at a time in an array;**
2. **Process the data that was read from the datafile one record at a time, into an array;**
3. **Print the records in an array to a datafile using an ofstream object;**
4. **Be able to use the fstream library;**
5. **Be able to use an array of record records;**
6. **Be able to use an ifstream object;**
7. **Be able to use an ofstream object;**

This assignment is an extension of Assignments 2 and 2B. You will implement a program called ***"call_stats4.cpp"*** to process customer call records. You will read the records in a datafile into an array of call records, then process each call record in the array, and finally print the array of call records to a datafile. Remember, each customer call record contains seven fields, which are as follows: 1) a ten digit cell phone number (string, no dashes), 2) the number of relay stations used in making the call (integer), 3) the length of the call in minutes (integer), 4) the net cost of the call (double), 5) the tax rate (double), 6) the call tax (double) and 7) the total cost of the call (double). Your program will have 3 functions: Input, Process, and Output. Your main program will call each function once. Following are the descriptions of the functionality of each function:

1. The void function "***Input***" will have two parameters: the call record array called "call_DB", and the count. call_DB and count should be initialized in your main program. The global integer constant SIZE should be set to 200. count should be initialized to 0. The function will read the cell_number, relays, and call_length (in minutes) into the a call record in

call_DB (call_DB[i] is an individual call record) from the input data file. Remember, count should be passed by reference.

2. The function "Process will have two parameters: call_DB and count. The function ***"Process" will*** calculate the net cost of a call ***(net_cost)***, the tax on a call ***(call_tax)*** and the total cost of the call ***(total_cost)*** using ***the number of relay stations (relays)*** and ***the length in minutes of the call (call_length)*** for a call record. Please consider the following:
    a. The ***tax rate on a call (call_tax)*** is simply based on the number of ***relay stations (relays)*** used to make the call (0<= ***relays*** <=5 then ***call_tax*** = 1%; 6<= ***relays*** <=11 then ***call_tax*** = 3%; 12<= ***relays***<=20 then ***call_tax*** = 5%; 21<= ***relays*** <=50 then ***call_tax*** = 8%; ***relays*** >50 then ***call_tax*** =12%) .
    b. The ***net cost of a call*** is calculated by the following formula: ***net_cost = ( relays / 50 x 0.40 x call_length).***
    c. ***The tax on a call is equal to net_cost x call_tax / 100.***
    d. ***The total cost of a call (rounded to the nearest hundredth)*** is calculated by the following formula: ***total_cost*** = ***net_cost*** + ***call_tax*** . All tax and cost calculations should be rounded to the nearest hundredths.

***hint: call_DB[i].net_cost = (call_DB[i].relays/50.0)*0.40* (call_DB[i].call_length);***

3. The function "***Output***" will have two parameters: call_DB and count. Note that call_DB and count will not change inside this function. ***Output*** will print every field of every call record stored in call_DB to the file "**weekly4_call_info.txt"**. The fields should be printed in the following order: 1) cell phone number, 2) number of relay stations, 3) length of the call in minutes, 4) net cost, 5) tax rate, 6) call tax, 7) total cost of call. See the sections below called "Input Stream" and "Format of Output" for more information. See the section "**Format of the input data file(input filename is "*call4_data.txt*")".**

***hint: cout<<call_DB[i].cell_number<<"\t"<<call_DB[i].relays<<"\t"<<call_DB[i].call_length<<endl;***

You may implement more functions if you find it necessary. Please start the assignment ASAP and ask questions to make sure you understand what you must do. Remember to follow all style rules and to include all necessary documentation (consistent, indentation, proper variable names, pre/post condition, program header, function headers, and so forth.)

Finally, your input data file ***(call4_data.txt)*** should be in the same directory as your program source file ***(call_stats4.cpp).***

**Output Format for the Function *"Output"*:**

Consider the following sample output table when designing and implementing the function ***"Output"***. See section "**Format of Output (output filename is "weekly4_call_info.txt")"** below:

(The output is in the following order: cell phone number, relays, minutes, net cost, tax rate, call tax, total call cost)

| | | | | | | |
|---|---|---|---|---|---|---|
| 9546321555 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.00 |
| 9546321555 | 15 | 30 | 3.60 | 0.05 | 0.18 | 3.78 |
| 9546321555 | 4 | 3 | 0.10 | 0.01 | 0.00 | 0.10 |

**Input Stream:**

In the assignment you will declare one **ifstream** to bind your input to the file ***"call_data.txt"*** and one **ofstream** to bind your output to the file "***weekly_call_info.txt*** ". Whenever a program performs ***file i/o*** you must include the **"fstream"** library. Add the following statements to your program:

**For source file, *"call_stats3.cpp"*:**

- Add "**#include <fstream>**" to your # include statements in your source file.
- Add **"include <string>** to your # include statements in your source file.

**Format of the input data file(input filename is "*call_data.txt*"): Do not include column titles**

(The order of the columns are as follows: cell phone number, relays, minutes)

| | | |
|---|---|---|
| 9546321555 | 0 | 0 |
| 5612971340 | 5 | 50 |
| 3051234567 | 8 | 25 |
| 7542346622 | 24 | 17 |
| 3054432762 | 15 | 30 |
| 9544321011 | 50 | 100 |
| 8776219988 | 87 | 82 |
| 9042224556 | 4 | 5 |
| 7877176590 | 11 | 1 |
| 5617278899 | 20 | 45 |
| 9546321555 | 4 | 3 |
| 5612971340 | 79 | 86 |
| 3051234567 | 8 | 25 |
| 7542346622 | 24 | 118 |
| 3054432762 | 115 | 25 |
| 9544321011 | 43 | 10 |
| 8776219988 | 265 | 22 |
| 9042224556 | 2 | 5 |
| 7877176590 | 89 | 67 |
| 5617278899 | 40 | 56 |

**Format of Output (output filename is "weekly4_call_info.txt"):**

(the order of the columns is as follows: cell phone number, relays, minutes, net cost, tax rate, call tax, total call cost)

| | | | | | |
|---|---|---|---|---|---|
| 9546321555 | 0 | 0 | 0.00 | 0.01 | 0.00 |
| 5612971340 | 5 | 50 | 2.00 | 0.01 | 0.02 |
| 3051234567 | 8 | 25 | 1.60 | 0.03 | 0.05 |
| 7542346622 | 24 | 17 | 3.26 | 0.08 | 0.26 |
| 3054432762 | 15 | 30 | 3.60 | 0.05 | 0.18 |
| 9544321011 | 50 | 100 | 40.00 | 0.08 | 3.20 |
| 8776219988 | 87 | 82 | 57.07 | 0.12 | 6.85 |
| 9042224556 | 4 | 5 | 0.16 | 0.01 | 0.00 |
| 7877176590 | 11 | 1 | 0.09 | 0.03 | 0.00 |
| 5617278899 | 20 | 45 | 7.20 | 0.05 | 0.36 |
| 9546321555 | 4 | 3 | 0.10 | 0.01 | 0.00 |
| 5612971340 | 79 | 86 | 54.35 | 0.12 | 6.52 |
| 3051234567 | 8 | 25 | 1.60 | 0.03 | 0.05 |
| 7542346622 | 24 | 118 | 22.66 | 0.08 | 1.81 |
| 3054432762 | 115 | 25 | 23.00 | 0.12 | 2.76 |
| 9544321011 | 43 | 10 | 3.44 | 0.08 | 0.28 |
| 8776219988 | 265 | 22 | 46.64 | 0.12 | 5.60 |

| | | | | | |
|---|---|---|---|---|---|
| 9042224556 | 2 | 5 | 0.08 | 0.01 | 0.00 |
| 7877176590 | 89 | 67 | 47.70 | 0.12 | 5.72 |
| 5617278899 | 40 | 56 | 17.92 | 0.08 | 1.43 |

## Handing in your program

Electronically submit ***the source file "call_stats4.cpp"*** in the Assignments area of blackboard before the due date and time. **Remember, submit your assignment on time no matter if it is incorrect and/or incomplete!**