## Lab Purpose

1. To be able to define and use a pointer to a struct data type dynamically.
2. To be able to read in data correctly from a file using a pointer to a struct.

## Always bring to class

1. Gaddis' book, How-to handouts from Canvas and your class notes.
2. This assignment sheet & the grade sheet for this lab already printed out.
3. USB Flash drive(s) or other storage media.

## Mandatory Instructions

Write a C++ program to be used by a personal trainer at a health club to calculate a person's ideal weight based on the person's gender and height.

Create the program in your *BGLinux* class account using the file name **lab4.cpp**. Include your name, class and class time in a comment at the beginning of the file.

1. Define a structure called **Client** to store a person's name, gender (M or F) and height (in inches). Chose appropriate data types for structure members.

2. In the *main* function define a Client **pointer variable** and dynamically (using the ***new*** operator) assign the pointer an address of dynamically allocated Client. The pointer variable should be used for all processing of the Client data.

3. Pass the pointer to a function that prompts the user to enter a name, gender, and height (in inches) for a client, using the pointer, store the data in the structure via pointer parameter.

   Compile, debug and run your program to make sure the function is working before going on to the next step. Use ***getline(cin, variableName);*** to read in the client's name as it may contain spaces.

4. Pass the pointer to another function to display the client's name, gender, height, ideal weight and weight range. Use the formulas below to calculate the ideal weight (based on the Hamwi formula for a medium frame) and recommended weight range.

   **Male:** **Ideal body weight = 106 pounds for first 5 feet + 6 pounds for each inch over 5 feet.**
   **Female:** **Ideal body weight = 100 pounds for first 5 feet + 5 pounds for each inch over 5 feet.**

   **Recommended weight range (both male and female): ideal body weight plus or minus 15 pounds**

   Calculate expected results by hand and record them in the spaces below for the sample data:

   Jack Black, a male who is 70 inches tall (5' 10"):

```
Name:           Jack Black
Height:         70"    ← note double quotes should be displayed to indicate inches!
Ideal weight:   _________#
Weight range:   _________# to _________#
```

   Try other heights for males and females to test your program to make sure it is working correctly.

```
Client name: Joe Black
Client gender [M ¦ F]: M
Client height in inches: 74

Name:                   Joe Black
Height:                 74"
Ideal wight:            190#
Weight range:           175# to 205#
Press any key to continue . . .
```

## Optional Instructions

Comment out the line to call the function to get data from the keyboard. Add code to read data for clients from the file **lab4.txt** that can be copied from the class library (lib) account to your cs2020 directory.

In your *main* function, define an input file variable, open the file, check the success of the file open and add a loop to read in the input until the end of the file is reached. For each person data read from the file, call your function to show ideal weight and weight range.

Close the file after all data has been read in. You can reuse the pointer (and the same location to store the data) for each set of client data read in, i.e., not use new more than once!

Tip: Use ***fileVariableName.ignore();*** after reading in the height to skip the end-of-line character following the number before reading in the next name.

## What to turn in?

**Make a printout of your program to turn in by typing the following commands at the $ prompt:**

WITHOUT BONUS:

```
$ photo lab4.log
$ ls -l
$ cat lab4.cpp
$ g++ lab4.cpp
$ ./a.out                 Enter Tom Jones, M, 72
$ ./a.out                 Enter Janet Smith, F, 66
$ exit
```

WITH BONUS:

```
$ photo lab4.log
$ ls -l
$ cat lab4.cpp
$ g++ lab4.cpp
$ ./a.out                 data file will be read, so make sure it is in your directory
$ exit
```