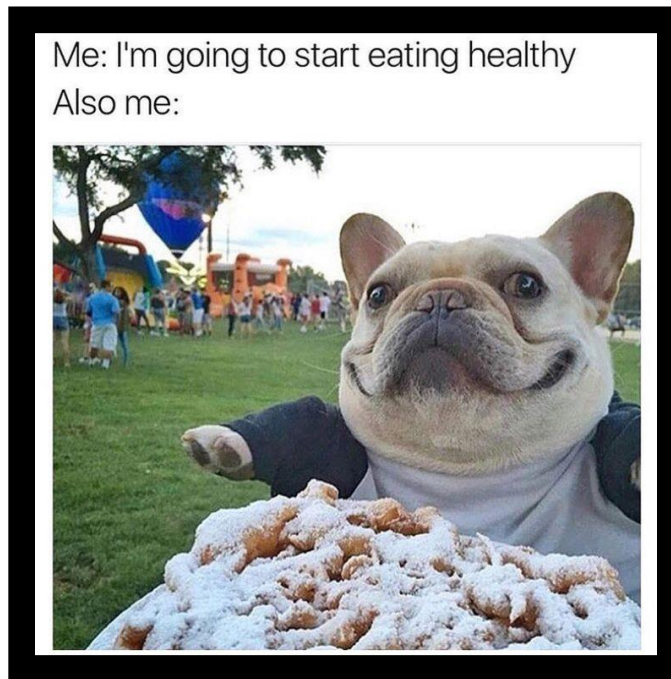# CSC1310: LAB 3

CONCEPTS

- Makefiles
- Templates

DESCRIPTION

Dog Health

This is a program for entering in a dog's monthly weight and heart rate (for 12 months) and then printing out statistics. This assignment will allow you to practice creating a makefile and class template.

SPECIFICATIONS

This program contains multiple files as described below

- **Driver.cpp** – PROVIDED FOR YOU – DO NOT MODIFY
  ArrayHelper.h – class specification for the ArrayHelper class template
- **ArrayHelper.cpp** – class implementation for the ArrayHelper class template
- **DogHealth.h** – PROVIDED FOR YOU – DO NOT MODIFY
- **DogHealth.cpp** – class implementation for the DogHealth class, PARTIALLY PROVIDED FOR YOU (you have to add to it)
- **Makefile** – makefile to compile & run the program
- **RUN.bat** – PROVIDED FOR YOU – DO NOT MODIFY
- **TEST_CASE.txt** – PROVIDED FOR YOU - this is the test case similar to one that will be used to grade your program. You shouldn't have to change it to make your program work.

Create a class specification (ArrayHelper.h) & class implementation (ArrayHelper.cpp) file for a class template named ArrayHelper. The purpose of the ArrayHelper template class is to perform common array functions on any numerical data type.

ArrayHelper should have the following <u>attributes</u>:

- A pointer to an array of the template type

- An integer containing the number of elements in the array

ArrayHelper should have the following <u>member functions</u>:

- Constructor, which accepts a pointer to an array and an integer containing the number of elements in the array. The constructor should set the number of elements attribute to the number sent to this function. Then, the constructor should create a **dynamically allocated** array of the same size and then copy the array elements from the array parameter into the ArrayHelper object's array.

- Destructor – should release the dynamically allocated array

- getMax function – should find the largest number in the array and return the integer index of the element that contains the largest number.

- getMin function – should find the smallest number in the array and return the integer index of the element that contains the smallest number.

- getTotal function – should find the total of all the elements and return the total

- getAvg function – should find the average of all the elements (hint: you can call the getTotal function!)

DOGHEALTH

Use the class specification (DogHealth.h) & class implementation (DogHealth.cpp) file provided for you. The purpose of the DogHealth class is to allow a user to enter in information about a dog and then get statistics based on that information.

YOU WILL ONLY NEED TO WRITE TWO MEMBER FUNCTIONS IN THIS CLASS.

- printWeightStatistics – should create a **dynamically allocated** ArrayHelper object sending the weight array & number of elements in the array to this object. Should then call the getMax, getMin, and getAvg functions of the ArrayHelper object in order to print:
  - month that the dog had the highest weight and the weight amount
  - month that the dog had the lowest weight and the weight amount
  - the average weight of all the months

- printHeartRateStatistics – should create a **dynamically allocated** ArrayHelper object sending the heartrate array & number of elements in the array to this object. Should then call the getMax, getMin, and getAvg functions of the ArrayHelper object in order to print:
  - month that the dog had the highest resting heart rate and the resting heart rate amount
  - month that the dog had the lowest resting heart rate and the resting heart rate amount
  - the average resting heart rate of all the months

MAKEFILE

Create a makefile that will compile the program. Remember that **you can't compile the template class** because it automatically gets compiled when a template class object gets created. Name your executable file **DogHealth.exe**.

```
C:\Windows\System32\cmd.exe                                    —   □   ×
Hello!  Welcome to the Dog Health Program!


What is the dog's name?  Bartlet

What is the dog's age?  9


Please enter in the dog's weight (LBS) & resting heart rate (BPM)
for each month in 2017.

MONTH 1 WEIGHT:  35.6
MONTH 1 RESTING HEART RATE:  57

MONTH 2 WEIGHT:  36.9
MONTH 2 RESTING HEART RATE:  60

MONTH 3 WEIGHT:  39.4
MONTH 3 RESTING HEART RATE:  65

MONTH 4 WEIGHT:  42
MONTH 4 RESTING HEART RATE:  72

MONTH 5 WEIGHT:  43.5
MONTH 5 RESTING HEART RATE:  75

MONTH 6 WEIGHT:  48.6
MONTH 6 RESTING HEART RATE:  80
```

```
C:\Windows\System32\cmd.exe                                    —   □   ×
MONTH 6 RESTING HEART RATE:  80

MONTH 7 WEIGHT:  45.1
MONTH 7 RESTING HEART RATE:  75

MONTH 8 WEIGHT:  44.6
MONTH 8 RESTING HEART RATE:  73

MONTH 9 WEIGHT:  41.8
MONTH 9 RESTING HEART RATE:  69

MONTH 10 WEIGHT:  40.1
MONTH 10 RESTING HEART RATE:  69

MONTH 11 WEIGHT:  38.6
MONTH 11 RESTING HEART RATE:  62

MONTH 12 WEIGHT:  38.4
MONTH 12 RESTING HEART RATE:  61


Thank you!  Bartlet's data has been saved!


        NAME NAME:              Bartlet

        AGE:                    9

        WEIGHT PER MONTH:
```

```
C:\Windows\System32\cmd.exe                                    —   □   ×
        WEIGHT PER MONTH:

                        MONTH 1:   35.6
                        MONTH 2:   36.9
                        MONTH 3:   39.4
                        MONTH 4:   42.0
                        MONTH 5:   43.5
                        MONTH 6:   48.6
                        MONTH 7:   45.1
                        MONTH 8:   44.6
                        MONTH 9:   41.8
                        MONTH 10:  40.1
                        MONTH 11:  38.6
                        MONTH 12:  38.4
        HEART RATE PER MONTH:

                        MONTH 1:   57
                        MONTH 2:   60
                        MONTH 3:   65
                        MONTH 4:   72
                        MONTH 5:   75
                        MONTH 6:   80
                        MONTH 7:   75
                        MONTH 8:   73
                        MONTH 9:   69
                        MONTH 10:  69
                        MONTH 11:  62
                        MONTH 12:  61
```

```
                          MONTH 11:  62
                          MONTH 12:  61
Weight Statistics
-------------------------------------
Bartlet had the highest weight in month 6 at 48.6 pounds.

Bartlet had the lowest weight in month 1 at 35.6 pounds.

Bartlet's average weight over one year was 41.2

Heart Rate Statistics
-------------------------------------
Bartlet had the highest resting heart rate in month 6 at 80 beats per minute.

Bartlet had the lowest resting heart rate in month 1 at 57 beats per minute.

Bartlet's average resting heart rate over one year was 68.2
C:\Users\acrockett\Desktop\CSC1310 Spring 2018\PROGRAMS\PROGRAM 2\solution>
```

WHAT TO TURN IN

Zip all the following files and upload to ilearn.

- Driver.cpp
- ArrayHelper.h
- ArrayHelper.cpp
- DogHealth.h
- DogHealth.cpp
- Makefile
- RUN.bat
- TEST_CASE.txt