**BIL 105E – Introduction to Scientific and Engineering Computing (C)**

**Spring 2015-2016**

**Homework 4 Report**

Assignment Date: 02.05.2016

Due Date: 12.05.2016, 23:00

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**Introduction:**

As stated in description of homework, we are supposed to declare a person struct and sort the absolute differences between BMI values of people and threshold.

**Development Environment:**

My project includes 1 C file, named 150140032.c and 1 executable file, named 150140032. I wrote my code Atom Editor on Mac OS, and compile it with GCC compiler in two different platforms (Mac OS and Linux). My command that I used to compile is

“gcc 150140032.c –o 150140032”.

**Structs:**

person: holds the person data.

* int personID: the id of person
* double height and weight: body properties of person
* double BMI: Body Mass Index of person

**Variables:**

Defined on global:

* threshold: integer to hold the threshold information read from command line

Defined in main function:

* N, M: integers to hold the data read from command line
* input: file stream for input
* output: file stream for output
* \*array: a pointer to hold the data of people (people array)
* \*buffer: temporary char array to get first line of input file

Defined in compare function:

* a: an integer to hold distance between 1st person's BMI and threshold
* b: an integer to hold distance between 2nd person's BMI and threshold

\*Detailed information is in comment lines of the source code and the pseudocode at next page.

**Used Funtions:**

* int absolute(double number) : determine the absolute value of number
* int compare(const void \*l, const void \*r): compare two person according to difference of BMI value and threshold
* double BMI(double weight,double height): calculate BMI value of person

**Conclusion:**

This was a beneficial homework that improved my programming skills. I fully understood the usage of file streams and sorting data. Also it was a instructive homework for use of structs.

**FlowChart**

double function absolute {

If number is negative

return -number;

return number

}

int function compare{

a is distance between 1st person's BMI and threshold

b is distance between 2nd person's BMI and threshold

If a is greater than b

return -1;

Else if b is greater than a

return 1;

return 0; // a == b

}

double function BMI{

return weight/(height\*height);

}

int function main {

read and store N, M and threshold;

create a person array named array;

open the file “height\_weight.txt” as input;

read the first line of input and store it in buffer;

read the following N lines and write to the array with BMI value calculated via BMI function;

sort the array according to compare function using qsort supplied from stdlib;

open a new file on writing mode named “output.txt” as output;

write the first M person in the sorted array over the output;

free allocated space for buffer;

free allocated space for array;

terminate the program // return 0;

}