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

Name: Kadir Emre Oto
ID: 150140032 CRN: 21831

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;
}
```