

SCHOOL OF COMPUTER SCIENCE

SEMESTER 1 SESSION 2019/2020

CPT 111 – Principle of Programming

ASSIGNMENT 2

Course : PRINCIPLE OF PROGRAMMING (CPT111)

Assignment : 2

Due Date : By 11:59pm on 8 December 2019

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Group : D2

Title : Let’s Get Fit Program

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Problem Analysis

Let’s Get Fit (LGF) program is developed to keep track of Body Mass Index (BMI) of each stuff in USM, as Malaysia is reported to be Asia’s fattest country with approximately half of its people overweight or obese. Obesity is very dangerous and can lead to serious and potentially life-threatening conditions. By reading data from a text file which contains name, staff ID, gender, age, weight(kg) and height(cm) of USM’s staff, LGF is able to calculate their BMI and display their weight category based on BMI scale. Besides, the program can also compute Basal Metabolic Rate (BMR) and Metabolic Rate (RMR) using correct formulas. LGF program also has other features that can provide useful information which can be selected from a menu.

Input

|  |  |  |
| --- | --- | --- |
| **NO** | **INPUT** | **FUNCTION** |
| 1 | Name | To know who it is |
| 2 | Staff ID | To be used to search for information |
| 3 | Gender | The formulae for BMR and RMR of both genders might be different |
| 4 | Age | The age will influence the results |
| 5 | Weight (kg) | To calculate BMI, BMR, RMR |
| 6 | Height (cm) | To calculate BMI, BMR, RMR |

Output

|  |  |  |
| --- | --- | --- |
| **NO** | **OUTPUT** | **FUNCTION** |
| 1 | BMI | To determine weight category |
| 2 | BMR | To know the amount of energy per unit time that a person needs to keep the body functioning at rest |
| 3 | RMR | To know the amount of energy you burn when you are at complete rest |
| 4 | Healthy routine | To suggest how much calories to be taken a day for different weight categories of stuff. |
| 5 | Weight category | To know that which lifestyle routine the stuffs should take |
| 6 | Number of male and female stuffs | To know how many stuffs are male or female |
| 7 | Number of stuffs in different age groups | To know how many stuffs are in different age groups |
| 8 | Number of stuffs in different weight category | To know how many stuffs are lightweight, normal weight, overweight or obese |

Process

1. Read data from a text file specified by user
2. Calculate bmi, bmr, rmr and weight category based on data that are input by user
   * BMI = weight in kg / (height2 in Meter)
   * BMR = 10 \* W + 6.25 \* H – 5 \* A + 5 (men)
   * BMR = 10 \* W + 6.25 \* H – 5 \* A – 161 (women)
   * RMR = 88.362 + (13.397 x W) + (4.799 x H) - (5.677 x A) (men)
   * RMR = 447.593 + (9.247 x W) + (3.098 x H) - (4.330 x A) (women)
   * Weight category is underweight if BMI <20
   * Weight category is normal weight if 20 <= BMI < 25
   * Weight category is overweight if 25 <= BMI < 30
   * Weight category is obese if BMI >= 30
   * W = weight(kg) H = height (cm) A = age (year)
3. Provide a menu
4. Print data into file (adding new stuff)
5. Print data of all USM staff from the file
6. Display data of stuff by searching via ID
7. Search for combinational criteria with gender and bmi, bmr, rmr
8. Suggest healthy routine for stuff with different weight categories and lifestyles
9. Modify selective information such as age, gender, weight and height
10. Calculate number of male and female stuffs, number of stuffs of different age groups, number of stuffs of different weight categories

Constraints

1. Menu cannot be non-numeric value, less than or equal to 0 and more than 8.
2. Choice must be either “yes” or “no”
3. Gender must be either “male” or “female”
4. Age cannot be non-numeric value, less than 16 or more than 65. (because people can only start to work at 16, and retirement age is 65 according to Malaysian laws)
5. Weight cannot be non-numeric value, less than 0 or more than 500kg.
6. Height cannot be non-numeric value, less than 0 or more than 250cm.

Flowchart

**Main function**

A close up of text on a white background

Description automatically generated

A close up of text on a white background

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A close up of text on a white background

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A close up of a map

Description automatically generated

A close up of a map

Description automatically generated

**Sub-functions**

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A picture containing text, map

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A picture containing text, map

Description automatically generated

A close up of a piece of paper

Description automatically generated

A screenshot of a cell phone

Description automatically generated

A close up of a map

Description automatically generated

A close up of a map

Description automatically generated

A screenshot of a cell phone

Description automatically generated

A close up of a logo

Description automatically generated

A close up of a map

Description automatically generated

A picture containing text, map

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Description automatically generated

C++ Program Listing

*// Let's Get Fit (LGF) Program*

#include <iostream>

#include <ctime> *// include library to display time*

#include <iomanip>

#include <fstream>

#include <string>

#include <windows.h>

**using** **namespace** std**;**

*// function prototype*

**void** inputData**();**

**void** readData**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **int** **&);**

**void** computeData**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**void** menu**();**

**void** printDataHeader**();**

**void** printData**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**void** printAllData**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**void** searchviaID**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**void** getSlim**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**void** modifyData**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**void** displayStats**(**string**[],** string**[],** string**[],** string**[],** **int[],** **float[],** **float[],** **float[],** **float[],** **float[],** string**[],** **int** **&);**

**int** searchData**(**string **[],** **int** **,** string **);**

**int** main**()**

**{**

*// variable declaration*

string fname**[**100**],** lname**[**100**],** id**[**100**],** gender**[**100**],** weightc**[**100**],** cont**,** gender2**;**

**int** age**[**100**]={**0**},** i**=**0**,** choice**=**0**,** age2**=**0**;**

**float** weight**[**100**]={**0**},** height**[**100**]={**0**},** bmi**[**100**]={**0**},** bmr**[**100**]={**0**},** rmr**[**100**]={**0**},** maxbmi2**=**0.0**,** minbmi2**=**0.0**,** rmr2**=**0.0**,**

maxbmr2**=**0.0**,** minbmr2**=**0.0**,** maxrmr2**=**0.0**,** minrmr2**=**0.0**;**

cout **<<** fixed **<<** showpoint **<<** setprecision**(**2**);**

*// 2 digits after decimal point for every output*

readData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** i**);**

*// function call to read data from file*

**do**

**{**

*// function call to calculate bmi, bmr, rmr, weight category.*

computeData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** i**);**

menu**();**

cin **>>** choice**;** *// input choice from user*

system**("cls");** *// clearing the screen*

**switch(**choice**)**

**{**

**case** 1**:{**

inputData**();** *// function call to print data into file*

**break;}**

**case** 2**:{**

*// function call to print data of all stuff*

printAllData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** i**);**

**break;}**

**case** 3**:{**

**do**

**{**

*// function call to display data of stuff by searching via ID*

searchviaID**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** i**);**

cout **<<** **"Would like to search again? (yes/no)";**

*// ask if user wants to search another stuff*

cin **>>** cont**;**

**}**

**while(**cont**==** **"yes");**

**break;}**

**case** 4**:{**

*// search for combinational criteria with gender and bmi, bmr, rmr*

**int** cri1**=**1**,** cri2**;**

**do**

**{**

cout **<<** **"What two criteria do you wish to search for? "** **<<** endl**;**

cout **<<** **"Input 3 for bmi, 4 for bmr and 5 for rmr."<<** endl**;**

**do**

**{**

cout **<<** **"Criteria (bmi, bmr or rmr): ";**

cin **>>** cri2**;**

**if(**cin**.**fail**()** **||** cri2 **!=** 3 **&&** cri2 **!=** 4 **&&** cri2 **!=** 5**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter 3, 4 or 5 only!"** **<<** endl**;**

**}**

**}while(** cri2 **!=** 3 **&&** cri2 **!=** 4 **&&** cri2 **!=**5**);**

**if** **(**cri1**==**1**)**

**{**

**do{**

cout **<<** **"Gender: ";**

cin **>>** gender2**;**

**if(**cin**.**fail**()** **||** gender2 **!=** **"male"** **&&** gender2 **!=** **"female")** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter male or female (in small letters) only!"** **<<** endl**;**

**}**

**} while(**gender2 **!=** **"male"** **&&** gender2 **!=** **"female");**

**if(**cri2**==**3**)**

**{**

*// gender and bmi*

**do**

**{**

cout **<<** **"Please enter minimum bmi value (between 0 and 50 only): ";**

cin **>>** minbmi2**;**

**if(**cin**.**fail**()** **||** minbmi2 **<**0 **||** minbmi2**>**50**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please reenter bmi value (between 0 and 50 only): ";**

**}**

**}while(**minbmi2**<**0 **||** minbmi2 **>** 50**);**

**do**

**{**

cout **<<** **"Please enter maximum bmi value (between 0 and 50 only): ";**

cin **>>** maxbmi2**;**

**if(**cin**.**fail**()** **||** maxbmi2 **<**0 **||** maxbmi2**>**50**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please reenter bmi value (between 0 and 50 only): ";**

**}**

**}while(**maxbmi2**<**0 **||** maxbmi2 **>** 50**);**

**for(int** a**=**0**;** a**<**i**;** a**++)**

**{**

**if(**gender2 **==** **"male"** **&&** gender**[**a**]** **==** **"male"** **&&** bmi**[**a**]** **>** minbmi2 **&&** bmi**[**a**]** **<** maxbmi2 **)**

printData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** a**);**

**else** **if** **(**gender2 **==** **"female"** **&&** gender**[**a**]** **==** **"female"** **&&** bmi**[**a**]>** minbmi2 **&&** bmi**[**a**]** **<** maxbmi2**)**

printData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** a**);**

**}**

**}**

**if(**cri2**==**4**)**

**{**

*// gender and bmr*

**do**

**{**

cout **<<** **"Please enter minimum bmr value (between 0 and 5000 only): ";**

cin **>>** minbmr2**;**

**if(**cin**.**fail**()** **||** minbmr2 **<**0 **||** minbmr2**>**5000**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please reenter bmr value (between 0 and 5000 only): ";**

**}**

**}while(**minbmr2 **<**0 **||** minbmr2**>**5000**);**

**do**

**{**

cout **<<** **"Please enter maximum bmr value (between 0 and 5000 only): ";**

cin **>>** maxbmr2**;**

**if(**cin**.**fail**()** **||** maxbmr2 **<**0 **||** maxbmr2**>**5000**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please reenter bmr value (between 0 and 5000 only): ";**

**}**

**}while(**maxbmr2 **<**0 **||** maxbmr2**>**5000**);**

**for(int** a**=**0**;** a**<**i**;** a**++)**

**{**

**if(**gender2 **==** **"male"** **&&** gender**[**a**]** **==** **"male"** **&&** bmr**[**a**]** **>** minbmr2 **&&** bmr**[**a**]** **<** maxbmr2 **)**

printData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** a**);**

**else** **if** **(**gender2 **==** **"female"** **&&** gender**[**a**]** **==** **"female"** **&&** bmr**[**a**]>** minbmr2 **&&** bmi**[**a**]** **<** maxbmr2**)**

printData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** bmr**,** rmr**,** weightc**,** a**);**

**}**

**}**

**if(**cri2**==**5**)**

**{**

*// gender and rmr*

**do**

**{**

cout **<<** **"Please enter minimum rmr value (between 0 and 5000 only): ";**

cin **>>** minrmr2**;**

**if(**cin**.**fail**()** **||** minrmr2 **<**0 **||** minrmr2**>**5000**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please reenter rmr value (between 0 and 5000 only): ";**

**}**

**}while(**minrmr2 **<**0 **||** minrmr2**>**5000**);**

**do**

**{**

cout **<<** **"Please enter maximum rmr value (between 0 and 5000 only): ";**

cin **>>** maxrmr2**;**

**if(**cin**.**fail**()** **||** maxrmr2 **<**0 **||** maxrmr2**>**5000**)** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please reenter rmr value (between 0 and 5000 only): ";**

**}**

**}while(**maxrmr2 **<**0 **||** maxrmr2**>**5000**);**

**for(int** a**=**0**;** a**<**i**;** a**++)**

**{**

**if(**gender2 **==** **"male"** **&&** gender**[**a**]** **==** **"male"** **&&** rmr**[**a**]** **>** minrmr2 **&&** rmr**[**a**]** **<** maxrmr2 **)**

printData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** rmr**,** rmr**,** weightc**,** a**);**

**else** **if** **(**gender2 **==** **"female"** **&&** gender**[**a**]** **==** **"female"** **&&** rmr**[**a**]>** minrmr2 **&&** bmi**[**a**]** **<** maxrmr2**)**

printData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** rmr**,** rmr**,** weightc**,** a**);**

**}**

**}**

**}**

cout **<<** **"Would like to continue? (type yes/no):"** **;**

cin **>>** cont**;**

**}**

**while(**cont **==** **"yes");**

**break;}**

**case** 5**:{**

*// Suggest healthy routine*

**do**

**{**

getSlim**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** rmr**,** rmr**,** weightc**,** i**);**

cout **<<** **"Would you like to have routine suggestion for another stuff? (type yes/no): ";**

cin **>>** cont**;**

**}while(**cont **==** **"yes");**

**break;**

**}**

**case** 6**:{**

*// Modify selective information*

**do**

**{**

modifyData**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** rmr**,** rmr**,** weightc**,** i**);**

cout **<<** **"Would you like to update the information of another stuff?\n continue(yes/no): ";**

cin **>>** cont**;**

**}while(**cont **==** **"yes");**

**break;**

**}**

**case** 7**:{**

*// Display minimal statistical information*

displayStats**(**fname**,** lname**,** id**,** gender**,** age**,** weight**,** height**,** bmi**,** rmr**,** rmr**,** weightc**,** i**);**

**break;**

**}**

**case** 8**:{**

*// Exit*

cout **<<** **"Thank you for using this program!!!\nKeep fit!!!\n";**

**break;**

**}**

**default:**

cout **<<** **"invalid input\n";** *// choice cannot be less than or equal to 0 and more than 8*

**}**

system**("pause");** *// pausing the screen*

system**("cls");** *// clearing the screen*

**}**

**while(**choice**!=**8**);** *// continue to loop until the user asks to stop*

**}**

*// input data from file*

**void** readData**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[],** **float** weight**[],** **float** height**[],** **int** **&**i**)**

**{**

ifstream inData**;**

string filename**;**

cout **<<** **"Which file do you want to input?"** **<<** endl**;**

cin **>>** filename**;**

inData**.**open**(**filename**.**c\_str**(),** ios**::**app**);** *// input data from file that is specified by user and add data into end of the file*

**for(int** j**=**0**;** **!**inData**.**eof**();** j**++)**

**{**

**if(**inData**.**eof**()** **==** **true)** *// end the loop if it reaches end of file*

**break;**

**else**

**{**

inData **>>** fname**[**j**]** **>>** lname**[**j**]** **>>** id**[**j**]** **>>** gender**[**j**]** **>>** age**[**j**]** **>>** weight**[**j**]** **>>** height**[**j**];** *// putting data into arrays*

i**++;** *// increment the number of staff*

**}**

**}**

inData**.**close**();** *//closing file*

**}**

*// print data into file*

**void** inputData**()**

**{**

string choice**,** fname**,** lname**,** id**,** gender**,** cont**,** filename**;**

**int** age **=** 0**;**

**float** height **=** 0.0**,** weight **=** 0.0**;**

ofstream outData**;**

ifstream readFile**;**

outData**.**open**("USMstaff.txt",** ios**::**app**);**

cout **<<** **"Do you want to input any data? (yes/no) \n";** *// ask user to input data or not*

**while(true)**

**{**

cout **<<** **"Choice: ";**

cin **>>** choice**;**

**if(**cin**.**fail**()** **||** choice **!=** **"yes"** **&&** choice **!=** **"no")** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter yes or no (in small letters) only!"** **<<** endl**;**

**continue;**

**}**

**break;**

**}**

**if(**choice **==** **"yes")**

**{**

**do**

**{**

string line **=** **"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_";**

cout **<<** line **<<** endl**;**

cout **<<** **"| First name :|";**

cin **>>** fname**;**

cout **<<** **"| Last name :|";**

cin **>>** lname**;**

cout **<<** **"| Staff ID :|";**

cin **>>** id**;**

**do**

**{**

cout **<<** **"| Gender (male or female) :|";**

cin **>>** gender**;**

**if(**cin**.**fail**()** **||** gender **!=** **"male"** **&&** gender **!=** **"female")** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter male or female (in small letters) only!"** **<<** endl**;**

**}**

**}**

**while(**gender **!=** **"male"** **&&** gender **!=** **"female");**

**do**

**{**

cout **<<** **"| Age :|";**

cin **>>** age**;**

**if(**cin**.**fail**()** **||** **(**age **<** 16 **||** age **>** 65**))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter age ranged between 16 and 65 only!"** **<<** endl**;**

**}**

**}**

**while(**cin**.**fail**()** **||(**age **<** 16 **||** age **>** 65**));**

**do**

**{**

cout **<<** **"| Weight (kg) :|";**

cin **>>** weight**;**

**if(**cin**.**fail**()** **||** **(**weight **<**0 **||** weight**>** 500**))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter weight ranged between 0 and 500 only!"** **<<** endl**;**

**}**

**}**

**while(**cin**.**fail**()** **||** **(**weight **<**0 **||** weight**>** 500**));**

**do**

**{**

cout **<<** **"| Height (cm) :|";**

cin **>>** height**;**

**if(**cin**.**fail**()** **||** **(**height**<**0 **||** height**>**250**))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter height ranged between 0 and 250 only!"** **<<** endl**;**

**}**

**}**

**while(**cin**.**fail**()** **||** **(**height**<**0 **||** height**>**250**));**

outData **<<** **" "** **<<** fname **<<** **"\t"**

**<<** **" "** **<<** lname **<<** **"\t"**

**<<** **" "** **<<** id **<<** **"\t"**

**<<** **" "** **<<** gender **<<** **"\t"**

**<<** **" "** **<<** age **<<** **"\t"**

**<<** **" "** **<<** weight **<<** **"\t"**

**<<** **" "** **<<** height **<<** endl**;**

cout **<<** **"Do you wish to input data again? (yes/no)";**

cin **>>** cont**;**

**if(**cin**.**fail**()** **||** cont **!=** **"yes"** **&&** cont **!=** **"no")** *//input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter yes or no (in small letters) only!"** **<<** endl**;**

**}**

**}**

**while(**cin**.**fail**()** **||** cont **!=** **"no"** **||** cont **==** **"yes");**

**}**

outData**.**close**();**

system**("pause");**

system**("cls");**

**}**

**void** computeData**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[],** **float** weight**[],** **float** height**[],**

**float** bmi**[],** **float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

*// BMI depends on weight and height of a person*

*// BMR is that men and women of same age, weight and height have different values.*

*// RMR is that it is completely different even though gender, age, weight and height are the same.*

**for(int** k**=**0**;** k**<**i**;** k**++)**

**{**

bmi**[**k**]** **=** weight**[**k**]** **/** **((**height**[**k**]/**100**)\*(**height**[**k**]/**100**));**

*// The formula for BMR for male and female differs only in +5 and -161*

bmr**[**k**]=** 10 **\*** weight**[**k**]** **+** 6.25 **\*** height**[**k**]** **-** 5 **\*** age**[**k**];**

*// Update BMR for male and female and*

*// Calculate RMR for male and female*

**if(**gender**[**k**]** **==** **"male")**

**{**

bmr**[**k**]** **+=** 5**;**

rmr**[**k**]** **=** 88.362 **+** **(**13.397 **\*** weight**[**k**])** **+** **(**4.799 **\*** height**[**k**])** **-** **(**5.677 **\*** age**[**k**]);**

**}**

**else** **if(**gender**[**k**]** **==** **"female")**

**{**

bmr**[**k**]** **-=** 161**;**

rmr**[**k**]** **=** 447.593 **+** **(**9.247 **\*** weight**[**k**])** **+** **(**3.098 **\*** height**[**k**])** **-** **(**4.330 **\*** age**[**k**]);**

**}**

*// Calculate weight category according to bmi*

**if(**bmi**[**k**]** **<** 20**)**

weightc**[**k**]** **=** **"Underweight";**

**else** **if** **(**bmi**[**k**]** **>=** 20 **&&** bmi**[**k**]** **<** 25**)**

weightc**[**k**]** **=** **"Normal weight";**

**else** **if** **(**bmi**[**k**]** **>=** 25 **&&** bmi**[**k**]** **<** 30**)**

weightc**[**k**]** **=** **"Overweight";**

**else** **if** **(**bmi**[**k**]** **>=** 30**)**

weightc**[**k**]** **=** **"Obese";**

**}**

**}**

*// menu interface*

**void** menu**()**

**{**

time\_t now **=** time**(**0**);**

string line **=** **"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_";**

**char\*** dt **=** ctime**(&**now**);**

cout **<<** **"\t\t\t\t\t\t\t\t "** **<<** **"Current time: "** **<<** dt **<<** endl**;** *// display time*

cout **<<** **"\t\t\t\t"** **<<** line **<<** endl**;**

cout **<<** **"\t\t\t\t\t"** **<<** **"| MAIN MENU |"** **<<** endl**;**

cout **<<** **"\t\t\t\t"** **<<** line **<<** endl**;**

cout **<<** endl **<<** endl**;**

cout **<<** **"-------------------------------------->"** **<<** **"LET'S GET FIT!"** **<<** **"<------------------------------------"** **<<** endl **<<** endl **<<** endl**;**

cout **<<** **"\t\t 1) Add new staff information"** **<<** endl**;**

cout **<<** **"\t\t 2) Display all data for all USM stuff."** **<<** endl**;**

cout **<<** **"\t\t 3) Display data of specific stuff via ID"** **<<** endl**;**

cout **<<** **"\t\t 4) Display data of specific stuff via 2 specific criteria"** **<<** endl**;**

cout **<<** **"\t\t 5) Suggest healthy routine for stuff."** **<<** endl**;**

cout **<<** **"\t\t 6) Modify selective information (age and weight)."** **<<** endl**;**

cout **<<** **"\t\t 7) Display statistical information."** **<<** endl**;**

cout **<<** **"\t\t 8) Exit"** **<<** endl **<<** endl**;**

cout **<<** **"\t\t Choice: ";**

**}**

*// print data of specified stuff*

**void** printData**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[]** **,float** weight**[],** **float** height**[],** **float** bmi**[],**

**float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

printDataHeader**();**

cout **<<** **"\t"** **<<** fname**[**i**]** **<<** **"\t\t"** **<<** lname**[**i**]** **<<** **"\t\t"** **<<** id**[**i**]** **<<** **"\t\t"** **<<** gender**[**i**]** **<<** **"\t "** **<<** age**[**i**]** **<<** **"\t\t"** **<<**

weight**[**i**]** **<<** **"\t "** **<<** height**[**i**]** **<<** **"\t"** **<<** bmi**[**i**]** **<<** **"\t"** **<<** bmr**[**i**]** **<<** **"\t"** **<<** rmr**[**i**]** **<<** **"\t\t"** **<<** weightc**[**i**]**

**<<** endl **<<** endl**;**

**}**

*// function to print all data of all stuff*

**void** printAllData**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[]** **,float** weight**[],** **float** height**[],** **float** bmi**[],**

**float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

printDataHeader**();**

**for(int** a**=**0**;** a**<** i**-**1**;** a**++)**

**{**

cout **<<** **"\t"** **<<** fname**[**a**]** **<<** **"\t\t"** **<<** lname**[**a**]** **<<** **"\t\t"** **<<** id**[**a**]** **<<** **"\t\t"** **<<** gender**[**a**]** **<<** **"\t "** **<<** age**[**a**]** **<<** **"\t\t"** **<<**

weight**[**a**]** **<<** **"\t "** **<<** height**[**a**]** **<<** **"\t"** **<<** bmi**[**a**]** **<<** **"\t"** **<<** bmr**[**a**]** **<<** **"\t"** **<<** rmr**[**a**]** **<<** **"\t\t"** **<<** weightc**[**a**]**

**<<** endl **<<** endl**;**

**}**

**}**

*// function to search data via stuff ID*

**void** searchviaID**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[]** **,float** weight**[],** **float** height**[],** **float** bmi**[],**

**float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

string search**;**

cout **<<** **"Please enter the stuff ID you wish to search: ";**

cin **>>** search**;**

printDataHeader**();**

**int** a **=** searchData**(**id**,** 100**,** search**);**

**if(**a **>=** 0**)**

cout **<<** **"\t"** **<<** fname**[**a**]** **<<** **"\t\t"** **<<** lname**[**a**]** **<<** **"\t\t"** **<<** id**[**a**]** **<<** **"\t\t"** **<<** gender**[**a**]** **<<** **"\t "** **<<** age**[**a**]** **<<** **"\t\t"** **<<**

weight**[**a**]** **<<** **"\t "** **<<** height**[**a**]** **<<** **"\t"** **<<** bmi**[**a**]** **<<** **"\t"** **<<** bmr**[**a**]** **<<** **"\t"** **<<** rmr**[**a**]** **<<** **"\t\t"** **<<** weightc**[**a**]**

**<<** endl **<<** endl**;**

**else**

cout **<<** **"Staff not found! "** **<<** endl**;**

**}**

**void** printDataHeader**()**

**{**

cout **<<** **"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n";**

cout **<<** **"| First name\t| Last name\t| Stuff ID\t| Gender\t| Age\t| Weight(kg)\t|Height(cm)\t| BMI\t| BMR\t| RMR\t| Weight category\t|"**

**<<** endl**;**

**}**

*// function to search data of stuff, return array index if found, return -1 if not found*

**int** searchData**(**string id**[],** **int** size**,** string search**)**

**{**

**for(int** i**=**0**;** i**<**size**;** i**++)**

**{**

**if(**search **==** id**[**i**])**

**return** i**;**

**}**

**return** **-**1**;**

**}**

*// function to suggest daily calorie intake for each stuff of different gender, age and weight category*

**void** getSlim**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[]** **,float** weight**[],** **float** height**[],** **float** bmi**[],**

**float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

**int** often**=**0**;**

**double** calories**=**0.0**,** newweight**=**0.0**,** newcal**=**0.0**;**

string search**;**

cout **<<** **"Please enter your stuff ID: ";**

cin **>>** search**;**

**int** a **=** searchData**(**id**,** 100**,** search**);**

**if(**a **>=** 0**)**

**{**

cout **<<** **"Your weight category is "** **<<** weightc**[**a**]** **<<** endl**;**

cout **<<** **"How often do you exercise per week?\n";**

cout **<<** **"1 - Sedentary, 2 - Slightly, 3 - Moderately, 4 - Actively\n";**

cin **>>** often**;**

**switch(**often**)** *//suggest calorie intake based on activity*

**{**

**case** 1**:**

calories **=** bmr**[**a**]** **\*** 1.2**;**

**break;**

**case** 2**:**

calories **=** bmr**[**a**]** **\*** 1.375**;**

**break;**

**case** 3**:**

calories **=** bmr**[**a**]** **\*** 1.55**;**

**break;**

**case** 4**:**

calories **=** bmr**[**a**]** **\*** 1.725**;**

**break;**

**default:**

cout **<<** **"Invalid input.\n";}**

**if(**weightc**[**a**]** **==** **"Underweight")**

**{**

cout **<<** **"You need to gain weight!\n In order to gain weight, you must consume more than "**

**<<** bmr**[**a**]** **<<** **"kcal per day.\n"** **<<** endl**;**

cout **<<** **"How much weight(kg) do you want to gain per week?"** **<<** endl**;**

cout **<<** **"Weight(kg): "** **;**

cin **>>** newweight**;**

newcal **=** bmr**[**a**]** **+** newweight**\***1000**;**

cout **<<** **"You need to add more than "** **<<** calories **<<** **"kJ per day.\n"** **<<** endl**;**

**}**

**else** **if(**weightc**[**a**]** **==** **"Normal weight")**

**{**

cout **<<** **"To maintain your normal weight, you must consume about "** **<<** calories **<<** **"kJ per day.\n";**

**}**

**else** **if(**weightc**[**a**]** **==** **"Overweight"** **||** weightc**[**a**]** **==** **"Obese")**

**{**

cout **<<** **"You need to lose weight!\n In order to lose weight, you must consume less than "**

**<<** bmr**[**a**]** **<<** endl**;**

cout **<<** **"How much weight (kg) do you want to lose per week?"** **<<** endl**;**

cout **<<** **"Weight (kg): "** **<<** endl**;**

cin **>>** newweight**;**

newcal **=** bmr**[**a**]** **-** newweight**\*** 1000**;**

cout **<<** **"You should consume not more than "** **<<** newcal **<<** **"kJ per day.\n";**

**}**

**}**

**else**

cout **<<** **"Staff not found!\n";**

**}**

*// function to modify data of stuff such as gender, age, weight and height*

**void** modifyData**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[]** **,float** weight**[],** **float** height**[],** **float** bmi**[],**

**float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

**int** choice**=**0**;**

string search**;**

cout **<<** **"Please enter the ID of the stuff you would like to modify: ";**

cin **>>** search**;**

**int** a **=** searchData**(**id**,** 100**,** search**);** *// function call to search data via id*

ofstream outData2**;**

outData2**.**open**("Temp.txt");** *// open a temporary text file*

**if(**a**>=**0**)**

**{**

cout **<<** **"Stuff is found!\n";**

**for** **(int** b**=**0**;** b **<** i**-**1 **;** b**++)** *// loop to transfer data to temp.txt*

**{**

**if(**b**!=**a**)** *// avoid transferring data that user wants to be modified to temp.txt*

**{**

outData2 **<<** **" "** **<<** fname**[**b**]** **<<** **"\t"**

**<<** **" "** **<<** lname**[**b**]** **<<** **"\t"**

**<<** **" "** **<<** id**[**b**]** **<<** **"\t"**

**<<** **" "** **<<** gender**[**b**]** **<<** **"\t"**

**<<** **" "** **<<** age**[**b**]** **<<** **"\t"**

**<<** **" "** **<<** weight**[**b**]** **<<** **"\t"**

**<<** **" "** **<<** height**[**b**]** **<<** endl**;**

**}** **}**

cout **<<** **"Please choose the data you wish to update.\n ";**

cout **<<** **"1 - gender, 2 - age, 3 - weight, 4 - height.\n";**

cout **<<** **"Choice: ";**

cin **>>** choice**;**

**switch(**choice**)**

**{**

**case** 1**:**

**{**

**do**

**{**

cout **<<** **"Please enter correct gender: ";**

cin **>>** gender**[**a**];**

**if** **(**cin**.**fail**()** **||** **(**gender**[**a**]** **!=** **"male"** **&&** gender**[**a**]** **!=** **"female"))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter correct gender again (male or female) : ";**

**}**

**}while(**gender**[**a**]** **!=** **"male"** **&&** gender**[**a**]** **!=** **"female");**

**break;**

**}**

**case** 2**:**

**{**

**do{**

cout **<<** **"Please enter new age: ";**

cin **>>** age**[**a**];**

**if** **(**cin**.**fail**()** **||** **(**age**[**a**]** **<** 16 **||** age**[**a**]** **>** 65 **))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter age between 16 to 65 years old only.\n";**

**}**

**}while(**age**[**a**]<**16 **||** age**[**a**]>**65**);**

**break;**

**}**

**case** 3**:**

**{**

**do{**

cout **<<** **"Please enter new weight: ";**

cin **>>** weight**[**a**];**

**if(**cin**.**fail**()** **||** **(**weight**[**a**]** **<** 0 **||** weight**[**a**]** **>** 500**))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter correct weight (0-500kg) only!\n";**

**}**

**}while(**weight**[**a**]** **<**0 **||** weight**[**a**]** **<** 0 **||** weight**[**a**]** **>** 500**);**

**break;**

**}**

**case** 4**:**

**{**

**do{**

cout **<<** **"Please enter new height: ";**

cin **>>** weight**[**a**];**

**if(**cin**.**fail**()** **||** **(**height**[**a**]** **<** 0 **||** height**[**a**]** **>** 250**))** *// input validation*

**{**

cin**.**clear**();**

cin**.**ignore**();**

cout **<<** **"Please enter correct height (0-250cm) only!\n";**

**}**

**}while(**weight**[**a**]** **<**0 **||** height**[**a**]** **<** 0 **||** height**[**a**]** **>** 250**);**

**break;**

**}**

**default:** cout **<<** **"Invalid input! ";**

**}**

*// Transfering new data from old file to new file*

outData2 **<<** **" "** **<<** fname**[**a**]** **<<** **"\t"**

**<<** **" "** **<<** lname**[**a**]** **<<** **"\t"**

**<<** **" "** **<<** id**[**a**]** **<<** **"\t"**

**<<** **" "** **<<** gender**[**a**]** **<<** **"\t"**

**<<** **" "** **<<** age**[**a**]** **<<** **"\t"**

**<<** **" "** **<<** weight**[**a**]** **<<** **"\t"**

**<<** **" "** **<<** height**[**a**]** **<<** endl**;**

outData2**.**close**();** *// closing the temp file*

remove**("USMstaff.txt");** *//deleting old file*

rename**("Temp.txt",** **"USMstaff.txt");** *// renaming new file*

**}**

**else**

cout **<<** **"Data not found!\n";**

**}**

*// function to display statistics based on data of all USM's stuffs*

**void** displayStats**(**string fname**[],** string lname**[],** string id**[],** string gender**[],** **int** age**[]** **,float** weight**[],** **float** height**[],** **float** bmi**[],**

**float** bmr**[],** **float** rmr**[],** string weightc**[],** **int** **&**i**)**

**{**

**int** age16**=**0**,** age26**=**0**,** age36**=**0**,** age46**=**0**,** age56**=**0**,** nummale**=**0**,** numfemale**=**0**,** uw**=**0**,** nw**=**0**,** ow**=**0**,** ob**=**0**;**

**for(int** a**=**0**;** a**<**i**;** a**++)**

**{**

**if(**gender**[**a**]** **==** **"male")**

nummale**++;**

**else** **if(**gender**[**a**]** **==** **"female")**

numfemale**++;**

**}**

cout **<<** **"The number of male stuffs is "** **<<** nummale **<<** endl**;**

cout **<<** **"The number of female stuffs is "** **<<** numfemale **<<** endl**;**

**for(int** a**=**0**;** a**<**i**;** a**++)**

**{**

**if(**age**[**a**]** **>=** 16 **&&** age**[**a**]** **<=** 25**)**

age16**++;**

**else** **if(**age**[**a**]** **>=** 26 **&&** age**[**a**]** **<=** 35**)**

age26**++;**

**else** **if(**age**[**a**]** **>=** 36 **&&** age**[**a**]** **<=** 35**)**

age36**++;**

**else** **if(**age**[**a**]** **>=** 46 **&&** age**[**a**]** **<=** 55**)**

age46**++;**

**else** **if(**age**[**a**]** **>=** 56 **&&** age**[**a**]** **<=** 65**)**

age56**++;**

**}**

cout **<<** **"The number of stuffs aged between 16 and 25 is "** **<<** age16 **<<** endl**;**

cout **<<** **"The number of stuffs aged between 26 and 35 is "** **<<** age26 **<<** endl**;**

cout **<<** **"The number of stuffs aged between 36 and 45 is "** **<<** age36 **<<** endl**;**

cout **<<** **"The number of stuffs aged between 46 and 55 is "** **<<** age46 **<<** endl**;**

cout **<<** **"The number of stuffs aged between 56 and 65 is "** **<<** age56 **<<** endl**;**

**for(int** a**=**0**;** a**<**i**;** a**++)**

**{**

**if(**weightc**[**a**]** **==** **"Underweight")**

uw**++;**

**else** **if(**weightc**[**a**]** **==** **"Normal weight")**

nw**++;**

**else** **if(**weightc**[**a**]** **==** **"Overweight")**

ow**++;**

**else** **if(**weightc**[**a**]** **==** **"Obese")**

ob**++;**

**}**

cout **<<** **"The number of stuffs that are underweight are "** **<<** uw **<<** endl**;**

cout **<<** **"The number of stuffs that are normal weight are "** **<<** nw **<<** endl**;**

cout **<<** **"The number of stuffs that are overweight are "** **<<** ow **<<** endl**;**

cout **<<** **"The number of stuffs that are obese are "** **<<** ob **<<** endl**;**

**}**

**Screenshots of input and output**

Input file specified by user

A screenshot of a computer screen

Description automatically generated

Menu

A screenshot of a computer screen

Description automatically generated

Add new stuff informationA screenshot of a cell phone

Description automatically generated

Display data of all USM’s stuffA screen shot of a computer

Description automatically generated

Search data via stuff IDA screenshot of a computer screen

Description automatically generated

Search data via 2 specific criteriaA screen shot of a computer

Description automatically generated

Suggest healthy routine for stuffA screenshot of a cell phone

Description automatically generated

Modify data for stuffA close up of a logo

Description automatically generated

Display statistical informationA close up of a logo

Description automatically generated

Exit the program

A screenshot of a computer

Description automatically generated