Semester: III

Group: I

COMPUTER PROGRAMMING 3

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1. Task topic

Create the program consisting of five classes and 4 topics from the programming course. The program must be displayed as a window application consisting of Graphical User Interface. The idea of the project can be given by the student.

2. General description

The goal of the program Health Planner is to allow user to lead healthy lifestyle. User is able to do calculations and track parameters in daily life. There are provided calculators for BMI, BMR and tracking systems. The interface is clear and visible for the user. The entire information concerning health is provided.

3. Project analysis

Program for tracking eating habits and workouts. Application has features: tracking results, BMI calculator and generating result. The program demanded to choose appropriate classes which consist of necessary topics from the lectures. The most interesting topics were exceptions, inheritance, templates and I/O streams. This procedure needed to revise information from the lectures. The names and tasks of the classes were chosen very simple because of bright perception of the topic.

Chosen topics:

- Exceptions - an event, which occurs during the execution of a program, that disrupts the normal flow of the program's instructions. The runtime system searches the call stack for a method that contains a block of code that can handle the exception. This block of code is called an exception handler.
- I/O streams - contains all standard library functions required for writing a basic program.
- Templates - response to an exceptional circumstance that arises while a program is running, such as an attempt to divide by zero. Exceptions provide a way to transfer control from one part of a program to another.
- Inheritance - is defined as the tendency of one class to derive properties and characteristics from other classes. It provides additional functionalities to extract features from the base class and imply it into other derived classes significantly.

Created classes:

- BMI.cpp
- BMR.cpp
- Dish.cpp
- Water.cpp
- Workout.cpp
- Food.cpp
- ToFile.cpp
- FromFile.cpp

4. *External specification*

To compile program use commands:

make all

./health

At the beginning the user obtains a table for tracking and deleting results and five main windows with “Calculate” and “Add” buttons.

The button must be pressed to get wanted value of calculator or to save data. Each of these options consist of inserting data. All of the windows and buttons are visible and inform the user properly how to proceed further.

The user can calculate the Body Mass Index BMI by inserting his weight and height. He can also calculate Basal Metabolic Rate BMR by inserting his weight, height and age. The user can store information about amount of drank water by inserting volume of water. This gives water hydration. The user can track amount of consumed calories by inserting nutrition values as proteins, carbohydrates and fats. The user can track time spent on workout by inserting number of hours spent on training.

5. *Internal specification*

The program demanded to choose appropriate classes which should consist of necessary topics from the lecture.

The program contains of 7 independant classes: BMI, Dish, Water, Workout, Food, ToFile, FromFile. Each of the class is created as the heading and source class. There is also class BMR that is inheriting from class BMI.

class BMI	
double weight	stores information about users weight
double height	stores information about users height
double calcBMI()	method for calculating BMI index
bool isResultWindowOpen	stores information about result window status
bool isErrorWindwoOpen	stores information about error window status
void switchErrorWindow()	changes status of error window for opening and closing
void switchResultWindow()	changes status of resultwindow for opening and closing
constructor	set weigh and height to 1
destructor	deletes the object

inherited class BMR	
int age	stores information about users age
double bmr	returned value about BMR result
double calcBMR()	method for calculating BMR index
bool isResultWindowOpen	stores information about result window status
bool isErrorWindwoOpen	stores information about error window status
void switchErrorWindow()	changes status of error window for opening and closing
void switchResultWindow()	changes status of resultwindow for opening and closing
constructor	set weight, height and age to 1
destructor	deletes the object

class Dish	
int calories	returned information about calculated calories
int protein	stores information about dish amount of proteins
int carbs	stores information about dish amount of carbohydrates
int fat	stores information about dish amount of fats
void setDish()	initializes data members of class
int getDishCalories()	method returning number of calculated calories

classWater	
int glass	inserted value of volume of water
vector<int> glassesOfWaterVolume	container for storing drank water data
void addGlasses()	method adds new data to the container
int sumAllGlassesVolume()	method summing all inserted water data

class Workout	
double time	inserted value of time spent on workout
vector<double> timeTrainedMinutes	container for storing training time data
void addRecord()	method adding new data to the container
double sumAllTimeSpent()	method summing all inserted data

class Food	
int protein	stores information about number of consumed proteins
int carbs	stores information about number of consumed carbohydrates
int fat	stores information about number of consumed fat
vector<Dish> dishes	container for storing nutrition data
int calcCalories()	method returning calculated calories
vector<Dish> getAllCalories()	method returning vector of calculated calories for all results

class ToFile	
string day	argument storing selected day
string indicator	argument, name of calculator
int value	argument storing calculated result
void saveToFileInt()	method saving result to file dataBase.json from calculators returning int type
void saveToFileDouble()	method saving result to file dataBase.json from calculators returning double type

class FromFile	
string day	argument storing selected day
string indicator	argument, name of calculator
void readToFileInt()	method reading result from file dataBase.json for calculators returning int type
void readToFileDouble()	method reading result from file dataBase.json for calculators returning double type

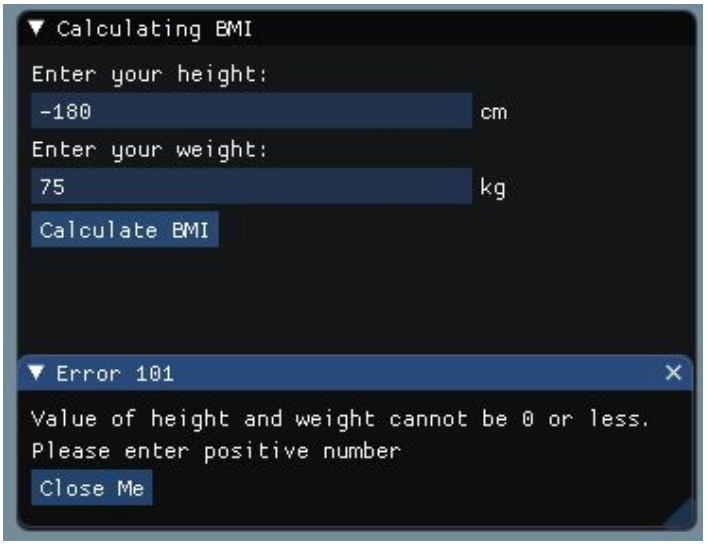
Exceptions	error handling with BMI and BMR classes when entered inappropriate value
Template	used for adding up inserted values of type int (class Water) and double (class Workout)
I/O streams	saving to file dataBase.json calculated values from calculators, reading from file dataBase.json
Inheritance	class BMR is inheriting from class BMI

6. *Source code*

Provided separately.

7. *Testing*

Inserting negative value of height



Inserting number 0 as weight

Inserting negative value of ml of water