Nutrition Planner

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Abstract—***Living a healthy lifestyle can be done by having a diet plan. Diet plans refer to the amount of calories a person has to intake. However, calculating calorie intake can be very difficult for many people. Because of that reason this paper is proposing a source code that is able to calculate the amount of calories a person needs to consume in order to gain, maintain, or lose weight. The amount of calories a person needs is consume is calculated based on their sex, age, height, weight, Basal Metabolic Rate (BMR), and Active Metabolic Rate (AMR).***

Keywords—Basal Metabolic Rate, Active Metabolic Rate

I. Introduction

Nutrition planners were developed to compute our calorie intake based on our preferred diet. Firstly, this program analyses calories intake by looking at its *Basal Metabolic Rate (BMR)*, where the user needs to input its characteristics. Hence each person's basal metabolic rate (BMR) is unique. Afterward, it will require the number of how many the user exercises per week to compute *Active Metabolic Rate (AMR)*. Lastly, the user's preferred diet will determine the percentage multiplied by its AMR to evaluate the calorie needed.

II. Background

Nutrition is a vital part of human health. Nutrition can affect weight, body growth, brain development, and the human body's ability to resist diseases. Therefore taking the correct intake of nutrition is very important to live a healthy life. But measuring the amount of nutrition we have to consume is difficult because everyone has different nutritional needs. Therefore, a diet plan is a great way to keep track of your healthy lifestyle. Planning your own meals will allow you to see how much you should be eating. Moreover, it is one way to prevent overeating and assist you to achieve your goal easily. Hence, we made a diet plan program to help people count calories more efficiently.

III. Problem analysis and basic concept

In order to find out the amount of calories a person needs to consume, we need to know the Active Metabolic Rate (AMR) of the person. Active Metabolic Rate is the number of calories a person burns in a day. Before calculating the AMR, we need to find out the person's daily activity score. The activity level of a person can be described as follows: sedentary, lightly active, moderately active, active, and very active. Every activity level has its own score.

We also need to know the Basal Metabolic Rate (BMR) of a person. Basal Metabolic Rate is the number of calories a person burns as their body performs basic life sustaining functions. To calculate BMR, we need to know the persons sex, age, height, and weight. Calculating AMR is done by multiplying the BMR by the daily activity score of the person.

IV. Materials and Methods

The materials and methods used for calculation in our program are demonstrated and discussed as follows.

A. Programming Language (C++)

We use C++ as our programming language, due to it is extremely fast and efficient. Therefore, it is a perfect programming language to develop our Nutrition Planner program. Furthermore, in our programming class we are currently learning and studying how to use and implement C++ in real world problems.

B. Basal Metabolic Rate (BMR)

Basal metabolic rate (BMR) is the amounts of calories you burned to perform life-sustaining function. For instance, cell production, respiration, circulation, maintenance of body temperature, etc.

Each person has a unique Basal Metabolic Rate, various factors influence it. Such as sex, weight, height, and age. We used the *Mifflin-St Jeor* equation to calculate the Basal Metabolic Rate. Below is the equation we use.

$$\text{BMR} = 10W + 6.25H - 5A + 5 \quad (1a)$$

$$\text{BMR} = 10W + 6.25H - 5A - 161 \quad (1b)$$

Mifflin-St Jeor equation is divided into two equations. (1a) is for men, whereas (2b) is for women. There are various factors that influences both equations, which are *W* as weight, *H* as height, and *A* as age.

C. Active Metabolic Rate (AMR)

Active metabolic rate is the actual amounts of calories you burn each day due to physical activities. Such as doing sports, going to the gym, cooking, etc.

The number of active metabolic rate for each person varies because they have different activities. Therefore, the active metabolic rate is heavily dependent on the person's activities. To find the active metabolic rate we use the following equation.

$$AMR = BMR \times 1.2 \quad (2a)$$

$$AMR = BMR \times 1.375 \quad (2b)$$

$$AMR = BMR \times 1.55 \quad (2c)$$

$$AMR = BMR \times 1.725 \quad (2d)$$

$$AMR = BMR \times 1.9 \quad (2e)$$

Calculating active metabolic rate is sorted into five different equations, and each equation has its factor. How many times exercise per week determines which *AMR* equation. (2a) is for sedentary (little to no exercise). (2b) is for lightly active (exercise 1-3 days/week). (2c) is for moderately active (exercise 3-5 days/week). (2d) is for active (exercise 6-7 days/week). (2e) is for very active (hard exercise 6-7 days/week).

D. Calculating Calories

A person's preferred diet determines how many calories intake the person needs. Specifically, each diet has a different percentage. To calculate the calories, we use the following formula.

$$Calories = AMR \times 164\% \quad (3a)$$

$$Calories = AMR \times 132\% \quad (3b)$$

$$Calories = AMR \times 116\% \quad (3c)$$

$$Calories = AMR \times 85\% \quad (3d)$$

$$Calories = AMR \times 68\% \quad (3e)$$

$$Calories = AMR \times 37\% \quad (3f)$$

Our program computes six different calculation for each preferred diet. (3a) is for fast weight gain. (3b) is for weight gain. (3c) is for mild weight gain. (3d) is for mild weight loss. (3e) is for weight loss. (3f) is for extreme weight loss.

E. Flowchart

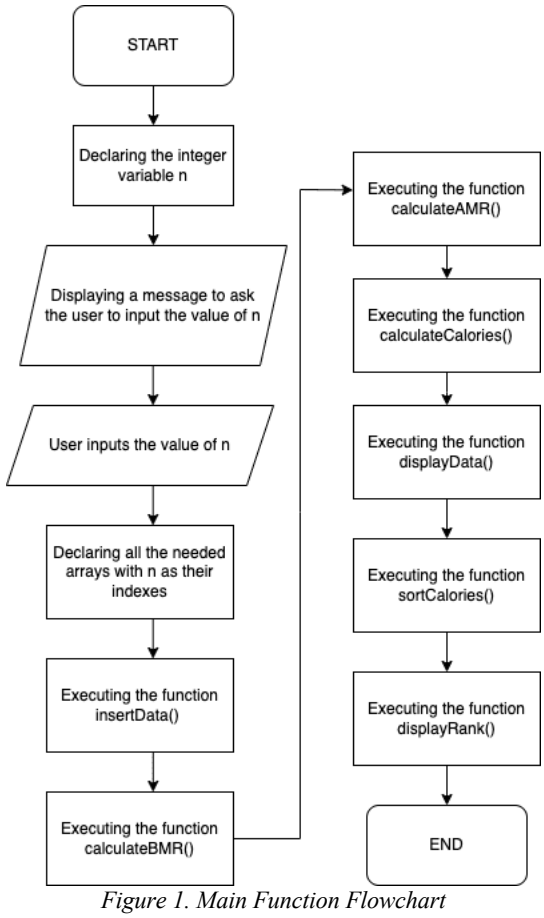

Figure 1. Main Function Flowchart

Figure (1) is the flowchart of our main function which consists of several subprograms, which are used to calculate the calories.

V. Results and Discussion

A. Input and Output of the Program

TABLE I. INPUT OF THE PROGRAM

No	*Username*	*Sex*	*Height (cm)*	*Weight (kg)*	*Activity level*	*Diet*
1.	Deryl	male	173	64	moderate	maintain

Note: this is an input sample.

Table (1) represents the input of our program. Afterward, it will compute the calories using the data it receives. The figure below shows a picture of the real output.

```
Calories needed: 2536.19kkal
```

Figure 2. Output calorie

Figure (1) is the output of calories needed based on the input in Table (1). Figure (1) is the actual output executed using a C++ compiler,

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