Green University of Bangladesh

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BMI Management Calculator

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Lab Project Status	
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Chapter 1

Introduction

1.1   Overview

The BMI Management Calculator is a simple tool created in Bash. It helps users find their Body Mass Index-a number that indicates whether they are underweight, at a healthy weight, overweight, or obese. The calculator uses basic inputs from the user, such as weight and height, and provides a complete interpretation of the BMI result. This tool should be used to let people gain a better understanding of their body composition and thus take informed steps toward their better health.

1.2   Motivation

People are becoming more aware of health and fitness, and thus seek all ways to monitor and improve their well-being. One of the easiest ways to do this is through the calculation of BMI, which can give insight into whether someone is underweight, overweight, or within a healthy weight range. This project was born out of the desire to create a simple tool that can help people better understand their health status through a simple calculation.

1.3   Problem Definition

1.3.1   Problem Statement

Many people either do not have access to easy means of checking their BMI or do not understand what exactly BMI is and how it could affect their health. This project will solve that problem by providing a simple, easy-to-use BMI calculator that not only calculates the value but also gives a helpful interpretation based on the result.

1.3.2 Complex Engineering Problem

The main technical challenge in the development was to create a user-friendly tool that would correctly process users' input-weight and height in different units-perform all the necessary calculations, and provide an interpretation of the results. Besides, of great importance was the interface-easy and intuitive for any user-using the dialog tool in Bash.

1.4 Design Goals/Objectives

The key objectives of this project were:

- To create an intuitive, simple interface for users to input their details.

- To calculate BMI accurately based on user input.

- To provide clear feedback on BMI results, including suggestions on what the results mean for a person's health.

- To store and display user data in an organised way, allowing for multiple users to be added.

1.5 Application

1. Individuals: All those who wish to monitor their health and fitness and know if their weight is within the normal range.

2. Healthcare Professionals: Medical doctors or nutritionists that may want to use this tool in their practices for the purpose of quickly assessing the status of their patients' health based on BMI

3. Fitness Enthusiasts: Those who are working towards attaining fitness goals can make use of this calculator to see how they are doing over time.

Chapter 2

Design/Development/Implementation of the Project

2.1 Introduction

This BMI Management Calculator was developed in Bash scripting, which is an excellent tool for developing simple text-based applications that can run on most Linux-based systems. The project makes use of the dialog command to create an interactive user interface for data entry and feedback.

2.2 Project Details

The program's functionality includes:

- BMI Calculation: The formula of BMI is applied to the user's weight and height (already converted to meters).

- User Input: The user enters their name, weight in kg, and height in feet and inches. This is then used in the calculation of the BMI.

- Interpretation: Once calculated, the tool gives an interpretation of the result, thereby indicating to the user whether the person is underweight, normal weight, overweight, or obese.

2.2.1 BMI Calculation Logic

We calculate BMI using the following formula:

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

The user inputs their weight in kilograms, and height in feet and inches. We first convert the height to meters, as the BMI formula necessitates this, before calculating the BMI.

2.3 Implementation

The project has a number of different components:

- Add User: A function that asks the user for their name, weight, and height, then calculates their BMI and stores the information.

- Convert Height to Meters: This function takes height input in feet and inches and converts it into meters.

- Calculate BMI: A function that actually does the calculation of BMI according to the user's weight and height.

- Interpret BMI: This function, once the BMI has been calculated, provides feedback to the user based on standard categories of BMI: underweight, normal weight, overweight, or obese.

2.4 User Input and Validation

The first step in the implementation is receiving input from the user. We used the dialogue utility to prompt the user for their details (name, weight, and height in feet and inches), making the script interactive and user-friendly. This ensures a clean and graphical user interface (GUI) for input collection, which is particularly useful for users who are not familiar with command-line interfaces.

2.4.1 Code Structure

The project's structure revolves around functions for modularity.

- Calculate BMI: computes BMI using weight and height.

- Convert Height to Meters: Converts height from feet/inches to meters.

- Interpret BMI: Classifies BMI ranges and provides advice

- Add User: Captures user data and calculates BMI.

- Show Users: Displays stored user data and BMI details.

2.5 Algorithms

The core of the project involves:

- Converting height from feet and inches to meters: Since the BMI formula requires the height in meters, this step is necessary to standardize the inputs.

- BMI Calculation: The weight is divided by the square of the height in meters.

- Interpretation: Based on the calculated BMI, the program provides feedback about the user's health category and offers relevant advice.

Chapter 3

Performance Evaluation

3.1 Simulation Environment/ Simulation Procedure

The tool was designed and tested using a Linux-based system. All the steps were performed using Bash scripting, and the utility used to develop interactive pop-ups for input and output is called 'dialog'.

3.1.1 Data Input and BMI Calculation Accuracy

During the testing, the users were able to insert their data (weight and height), and the BMI was computed and printed without any errors. Small and large values for input did not pose any problems for the system

3.1.2 BMI Category Interpretation Testing

Other testing included all the possible interpretation of the BMI categories. This testing was performed by running several cases with different heights and weights to see if the program could produce the correct BMI results with corresponding advice in all possible outcomes.

3.2 Results Analysis/Testing

- Accuracy: Calculation of BMI was correct, and feedback was as per general medical recommendations: below 18.5 Underweight, 18.5 to 24.9 normal, and so on.

- User Experience: The user interface was simple to use, and the input process was straightforward. Most users found the flow intuitive thanks to the clear prompts provided by the dialog tool.

- Scalability: The tool handled multiple users without any performance degradation, and there are no limitations on how many users can be added. Future im-

provements may include saving data to a file for persistence between sessions. Discussion about your various results should be included in this chapter in detail.

3.2.1 System Testing

During testing, users successfully entered their weight and height, and the BMI was calculated correctly in all scenarios. No errors were encountered, even when testing with large or extreme values

3.2.2 BMI Category Accuracy

Further tests were conducted to ensure the tool correctly categorized BMI values. The system displayed the appropriate health interpretation for various BMI ranges, confirming its alignment with medical guidelines (e.g., underweight: BMI < 18.5, normal weight: 18.5–24.9, overweight: 25–29.9, obese: BMI 30).

3.2.3 Testing Environment/Procedure

The BMI Management Calculator meets its goals by providing an easy way to calculate BMI. In the user testing, the tool was observed to correctly calculate the BMI and provide medically correct interpretation of the same. The tool was efficient, scalable, and user-friendly for both individuals and healthcare professionals. However, future improvements could be made in data persistence and the provision of more functionality for long-term health tracking.

3.2.4 Complex Engineering Problem Discussion

The main challenge was ensuring accurate BMI calculations with proper unit conversions (from feet/inches to meters) and maintaining a smooth user experience using Bash scripting. Creating a user-friendly, text-based interface with dialog was also crucial. Despite these challenges, the project successfully delivered a reliable BMI calculator, though more advanced features could be added in future versions.

Chapter 4

Conclusion

4.1 Discussion

The project highlights the effectiveness of Bash scripting and the dialog tool for creating a simple, accessible BMI calculator. While the tool functions well, future improvements could involve adding a graphical interface, tracking user data, and supporting additional units of measurement.

4.2 Limitations

- Limited unit options (height in feet/inches only)
- Basic user interface, lacking visual appeal
- No data persistence between sessions
- Minimal error handling for edge cases
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4.3 Scope of Future Work

- Implement data storage and tracking over time
- Expand units of measurement (e.g., centimeters, pounds)
- Develop a graphical user interface (GUI)
- Integrate with health tracking apps or devices

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