Green University of Bangladesh

Department of Computer Science and Engineering (CSE)
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BMI Calculator using Assembly Language

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Introduction

1.1 Overview

The BMI Calculator project, created using assembly language, calculates the Body Mass Index (BMI) based on user inputs for height and weight. The program determines if a person is Underweight, Perfect, or Overweight based on the calculated BMI. It uses fundamental assembly commands such as MOV, PUSH, POP, MUL, and DIV for data manipulation and computation. While the project has limitations, such as not supporting floating-point numbers for more accurate BMI calculations, it serves as a simple and effective tool for assessing health status through BMI. [1] [2]

1.2 Motivation

This project aims to explore assembly language programming in a practical context by creating a BMI Calculator. It enhances understanding of low-level programming concepts and demonstrates how simple health assessments can be automated, inspiring further learning in embedded systems and assembly coding.

1.3 Problem Definition

1.3.1 Problem Statement

The project faced challenges in handling floating-point numbers and precise BMI calculations. It focuses on using basic integer arithmetic in assembly language to compute BMI but is limited by the absence of real-number handling capabilities, impacting the accuracy of the results.

1.3.2 Complex Engineering Problem

The following table summarizes the attributes related to the complex engineering problem addressed by the BMI Calculator project:

Table 1.1: Summary of the attributes touched by the mentioned project

Name of the P Attributes	Explain how to address
P1: Depth of knowledge required	Requires assembly language knowledge, basic arithmetic, stack operations (PUSH, POP), and understanding BMI and health parameters.
P2: Range of conflicting requirements	The project simplifies calculations using integers but lacks floating-point support, reducing BMI result accuracy.
P3: Depth of analysis required	Requires analysis of user inputs (height and weight), conversion of character inputs into numerical values, and correct BMI calculation using basic arithmetic operations in assembly language.
P4: Familiarity of issues	Common issues include input errors, converting characters to numbers, BMI calculation without floating-point support, and debugging.
P5: Extent of applicable codes	Utilizes assembly commands such as MOV, MUL, DIV, PUSH, POP, and CMP. Additionally, handling user input and providing output messages require careful use of INT 21h interrupt services.
P6: Extent of stakeholder involvement and conflicting requirements	SStakeholders include users seeking health assessments. Balancing user experience with assembly language limitations and simplicity was prioritized.
P7: Interdependence	The project depends on accurate input, calculations, and validation. Performance relies on correct assembly code and Emu8086 simulator.

1.4 Design Goals/Objectives

The goals and objectives of the project are as follows:

- To create a functional BMI calculator using assembly language.

- Utilize basic arithmetic operations like multiplication (MUL), division (DIV), and data handling with PUSH and POP commands.

- Accept user inputs for height (cm) and weight (kg).

- Calculate BMI based on the formula: BMI = (weight in kg) / (height in meters) power by 2.

- Provide user-friendly output indicating health status (Underweight, Perfect, Overweight).

- Design a simple flowchart for better user understanding.

1.5 Application

The BMI calculator is a quick tool to assess whether a person's weight falls within a healthy range for their height. It offers simple health guidance and can be used as a reference tool in basic health monitoring applications.

References

[1] Assembly Language Tutorials:. https://www.tutorialspoint.com/assembly_programming/index.htm.

[2] BMI Calculation Guide: . https://www.cdc.gov/healthyweight/assessing/bmi/.