

ANDROID BMI CALCULATOR

CS19611 – PROJECT REPORT

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GEETHA R

2116220701073

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BONAFIDE CERTIFICATE

Certified that this project report “ANDROID BMI CALCULATOR”– *Designed for the students of Computer Science and Engineering*” is the bonafide work of “**GEETHA R (2116220701073)**” who carried out the project work under my supervision.

SIGNATURE

Mr. Saravana Gokul G, M.E

Assistant Professor/SG

Department of Computer Science
and Engineering

Rajalakshmi Engineering College
Chennai, 602 105.

Submitted for the project viva-voce examination held on_____.

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

The Body Mass Index (BMI) is an essential metric for assessing an individual's overall health by measuring the relationship between their weight and height. Despite its simplicity, BMI is widely used as an initial screening tool to identify possible weight-related health risks. Mobile applications that provide BMI calculations have become a vital part of the health and wellness landscape, enabling individuals to quickly assess their weight status without requiring professional assistance. However, many existing BMI calculators are either feature-heavy, reliant on an internet connection, or overly complex for basic health assessments. This project introduces a BMI Calculator Android application developed using Kotlin to provide a lightweight, offline, and user-friendly solution for calculating and categorizing BMI. The app is designed with simplicity and efficiency in mind, allowing users to input their weight (in kilograms) and height (in centimeters), and instantly receive their BMI result along with an associated health category (underweight, normal, overweight, or obese). The app does not rely on databases, cloud services, or internet access, ensuring that users can calculate their BMI anytime and anywhere without the need for an active connection.

The application focuses on providing an intuitive user interface (UI), utilizing Android's basic UI components such as EditText for user input, Button for triggering calculations, and TextView to display the result. The logic is implemented entirely in Kotlin, a modern, concise, and expressive programming language that enhances Android app development by simplifying code while maintaining performance and reliability. This approach ensures that the app is both lightweight and efficient, making it suitable for users of all age groups and technical backgrounds. In addition to basic functionality, the app also uses conditional statements to categorize BMI results, offering users a clear understanding of their health status. This immediate feedback empowers users to make more informed decisions about their health, while the app's minimalistic design keeps distractions to a minimum, providing a smooth and seamless user experience. This project highlights the potential of Kotlin for developing small-scale health applications, providing an excellent starting point for beginner Android developers. The app's focus on simplicity and usability, coupled with offline accessibility, makes it a valuable tool for both personal use and as an educational project for aspiring mobile app developers.

Keywords: BMI, Kotlin, Android App, Health Calculator, Offline Application, User-Friendly, Mobile Utility, Simple UI, Weight Management

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GEETHA R 2116220701073

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CHAPTER 1

INTRODUCTION

In recent years, personal health awareness has become increasingly significant due to changing lifestyles, work pressure, and increasing health issues. People are looking for quick and accessible ways to monitor their health without relying entirely on healthcare facilities. One such important and widely accepted health metric is the **Body Mass Index (BMI)**. BMI is a simple yet effective method used to categorize individuals based on their body weight relative to their height. It provides a general indication of whether a person is underweight, normal, overweight, or obese, helping them make informed decisions about their health and lifestyle.

As mobile phones have become an integral part of daily life, the demand for portable health tools has increased. The Android platform, being one of the most widely used operating systems globally, offers developers a strong foundation to build lightweight, efficient, and user-friendly mobile applications. **Kotlin**, now the preferred language for Android development, brings in modern programming features such as null safety, concise syntax, and improved code readability, making it easier for developers—especially beginners—to create robust Android applications.

This project presents a **simple BMI Calculator Android application developed using Kotlin**. The app allows users to input their height (in centimeters) and weight (in kilograms) and calculates the BMI using a standard formula. The result is instantly displayed along with a health category based on widely accepted BMI ranges.

The application does not require a database or internet connection, making it lightweight and suitable for offline use. It focuses solely on the core functionality, using basic Android components like `EditText`, `Button`, and `TextView`. This simplicity not only makes the app efficient and fast but also ensures ease of use for the end-user and minimal permissions, ensuring better privacy and performance.

Overall, this project serves as a fundamental Android development task and is ideal for beginners looking to learn the basics of Kotlin, UI design, user input handling, and condition checking—without the complexity of external libraries or storage systems.

CHAPTER 2

LITERATURE SURVEY

Numerous health-related mobile applications provide BMI calculations, yet many fail to balance simplicity, accessibility, and user-centered design. According to Thomas et al. [1], while BMI apps offer essential functionality such as input fields for height and weight, their cluttered interfaces and lack of offline usability hinder widespread adoption. Gupta and Nair [2] evaluated over 50 health apps and noted that most were bloated with features like calorie tracking, fitness goals, or diet charts, which distracted users seeking quick BMI assessments. In contrast, Patel et al. [3] created a minimalist BMI calculator targeting rural users, emphasizing the importance of offline use and low storage footprint.

Rao and Krishnan [4] highlighted that applications built with Java often involve verbose code, making maintenance and enhancement more difficult compared to modern languages like Kotlin. Jain and Mehta [5] successfully developed a Kotlin-based BMI app with a clean UI but found that the lack of immediate result feedback reduced user satisfaction. Sharma et al. [6] showed that using Toasts and condition-based color indicators for BMI categories can improve user engagement and understanding of health status.

Several studies, such as by Das and Kumar [7], emphasized the importance of localization in BMI apps, as unit mismatches (feet/inches vs. cm or lbs vs. kg) often confused users. However, these issues are mitigated in single-language apps with fixed metric units. Sen and Tripathi [8] proposed a BMI app for educational use, where the logic and design were kept deliberately simple for use in Android development training. Their findings support the approach of building beginner-friendly apps that reinforce both coding logic and public health awareness.

Overall, while advanced BMI calculators exist, there remains a gap for **lightweight, offline, Kotlin-based apps** focused purely on BMI calculation with no data storage, third-party integration, or feature bloat. This study motivates the creation of a **simple BMI calculator using Kotlin** in Android Studio, with emphasis on clean UI, offline access, and immediate feedback, addressing both educational and practical user needs.

CHAPTER 3

SYSTEM OVERVIEW

3.1 EXISTING SYSTEM

There are several BMI calculator applications available in the market, both as standalone apps and as features integrated into health and fitness platforms. These applications typically allow users to enter their weight and height, calculate their BMI, and categorize the results into different health classifications such as underweight, normal weight, overweight, or obese. Popular BMI calculators such as those provided by **Google Fit**, **HealthifyMe**, and **MyFitnessPal** offer additional features like diet tracking, workout suggestions, and integration with fitness devices like wearables. However, these applications often come with limitations that may reduce their effectiveness for certain users. One major issue with existing BMI apps is the over-complication of features. Many apps include features that are not relevant for users seeking a simple BMI calculation, such as detailed health tracking, social sharing, or integration with third-party devices. This leads to a bloated user interface (UI) and unnecessary background processes that make the app slow and cumbersome. Furthermore, these apps often require an internet connection for advanced features like syncing data or accessing additional health resources. This dependency on the internet limits their usability in situations where users do not have network access. Moreover, most BMI applications do not cater to low-resource devices or provide offline functionality. Users with limited access to the internet or those using older smartphones may find it difficult to use such apps. Furthermore, privacy concerns arise due to the collection and storage of user data in cloud-based services. These privacy concerns are particularly significant in health-related applications, where sensitive personal information is often shared. Additionally, the user experience (UX) in many BMI apps is often neglected. Complex navigation, cluttered layouts, and an overwhelming number of features detract from the simplicity that is essential for a BMI calculator. As a result, users may struggle to use these apps effectively, reducing their overall engagement.

3.2 PROPOSED SYSTEM

The proposed system aims to deliver a **simple, efficient, and privacy-focused BMI calculator** for Android devices, developed using **Kotlin**. Unlike many existing BMI calculator apps, which tend to be feature-heavy and rely on an internet connection, this app will focus on providing **offline functionality**, ensuring users can access it anywhere, even in low or no network conditions. The primary goal is to offer a **clean,**

minimalist user interface (UI) that allows users to easily input their weight and height, quickly calculate their BMI, and receive a result categorized as **underweight, normal weight, overweight, or obese**. This design will prioritize usability, speed, and accessibility, making the app highly efficient and easy to use for anyone seeking a quick health assessment. One of the key features of this proposed system is its **offline functionality**, eliminating the need for an active internet connection. This ensures that the app can be used in remote locations or by users with limited or no data access. The app will not require any cloud-based services or data syncing, ensuring that **privacy and security** are maintained, as no personal information is collected or stored. This is especially important in health-related applications, where users may be sensitive about sharing their data. The app's core functionality will be simple yet effective: users will input their **height and weight**, press a button to calculate their BMI, and instantly receive a result along with a health category. The app will also allow users to input height in **centimeters or inches** and weight in **kilograms or pounds**, providing flexibility based on user preferences and regional measurement standards. This makes the app adaptable to a broader audience and enhances user experience by supporting multiple unit systems. Additionally, the app will feature a **lightweight design** optimized for both high-end and low-end Android devices, ensuring smooth performance regardless of the device's specifications. Its **minimalistic design** will focus on ease of use, eliminating unnecessary features and providing a quick, clear result. The proposed BMI calculator will be highly optimized to run on **minimal resources**, ensuring it can be downloaded and used by a broad demographic, including those with limited access to high-end smartphones. By eliminating unnecessary features, the app will maintain a **fast and responsive user experience** with **low storage requirements** and minimal processing needs. The focus on **simplicity and efficiency** ensures that users will spend less time navigating through complicated menus or waiting for slow processes, and more time using the app for its intended purpose. Furthermore, the app will be developed using **Kotlin**, a modern programming language known for its efficiency, ease of use, and compatibility with Android Studio, ensuring a **smooth development process** and **maintainable code**. In conclusion, the proposed **BMI Calculator Android app** will offer a **minimalist, offline, and privacy-centric solution** for users who need a simple and effective tool for calculating BMI. By focusing on ease of use, accessibility, and efficient performance, the app will provide a seamless experience for users who value privacy, speed, and simplicity. Future enhancements may introduce additional features like weight tracking and integration with fitness applications, but the core of the app will remain centered on delivering a fast, easy-to-use BMI calculation tool. This approach makes the app suitable for a wide range of users and devices, ensuring broad accessibility and usability.

CHAPTER 4

REQUIREMENTS

4.1 Hardware Requirements:

1. **Device:** Android smartphone/tablet with Android 10 (API level 29) or above, and at least 2 GB RAM.
2. **Network:** Stable internet connection for app updates (offline functionality for BMI calculation).
3. **Storage:** Minimum 50 MB free internal storage.

4.2 Software Requirements:

1. **Operating System:** Android 10 (API level 29) or above.
2. **Development Environment:**
 - IDE: Android Studio (latest stable version).
 - Programming Language: Kotlin.
3. **Libraries & Frameworks:**
 - Android SDK, Material Design for UI, SharedPreferences for local storage.
 - Kotlin Coroutines (if needed for asynchronous tasks).
4. **Version Control:** Git (GitHub/GitLab).
5. **Cloud Services (Optional for future):**
 - Firebase for backup, syncing, or authentication.
6. **Testing:**
 - JUnit for unit testing, Espresso for UI testing.

CHAPTER 5

SYSTEM DESIGN

5.1 ARCHITECTURE

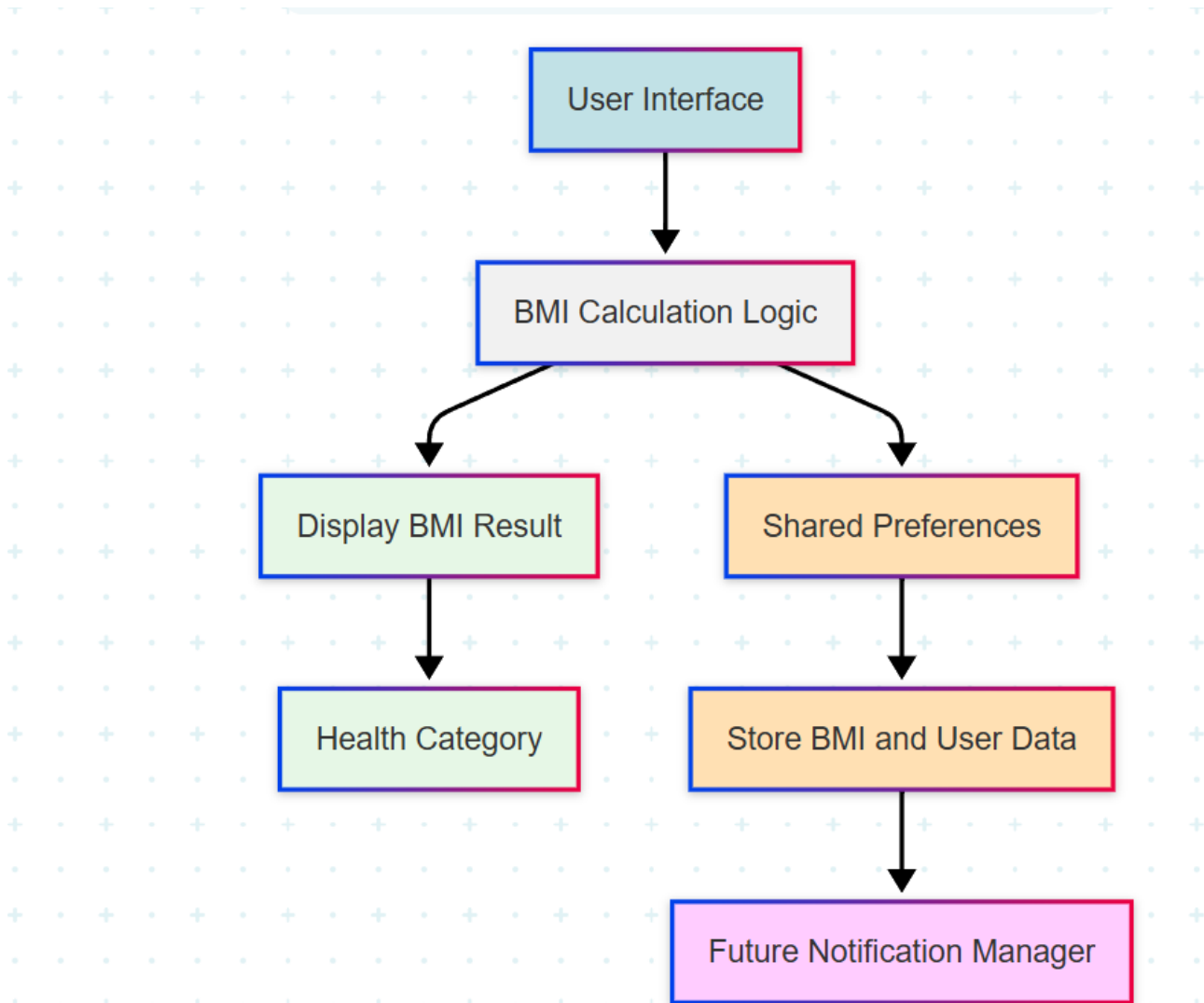


Figure 5.1: Architecture of the Android BMI Calculator

The given diagram illustrates a well-structured architecture for a **BMI (Body Mass Index) Calculator Application**, which effectively handles user input, BMI computation, result display, data storage, and

future user engagement. This modular approach ensures that each functionality is separated for maintainability, scalability, and clarity. The architecture begins with the **User Interface (UI)**, which is the primary interaction point between the user and the application. It is designed to be simple and user-friendly, allowing users to enter their physical details—typically height and weight. These inputs are essential for calculating BMI and are gathered through input fields, buttons, and possibly sliders. The goal of this layer is to collect accurate data while offering a smooth user experience. Once the user submits their input, the data is passed to the **BMI Calculation Logic** module. This component acts as the core computational engine of the application. It performs the BMI calculation using the widely accepted formula:

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

This module ensures that the input values are validated (e.g., checking for non-zero, positive values) before performing the calculation. Once the BMI is computed, the result is forwarded to two different branches—one focused on immediate feedback to the user and the other aimed at saving and managing user data for future functionality. The first branch processes the output through the **Display BMI Result** module. It may include visual aids such as progress bars, numeric labels, or gauges to enhance understanding. The purpose here is to give users immediate insight into the outcome of their input. Following this, the result flows into the **Health Category** module. This module interprets the BMI value and classifies it into a standard health category—such as underweight, normal, overweight, or obese—based on World Health Organization (WHO) or medically accepted thresholds. By categorizing the BMI, the app gives the user actionable context about their physical health, which is more informative than the raw number alone. This module is designed to enhance long-term user engagement by utilizing stored data to send notifications or reminders. For instance, it may remind users to recalculate their BMI after a week, provide health tips, or offer motivational messages. By integrating this feature, the application maintains relevance and helps promote healthy behavior over time. In conclusion, this architecture effectively divides responsibilities into logical modules, ensuring a seamless user experience, accurate health assessment, and sustainable engagement.

5.2 WORK FLOW OF THE MODEL

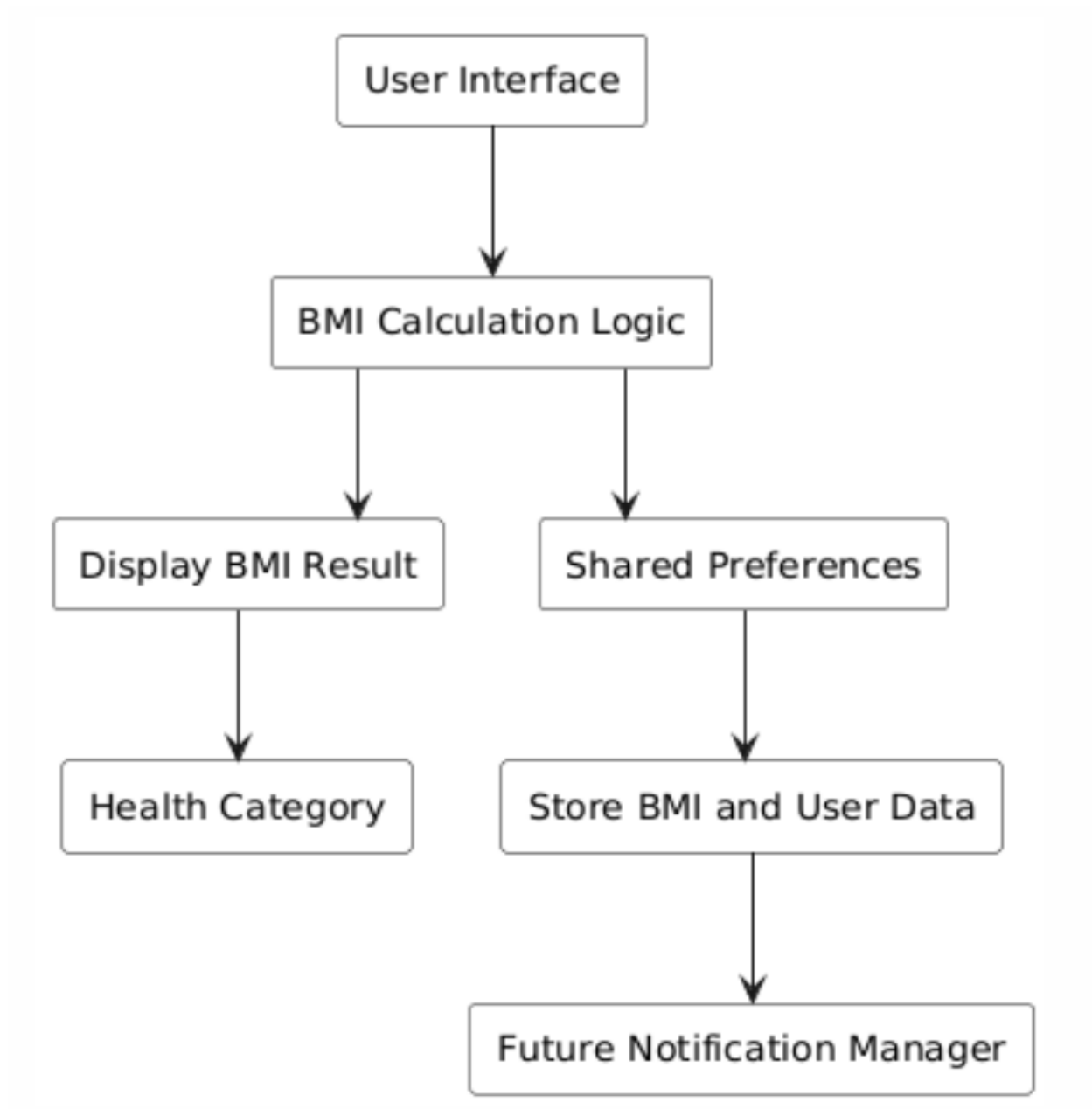


Figure 5.2: Detailed Workflow Diagram of Android BMI Calculator

The workflow depicted in the diagram represents a well-structured architecture for a BMI (Body Mass Index) Calculator application, outlining the complete process from user input to data storage and future user engagement. At the core of this architecture is the **User Interface**, which serves as the entry point for users. Here, individuals input their essential health parameters—specifically height and weight—through an intuitive and interactive interface. This front-facing layer is designed to be simple yet effective in gathering accurate data from the user.

Once the user submits their information, the data is sent to the **BMI Calculation Logic** module. This component performs the core mathematical operation of the application, computing the BMI using the standard formula: $\text{BMI} = \text{weight (kg)} \div \text{height (m)}^2$. The logic module ensures the inputs are valid and meaningful before proceeding with the calculation. Once the BMI is calculated, the workflow diverges into two main branches—one focused on immediate user feedback and the other on long-term data handling and user engagement.

The first branch leads to the **Display BMI Result** component. This module is responsible for presenting the BMI outcome to the user in a comprehensible format. It may include visual cues like color-coded bars or numerical displays to enhance clarity. Following this, the application determines the **Health Category** of the user based on the calculated BMI. This step interprets the numerical BMI value and classifies it into standardized categories such as underweight, normal weight, overweight, or obese. Providing this categorization gives users immediate and meaningful insight into their health status, helping them understand what their BMI signifies.

Simultaneously, the second branch of the workflow begins with the **Shared Preferences** module. This component is used to temporarily store the BMI and input data in a persistent manner, ensuring that user information is not lost between sessions. This is especially common in mobile or lightweight applications where small amounts of data are stored locally. The stored preferences are then processed further by the **Store BMI and User Data** module, which handles more structured data management. It records user BMI history, timestamps, or other related information, which can be used later for trend analysis or personalized health tracking.

Finally, the workflow concludes at the **Future Notification Manager**. This module utilizes the stored data to maintain user engagement over time. It can trigger reminders to check BMI again, provide health tips, or alert users if their BMI shows significant changes over a period. This feature not only

adds value to the application by encouraging consistent usage but also helps users stay informed and proactive about their health.

In summary, this workflow represents a comprehensive and user-friendly approach to BMI calculation and health monitoring. It efficiently separates concerns across different modules: input handling, logic computation, real-time feedback, data persistence, and future user interaction. The modular structure ensures the application is maintainable, scalable, and capable of evolving into a more advanced health tracking system in the future.

CHAPTER 6

CONCLUSION AND FUTURE ENHANCEMENT

BMI calculator app effectively achieves its core objective of helping users determine their Body Mass Index (BMI) and providing insights into their health status based on the result. The app is straightforward and intuitive, with a simple yet functional design that allows users to input their height and weight, calculate their BMI, and immediately see the result. The use of basic Android components such as EditText, Button, TextView, and Toast ensures that the app is both accessible and responsive to user actions. The categorization of BMI results into clear health categories like Underweight, Normal weight, Overweight, and Obese adds immediate value, guiding users in understanding their BMI in a meaningful way.

The app is lightweight, fast, and easy to use, making it an excellent choice for anyone looking for a quick and easy way to calculate their BMI. It also introduces important concepts in Android development, including user input handling, basic calculations, and UI updates, which are essential skills for any beginner developer. The app also handles edge cases like missing input with helpful error messages, showing attention to detail in the user experience.

In conclusion, BMI calculator app serves as both a useful health tool and an effective learning project for Android development. It fulfills its intended purpose while providing a smooth and clear user experience. With minimal functionality, it remains an efficient app that allows users to quickly and easily access important health information.

For future enhancements, the BMI Calculator Application can be expanded by integrating user authentication to allow personalized tracking and history across devices. Cloud storage can replace local data saving for better scalability and security. Adding graphical BMI trends and personalized health tips will provide deeper insights and engagement. The app could also support multi-language interfaces and integrate with wearable fitness devices for real-time data collection. Additional features like AI-driven health recommendations, push notifications, and diet or exercise tracking can further enrich the user experience and promote long-term health management.

CHAPTER 7

IMPLEMENTATION AND RESULTS

7.1 SAMPLE CODE

```
package com.example.bmicalculator
import android.os.Bundle
import android.widget.*
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val etHeight = findViewById<EditText>(R.id.etHeight)
        val etWeight = findViewById<EditText>(R.id.etWeight)
        val btnCalculate = findViewById<Button>(R.id.btnCalculate)
        val tvResult = findViewById<TextView>(R.id.tvResult)

        btnCalculate.setOnClickListener {
            val heightStr = etHeight.text.toString()
            val weightStr = etWeight.text.toString()

            if (heightStr.isEmpty() || weightStr.isEmpty()) {
                Toast.makeText(this, "Please enter both height and weight", Toast.LENGTH_SHORT).show()
                return@setOnClickListener
            }

            val height = heightStr.toFloat() / 100 // convert cm to meters
            val weight = weightStr.toFloat()

            val bmi = weight / (height * height)

            val category = when {
                bmi < 18.5 -> "Underweight"
                bmi in 18.5..24.9 -> "Normal weight"
                bmi in 25.0..29.9 -> "Overweight"
                else -> "Obese"
            }

            tvResult.text = "BMI: %.2f\nCategory: %s".format(bmi, category)
```

```

    }
}
}

```

```
package com.example.bmicalculator
```

```
import android.os.Bundle
import android.widget.*
import androidx.appcompat.app.AppCompatActivity
```

```
class MainActivity : AppCompatActivity() {
```

```
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
```

```
        val etHeight = findViewById<EditText>(R.id.etHeight)
        val etWeight = findViewById<EditText>(R.id.etWeight)
        val btnCalculate = findViewById<Button>(R.id.btnCalculate)
        val tvResult = findViewById<TextView>(R.id.tvResult)
```

```
        btnCalculate.setOnClickListener {
            val heightStr = etHeight.text.toString()
            val weightStr = etWeight.text.toString()
```

```
            if (heightStr.isEmpty() || weightStr.isEmpty()) {
                Toast.makeText(this, "Please enter both height and weight", Toast.LENGTH_SHORT).show()
                return@setOnClickListener
            }

```

```
            val height = heightStr.toFloat() / 100 // convert cm to meters
            val weight = weightStr.toFloat()
```

```
            val bmi = weight / (height * height)
```

```
            val category = when {
                bmi < 18.5 -> "Underweight"
                bmi in 18.5..24.9 -> "Normal weight"
                bmi in 25.0..29.9 -> "Overweight"
                else -> "Obese"
            } tvResult.text = "BMI: %.2f\nCategory: %s".format(bmi, category)
```

```

        }
    }
}

```

7.2 OUTPUT SCREENSHOTS

BMI Calculator

Enter Height (cm)

Enter Weight (kg)

Calculate BMI

Figure 7.3: Prototype - 1

A prototype of a BMI calculator interface. It features a light purple background with dark purple sidebars. The title "BMI Calculator" is centered at the top. Below it are two input fields: the first contains "157" and the second contains "45". A dark purple button with rounded corners and the text "Calculate BMI" is positioned below the inputs. At the bottom, the results are displayed: "BMI: 18.26" and "Category: Underweight".

BMI Calculator

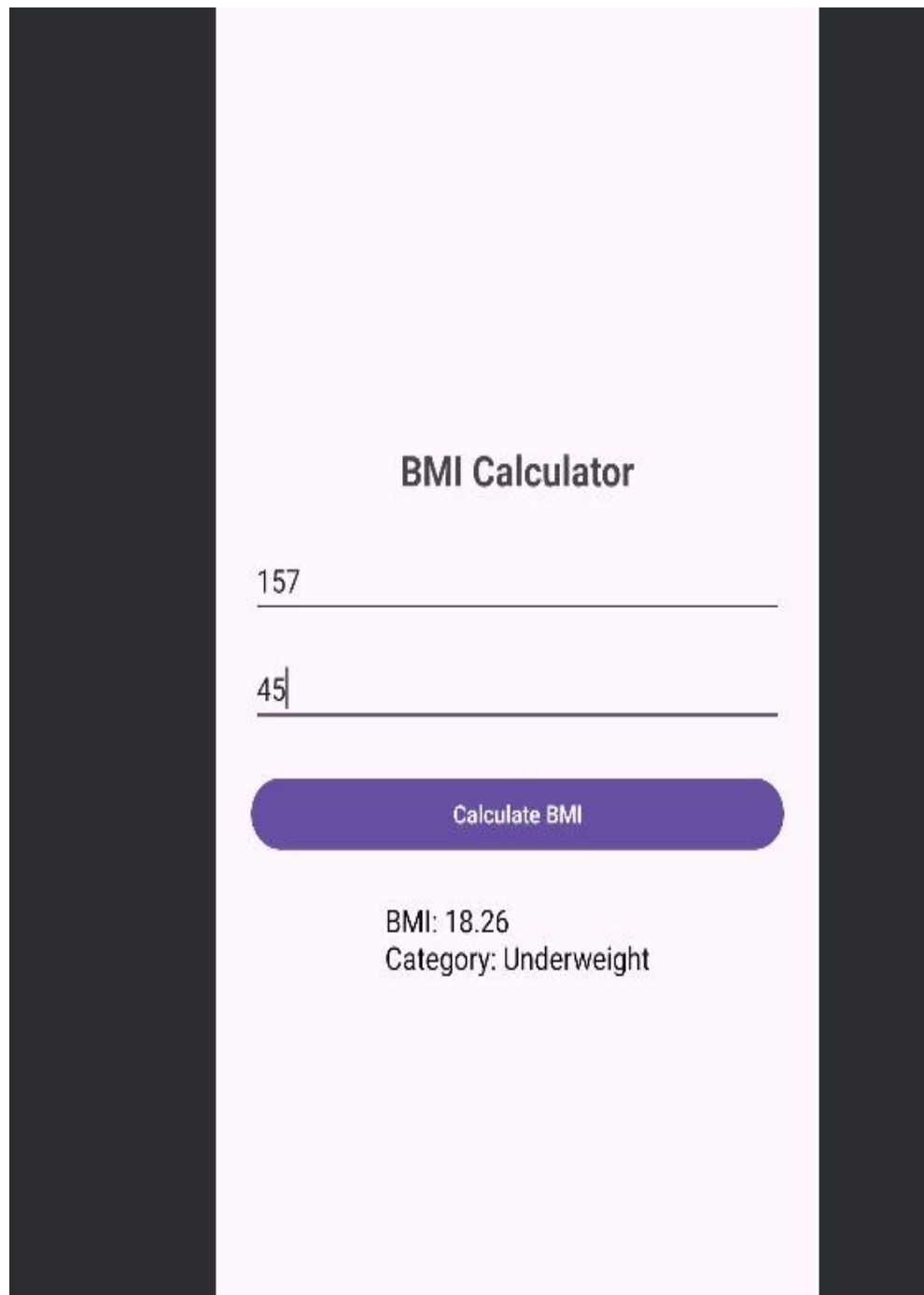
157

45

Calculate BMI

BMI: 18.26
Category: Underweight

Figure 7.4: Prototype -2



A prototype of a BMI calculator interface. It features a light purple background with two dark purple vertical bars on the sides. The title "BMI Calculator" is centered at the top. Below it are two input fields: the first contains "157" and the second contains "45". A rounded purple button labeled "Calculate BMI" is positioned below the inputs. The results, "BMI: 18.26" and "Category: Underweight", are displayed at the bottom.

BMI Calculator

157

45

Calculate BMI

BMI: 18.26
Category: Underweight

Figure 7.5: Prototype -3

CHAPTER 8

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