Green University of Bangladesh

Department of Computer Science and Engineering (CSE)
Semester: (Fall, Year: 2022), B.Sc. in CSE (Day)

PersonalHealthTracker

Course Title:Data Structures
Course Code: CSE 206
Section: D7

Students Details

Name	ID
Rukonuzzaman Topu	232002280

Submission Date: 13.11.2024
Course Teacher's Name: Md. Parvez Hossain

[For teachers use only: Don't write anything inside this box]

Lab Project Status	
Marks:	**Signature:**
Comments:	**Date:**

Contents

Chapter 1

Introduction

1.1 Overview

The Personal Health Tracker project is designed to empower individuals in maintaining and improving their health by tracking key health metrics such as water intake, exercise, sleep, and weight. The software application offers a simple yet comprehensive way to record daily health data, set goals, view progress, and receive reminders. By utilizing efficient data structures like linked lists, stacks, queues, and graph trees, the Personal Health Tracker is built to provide a robust, user-friendly health management solution for anyone who wishes to lead a healthier lifestyle.

1.2 Motivation

In today's fast-paced world, people are constantly struggling to balance their health and professional lives. Many individuals lack the tools and motivation to consistently track their daily health metrics, leading to unhealthy habits. The primary motivation behind the Personal Health Tracker is to provide an accessible, user-friendly solution to make health monitoring easy, motivational, and engaging. By offering features such as goal setting, reminders, visual progress, and easy tracking, the application aims to help users adopt healthier habits and make lasting changes. [**?**].

1.3 Problem Definition

1.3.1 Problem Statement

People often struggle to maintain a consistent routine for health and wellness. They lack effective tools that integrate data recording, progress visualization, and motivation to achieve their health objectives. This often results in erratic habits and loss of motivation, hindering progress toward improved physical well-being. The Personal Health Tracker aims to address these gaps by offering a cohesive solution that keeps individuals engaged with their personal health goals

1.3.2 Complex Engineering Problem

Complex Engineering Problem Developing a Personal Health Tracker involves solving several engineering challenges, such as efficiently storing and retrieving user health data, creating a user-friendly inter- face, and implementing features like reminders, undo functionality, and data visualiza- tion. These require the integration of diverse data structures, including linked lists for data storage, stacks for undo operations, queues for reminders, and graph trees for visu- alization. These features need to be carefully orchestrated to ensure smooth operation, real-time response, and intuitive user interaction, making the Personal Health Tracker a complex engineering problem.

1.4 Design Goals/Objectives

- To develop an application that allows users to easily input and track daily health metrics, such as water intake, exercise duration, sleep hours, and weight.
- To create a reminder system that keeps users motivated and on track with their health goals.
- To provide data visualization features for understanding trends in health metrics, offering valuable insights to users.
- To implement an undo function for reversing incorrect inputs, providing flexibility and reducing user frustration.
- To ensure data persistence through file storage, allowing users to save their records and retrieve them later.
- To develop an intuitive, user-friendly interface that facilitates interaction without requiring technical expertise.

1.5 Application

The Personal Health Tracker application can be used by a diverse range of individuals who are interested in maintaining or improving their health. This includes:

- **Individuals Focused on General Health**: Users looking to maintain healthy habits like proper hydration, regular exercise, adequate sleep, and weight management.
- **Fitness Enthusiasts**: Individuals who want a structured way to track their fitness routines and analyze progress over time.
- **Healthcare Professionals**: Professionals who need to monitor the health metrics of patients or clients remotely.
- **Students and Working Professionals**: People who may have hectic schedules and need reminders and easy ways to track their health metrics daily.

- **Adaptability for Mobile/Web Platforms**: The tracker can be adapted to mobile or web platforms to increase accessibility and convenience for users.

1.6 Features and Functionalities

- **Daily Health Metrics Tracking**: Track water intake, exercise, sleep, and weight data with ease.
- **Reminders**: Set reminders for important health activities, such as drinking water, exercising, or going to bed.
- **Goal Setting**: Users can set and track goals related to exercise, hydration, sleep, and weight, helping to motivate consistent health improvements.
- **Progress Visualization**: Generate simple graphs using graph trees to provide users with visual insights into their health progress over time.
- **Undo Feature**: Utilize a stack-based undo functionality that allows users to revert recent actions if mistakes are made.
- **Notifications**: Keep users informed with relevant notifications and updates related to their health progress and reminders.
- **Data Persistence**: Save and load user data through file storage to ensure continuity and allow long-term tracking.

1.7 Technical Approach

1.7.1 Data Structures

- **Linked Lists**: Used to store daily health records, where each record is represented by a node containing health data.
- **Queues**: Implemented for managing health reminders, allowing users to add, view, and complete reminders.
- **Stacks**: Used for the undo feature, allowing users to reverse their latest actions to correct errors or changes.
- **Graph Trees**: Used for visualizing user health metrics over time, where nodes represent specific health data points (e.g., water intake on a given date).
- **Arrays**: Used for storing notifications to provide updates about user progress or reminders.

1.7.2 Tools and Technologies

- **Programming Language**: C Language for efficient data structure management and performance.
- **Development Environment**: IDEs such as Code::Blocks or Visual Studio Code for development and testing.
- **Data Persistence**: File handling in C for storing health data records to ensure continuity across sessions.

1.8 Conclusion

The Personal Health Tracker is a practical, user-centered solution for promoting better health management. By incorporating data collection, visualization, goal-setting, reminders, and undo capabilities, the tracker empowers individuals to achieve their health goals consistently. The use of fundamental data structures like linked lists, queues, stacks, and graph trees ensures that the solution is both efficient and easy to expand in the future. This project will contribute to healthier habits and improved health outcomes for users who commit to tracking and improving their daily health metrics.