Green University of Bangladesh

Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering (FSE)
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Weather API Integration and Multiplayer Game Using Sockets

Course Title: Computer Networking Lab
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Lab Project Report Status	
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Chapter 1

Introduction

1.1 Overview

Weather Application: This project uses networking to fetch weather data from an online server using an API. Users can input a city name, and the application will display weather details like temperature and humidity.
Multiplayer Tic-Tac-Toe Game: This project allows two players to play Tic-Tac-Toe over a network. It uses client-server communication so players can connect remotely, make moves, and see the game updates live. [1] [2]

1.2 Motivation

The Weather Application helps us learn how to use networking to fetch real-time data and create useful tools for users. The Multiplayer Tic-Tac-Toe Game project teaches us about client-server communication and how to make interactive games that can be played online, building our networking and programming skills.

1.3 Problem Definition

1.3.1 Problem Statement

For the Weather Application, the main task is to fetch accurate weather data from an online API based on the user's city and display it clearly. For the Tic-Tac-Toe Game, the goal is to connect two players online, allowing them to make moves and see updates instantly. The challenge is keeping both players' moves synchronized in real-time without errors.

1.3.2 Complex Engineering Problem

The following table summarizes the attributes related to the complex engineering problem addressed by the 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	Basic knowledge of networking, using APIs, and socket programming is needed. Understanding of Java will help to build the applications.
P2: Range of conflicting requirements	Balancing between real-time updates and network stability, handling API response delays, and ensuring the app works on all devices.
P3: Depth of analysis required	API responses, socket communication, and potential network issues is needed for smooth, error-free performance.
P4: Familiarity of issues	Common issues include API errors, network connection problems, and handling synchronization between two players in the game.
P5: Extent of applicable codes	API integration, socket programming, user interface design, and handling network errors and real-time updates.
P6: Extent of stakeholder involvement and conflicting requirements	Stakeholders include users and developers, balancing user experience with network performance needs.
P7: Interdependence	The Weather App depends on the API for data, while the Tic-Tac-Toe Game relies on socket communication for real-time updates. Both projects need a stable network connection for smooth performance.

1.4 Design Goals/Objectives

The goals and objectives of the project are as follows:

- User-friendly Interface: Create a simple and clear interface for both the Weather App and Tic-Tac-Toe Game.
- API Integration: Fetch real-time weather data using a reliable weather API.
- Stable Connection: Use sockets for smooth, real-time communication in the Tic-Tac-Toe game.
- Error Handling: Handle network issues and invalid user input gracefully.

- Cross-Platform Support: Ensure the application works on different devices without issues.

1.5 Application

The solutions to the Traveling Knight Problem, Train Swapping Problem, and Travel in Desert Problem offer diverse and efficient applications:

Weather App:

Users can input any city name to get up-to-date weather information like temperature, humidity, and weather conditions. The app uses an API to gather real-time data and show it in a simple, easy-to-read format.

Multiplayer Tic-Tac-Toe Game:

Two players can connect to play Tic-Tac-Toe over a network using socket programming. The game updates the moves of both players in real-time, allowing them to compete remotely with clear and instant feedback.

References

[1] API Learning for project:. https://medium.com/@archimedes.fagundes/5-ways-to-call-an-api-in-java-b3de65fb2022.

[2] Socket Learning: . https://www.baeldung.com/a-guide-to-java-sockets.