

## PROJECT OBJECTIVES:

1. The first objective is **to identify the specific problems faced by commuters** when using the Quezon City Libreng Sakay Program. Through surveys and interviews, we aim to understand issues such as lack of real-time bus information, unclear routes, and difficulty in planning trips. This step is crucial to ensure the app addresses actual commuter needs and not just assumptions.

2. The second objective is **to design and develop a mobile application** that improves the Libreng Sakay experience. The app focuses on solving identified issues and providing accessible, useful features for daily commuters. It aims to be both functional and user-friendly, ensuring it's easy for anyone to use, regardless of tech familiarity.

2.1 A major feature of the app is **real-time bus tracking using mobile GPS technology**. This allows users to see the live location of Libreng Sakay buses, helping them plan better and reduce waiting time. This function enhances transparency and trust in the program.

2.2 The app will include **interactive route navigation**, helping commuters locate the nearest bus stop and compute the shortest or fastest path using Dijkstra's Algorithm. This ensures optimized routes for users, making travel more efficient and convenient.

2.3 the app will provide **route and schedule visualization**, especially for Route 1. It will display detailed bus stop information, estimated time of arrivals (ETA), and the current route in a visual, easy-to-understand interface. This improves user confidence and helps with travel planning.

## Research Design:

This study used **Applied Research** to solve a real-world problem using existing algorithms—specifically **Dijkstra's Algorithm**—to build a mobile application for real-time bus tracking.

The goal was to improve Quezon City's Libreng Sakay program by designing a functional system through system design, development, testing, and evaluation.

A **questionnaire technique** was used to gather feedback from commuters on usability and satisfaction, helping us improve the app based on real user input.

## Respondents of the Study:

Our primary respondents were commuters using Route 1 of the Libreng Sakay program and TTMD officials overseeing transport operations.

We also included possible input from bus drivers or operators.

Target: 30–50 survey respondents and 5–10 interviewees for deeper insights.

## **Data Gathering Instruments and Techniques:**

We used two main tools:

**Questionnaire** – distributed to commuters to assess app usefulness and pain points in current transportation.

**Interviews** – conducted with TTMD officials and app testers to evaluate expectations and feedback on prototypes.

This combination allowed us to collect **both quantitative and qualitative data**.

## **Preparation of Instruments:**

All instruments were validated by experts from the university and the QC LGU.

We conducted a pilot test with 5–10 individuals to refine the questions.

Evaluation of the app followed the ISO/IEC 25010 software quality model, focusing on usability, reliability, performance, and other system metrics.

## **Data Gathering Procedure:**

We first obtained formal approval from the Quezon City LGU and TTMD to conduct the study along Route 1.

Surveys were distributed at bus stops and terminals during peak hours.

We also conducted interviews and field observations to gain deeper understanding.

Ethical practices were followed—respondents gave informed consent, and all data was kept confidential and used only for academic purposes.

## **STATISTICAL TOOLS:**

To analyze our data, we used basic yet effective statistical tools. We applied the mean to understand general commuter satisfaction and experience with the app. The standard deviation helped check how consistent the feedback was. For technical performance, we evaluated the accuracy of the routing system using percentage accuracy, and measured response time using the average. For reliability, we calculated the Mean Time Between Failures, and for security, we used incident rate to monitor unauthorized access. These tools gave us a well-rounded view of the system's effectiveness and user impact.

## **ANALYTICAL TOOLS:**

We used several tools to analyze data and design the system efficiently. Microsoft Excel was used for statistical analysis, while SQL managed and retrieved system-related data. To collect structured feedback, we distributed surveys using Google Forms. For visual design and documentation, we created Use Case Diagrams and Flowcharts using Draw.io. These tools helped us ensure the system met user needs and performed well throughout testing and evaluation.