PROJECT PLAN FOR THE COURSE COMP1110 – GROUP D08

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1. Topic Selection & Introduction

The group has selected the topic **B. Smart Public Transport Advisor** for the project. For the project, the group will implement a route planner with the focus for pedestrian navigation within the campus of The University of Hong Kong (HKU). To achieve that, the group will model the campus as an undirected multigraph as defined mathematically by:

$$G = (V, E), \tag{1}$$

where for each vertex $v \in V$, v represents a key location on the campus, such as a building entrance, a canteen, etc.; and for each edge $e \in E$ represents an undirected path between two distinct vertices. In addition to the graph structure, each edge will have a set of attributes, such as the average walking time, type of path (e.g., slope, stairs, etc.), etc. The details of what attributes to include will be determined during the design phase of the project.

2. Review of Existing Solutions

For researching purposes, the group will review three types of existing solutions, each with two examples:

(1) **General purpose route planners**: Google Maps, Citymapper;
(2) **Transportation-specific route planners**: MTR Mobile App, HKBUS.app; and
(3) **Static navigation systems**: HKU campus map, On-campus navigation signages.

The examples will be evaluated across several dimensions, such as easiness of use, specificity for pedestrian navigation, etc. The conclusions drawn from the comparison shall be used to fine-tune the design of our own route planning implementation.

3. Task Decomposition, Assignments & Timeline

The project will be decomposed into three phases: **Research & Design**, **Implementation**, and **Case Study, Test, & Evaluation**, each with its dedicated tasks. Each task has a defined timeline and expected deliverables, which will be detailed in the following subsections.

3.1. **Task decomposition.** The tasks, along with their descriptions, expected deliverables, and time estimates, are listed in Table 1.

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Table 1: A list of tasks for accomplishing the project, along with their descriptions, expected deliverables, and time estimations.

Task ID	Phase	Description	Expected Deliverables	Time (days)
R01	Research & Design	Survey existing navigation solutions and compare them in a table format.	Comparison table of existing tools (target users, key features, missing features, etc.) with summary takeaways.	3
R02	Research & Design	Problem modeling for our solution: define core entities, input/output, and coverage scope.	Documentation of core concepts (stop, segment, journey, etc.), input/output specifications, scope of coverage.	1
I01	Implementation	Data collection: assign responsible areas to each team member, measure and record paths between designated nodes.	Collected path data (distance, time, cost, etc.), raw measurement records or data sheets.	7
I02	Implementation	Coding: basic data structures in Python.	Implemented data structure classes (e.g., Graph, Node, Edge) with methods for serialization, deserialization, and basic operations.	3
I03	Implementation	Coding: text-based application UI with main functionality for selecting origin/destination and preferences.	A text-based user interface (based on `Textual`) for user to choose origin/destination and preferences, with backend integration for route planning.	10
I03A	Implementation	Coding: data management UI for interactive data collection and editing.	(Optional) Interactive data management tool supporting CRUD operations on data.	5
I04	Implementation	Coding: route search logic (candidate generation, scoring, ranking).	Route search algorithm code, find the optimal itinerary based on the user's selected preferences (such as cost, duration, number of segments).	5

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Table 1. *Continued from last page.*

Task ID	Phase	Description	Expected Deliverables	Time (days)
I05	Implementation	Coding: advanced preference mode.	An algorithm that can avoid stairs, or pick routes that are accessibility-focused, etc.	3
C01	Case Study, Test, & Evaluation	Scenario design: write 3 to 4 user scenarios with goals, network layout, origin/destination, and preference modes.	Document describing 3 to 4 user scenarios.	2
C02	Case Study, Test, & Evaluation	Record input/output for scenarios. Run the program for each scenario and capture results.	Input parameters and program outputs for each scenario.	1
C03	Case Study, Test, & Evaluation	Analyze the competence of our solution and compare with existing solutions.	Analysis report on solution capabilities, comparison with existing tools.	2
C04	Case Study, Test, & Evaluation	Discussion and suggestions: summarize strengths, limitations, and future improvements.	Discussion document with limitations analysis and improvement directions.	2

TABLE 2. The tasks as defined in Table 1 and their assignees. Asterisk (∗) indicates the person has been assigned to the task.

Task ID \ Assignee	C. Banh	S. Liu	J. Shing	Y. Ye	Y. Zhang
R01	∗	∗			
R02		∗	∗		∗
I01	∗		∗	∗	∗
I02	∗		∗	∗	∗
I03	∗		∗	∗	∗
I03A	∗		∗	∗	∗
I04	∗		∗	∗	∗
I05	∗		∗	∗	∗
C01		∗		∗	
C02	∗	∗		∗	
C03	∗	∗			
C04	∗	∗			

3.2. **Task assignments.** The task assignments are listed in Table 2.

3.3. **Plan timeline.** Note that the tasks set out in Table 1 are not necessarily executed sequentially and linearly. They may be arranged in parallel where possible and appropriate. The timeline for the project and the dependency of tasks are illustrated by the Gantt chart in Figure 1.

The timeline is merely a rough estimation and may be adjusted as the project progresses. There is a buffer period at the end of the project to accommodate any unforeseen delays or additional work that may arise during the project execution.

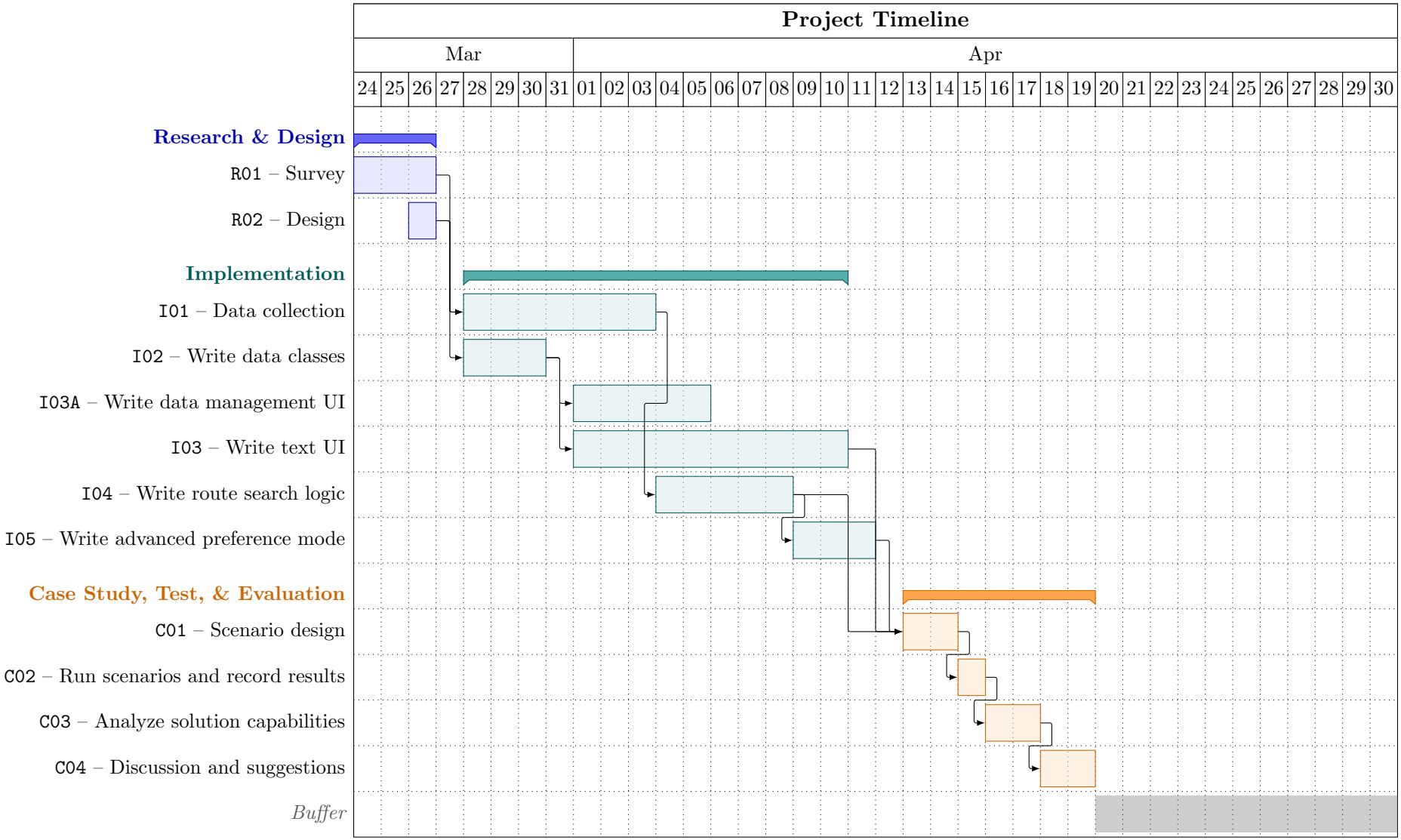

FIGURE 1. The Gantt chart illustrating the project execution.