

American International University-Bangladesh (AIUB)  
**Department of Computer Science  
Faculty of Science & Technology (FST)**

**Public Transport Optimization**

A Software Engineering Project Submitted

By

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| --- | --- | --- | --- | --- |
| **Semester: Summer\_21\_22** | | **Section:** | **Group Number:** | |
| SN | Student Name | Student ID | Contribution (CO3+CO4) | Individual Marks |
| 01 | SAZID – AL – ABEDIN | 22-45999-1 |  |  |
| 02 | MD. SAIDUZZAMAN SOHAG | 22-46006-1 |  |  |
| 03 | MD. SADMAN HOSSAIN | 22-46061-1 |  |  |
| 04 | NOUROZE TARANNUM ANANNYA | 22-46062-1 |  |  |
| 05 | SEEMANTA TORAFDAR | 21-45968-3 |  |  |

The project will be Evaluated for the following Course Outcomes

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| --- | --- | --- |
| **CO3:** *Select* appropriate software engineering models, project management roles and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects | Total Marks | |
|  | |
| Appropriate Process Model Selection and Argumentation with Evidence | [5 Marks] |  |
| Evidence of Argumentation regarding process model selection | [5Marks] |  |
| Analysis the impact of societal, health, safety, legal and cultural issues | [5Marks] |  |
| Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report | [5Marks] |  |
| **CO4:** *Develop* project management plan to manage software engineering projects following the principles of engineering management and economic decision process | Total Marks | |
|  | |
| Develop the project plan, its components of the proposed software products | [5Marks] |  |
| Identify all the activities/tasks related to project management and categorize them within the WBS structure. Perform detailed effort estimation correspond with the WBS and schedule the activities with resources | [5Marks] |  |
| Identify all the potential risks in your project and prioritize them to overcome these risk factors. | [5Marks] |  |

Description of Student’s Contribution in the Project work

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| --- |
| Student Name: SAZID – AL – ABEDIN  Student ID: 22-45999-1  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |
| Student Name: MD. SAIDUZZAMAN SOHAG  Student ID: 22-46006-1  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |
| Student Name: MD. SADMAN HOSSAIN  Student ID: 22-46061-1  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |
| Student Name: NOUROZE TARANNUM ANANNYA  Student ID: 22-46062-1  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |
| Student Name: SEEMANTA TORAFDAR  Student ID: 21-45968-3  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |

# PROJECT PROPOSAL

## Background to the Problem

To address the challenges faced by public transport systems in densely populated cities in Bangladesh, this project aims to develop a digital platform to enhance the accessibility, convenience and efficiency of public transport. Currently, passengers encounter significant difficulties due to a lack of real-time information, poor route management, and inefficient ticketing processes. These issues result in overcrowded buses and trains, long wait times, and reduced reliability, which discourages the use of public transport and increases reliance on private vehicles.

The root cause of this problem lies in the absence of real-time data and streamlined ticketing solutions, leading to passenger frustration and overall system inefficiency. Addressing these issues is essential for creating a more sustainable urban transport system that meets the demands of a growing population while promoting public transport usage. By providing real-time tracking, route planning, ticketing, and availability updates, this app seeks to make public transportation a more reliable, accessible and attractive option for daily passengers, contributing to better urban mobility and environmental sustainability.

## Solution to the Problem

The primary objective of this project is to develop a mobile application that enhances the public transportation experience by addressing common issues faced by passengers in urban areas. This app will integrate route searches, live tracking, suggestions, and a secure QR-code ticketing system to offer a convenient, reliable alternative to current transportation options. This solution aims to solve problems related to the lack of real-time information, overcrowding, and inefficient ticketing, making public transport a more attractive choice.

The proposed solution involves a GPS-integrated public transport app with features like route planning, real-time tracking, and cashless secure ticketing. The solution is feasible and scalable to meet business objectives since it supports widely-used mobile and GPS technology, requiring minimal additional infrastructure investment while increasing passenger satisfaction and potentially boosting public transport usage.

**Key Functionalities of the Proposed Solution:**

* **Route Search**: Provides an intuitive “From - To” search feature that recommends bus routes and options.
* **Bus Suggestion**: It will show available buses on that selected route.
* **Bus Information**: Tapping on a bus option provides details, including Estimated Time Arrival (ETA) and occupancy status, using GPS data.
* **Map with Route Suggestions**: A visual interface that offers route suggestions and relevant information.
* **Ticket Purchase and Validation**: Secure in-app ticketing system with one-hour pre-scan validity, reducing cash transactions.
* **Live Tracking**: Real-time bus tracking, updating users with accurate ETAs and traffic conditions.

**Target User Groups**: The primary users include daily commuters, students, and professionals in urban areas who depend on public transport. Secondary users are transport operators and government agencies that oversee public transit systems. Commuters benefit through:

* Live tracking will reduced wait times.
* Access to real-time updates that enhance efficiency.
* Cashless transactions that streamline the ticketing process.

**Comparison and Extensions in the Proposed Study:**

Building on existing solutions, our study addresses key gaps in urban public transport management to better serve densely populated areas like Bangladesh.

1. **User-Centric Mobile Application**: Unlike previous web-based approaches, such as the low-cost GPS model for mobile tracking presented in [1] and [2], our app focuses on a mobile platform for both users and drivers, centralizing route suggestions, live tracking, and digital ticketing.
2. **Integrated Ticketing**: While the reviewed studies focus on bus tracking, our solution extends functionality by integrating QR-based cashless ticketing, enhancing convenience and security for commuters.
3. **Advanced Route Planning**: Beyond real-time tracking, our app includes route planning with estimated arrival times and occupancy data, helping users reduce wait times and overcrowding.
4. **Enhanced Sustainability**: Our project encourages public transport usage by improving convenience, supporting goals like reduced congestion and emissions, aligning with urban sustainability efforts.

**References:**

[1] "Cost-Effective Bus Tracking Using Driver GPS," *IEEE Xplore*, [Online]. Available: <https://ieeexplore.ieee.org/document/10544750>.

[2] "Smart City Bus Tracking for Improved Urban Mobility," *IEEE Xplore*, [Online]. Available: <https://ieeexplore.ieee.org/document/10346218>.

**Existing studies in the problem area and solution:** Various software platforms, such as Uber and Pathao, offer real-time location tracking and navigation but focus on ridesharing on the other hand public transportation doesn’t provide this. Studies on smart cities and transportation highlight that good public transport apps should include real-time data, tools to predict arrival times, and an easy-to-use interface. These studies highlight the importance of digital integration, which our project addresses by combining tracking, routing, and ticketing.

# SOFTWARE DEVELOPMENT LIFE CYCLE

## Process Model

* Provide an analysis regarding the nature and environment of the software that you are going to develop and select the best suitable method(s) to develop the software.
* Present your arguments based on your analysis about why your selected method(s) is the best choice among all other methods to develop your proposed software.
* Presents sufficient amount of evidence to support argument for your model selection in developing your proposed solution.

## Project Role Identification and Responsibilities

* Identify all the roles/stakeholder in the software/project management activities in software development.
* Describes the responsibilities of the role in the software development.

**Text Format:**

* Style: Times New Roman
* Size: 12
* Space: 1.0
* Alignment: Justify
* Length: Maximum 6 pages (including cover page)

## Rubric for Project Assessment (CO3)

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| Criteria | Marks distribution (Max 3X5= 15) | | | | Acquired  Marks |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
| Selection of Software Engineering Models | Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model | Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice | Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model | Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient amount of evidence to support argument for the model selection |  |
| Role identification and Responsibility Allocation | The project has poor project management plans for identifying roles and assigning the responsibilities | Identify few roles in the project management where some of the roles are left alone with any project responsibilities | Identify most of the roles in the project management and assign their responsibilities | Well planned project with proper role identification and responsibility allocation in the project management activities |  |
| Impact identification |  |  |  |  |  |
| Formatting and Submission | Project report is not complete and Several errors in spelling and grammar. Present a Confusing organization of concepts, supporting  arguments, and  real-life example.  Sentences rambling, and details are repeated. | Some errors in spelling and grammar. Some problems  of organizing the answer in a logical order of defining,  elaborating, and providing real-life examples. | Few errors in spelling and grammar. Presents most of the details in a logical flow of  organization in  definition,  details, and  example. | Project report is complete and No errors in spelling and grammar. Consistently  presents a logical  and effective  organization of definition,  details, and real-life example of  the topic. |  |
| Acquired marks: | | | | |  |
| CO Pass / Fail: | | | | |  |

## Rubric for Project Assessment (CO4)

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| Marking Criteria | Marks Distribution (Maximum 3X5=15) | | | | Acquired Marks |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
|  |  |  |  |  |  |
| Project Planning | No background information regarding the project is  given; project goals and benefits are  missing. | Insufficient background information is given; project goals and benefits are  poorly stated | Sufficient background information is given; the purpose and goals of the project are explained. | Thorough and relevant background information  is given; project goals are clear and easy to identify. |  |
| Effort Estimation and Scheduling | Student vaguely discuss the impact of societal, health, safety, legal and cultural issues in their project | Student provided with partial relevance to the impact of societal, health, safety, legal and cultural issues in their project | Student fairly provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project | Student comprehensively provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project |  |
| Risk Management | Ambiguous representative example. | Partially identify / indicate towards real-life example. | Real-life example is fairly connected towards the definition. | Comprehensively defend with real life example. |  |
| Acquired Marks: | | | | |  |
| CO Pass / Fail: | | | | |  |