American International University-Bangladesh (AIUB)

Faculty of Science and Technology (FST)
Department of Computer Science (CS)

SDPM Group Project, Spring 2023

Project Title

AUTOMATIC PARKING CHARGE COLLECTION SYSTEM

Section D

Submitted by

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1.0 Introduction:

This document covers all the information about our project management for the development of the AUTOMATIC PARKING CHARGE COLLECTION SYSTEM

This is the project management plan for our project which contains all the details about how we are going to manage and implement the project. The target audiences of this project document are the project manager, the project sponsor, the project owner, the project stakeholders, the client (some parts of the project plan might be confidential information, we should check with our management team as to what parts of the project plan, we should communicate to the client) and project team. The intention of this document is to better manage the project, efficiently use the available resources and successfully complete the project within the deadline.

2.0 **Project Title**:

AUTOMATIC PARKING CHARGE COLLECTION SYSTEM

3.0 **Objectives:**

The purpose of this project is to design and create software that will automate the parking charge payment system. In this system whenever any vehicle approaches the parking gate, then it will check if the vehicle's RFID (Radio-frequency identification) tag is activated or not. If the chip is activated then it will check user's information from the database and deduct balance from the car owner's account automatically. When the tag is inactive or the tag is not found the laser will trigger the camera and the camera will take two photos, one on the rear number plate and another of the front name-plate. Then according to the registered number plate, a mail will be sent to the respective owner for paying the money within certain amount of time to avoid fine. Using this RFID tag, both time consumption is decreased and extra security measures are ensured. In this way, people don't have to stop at the toll gate even if they don't have registered for a RFID tag. Authority can still collect the fee from the unregistered users. This will completely remove any kind of traffic congestion at the entrance gate.

4.0 Justification:

4.1 Cars don't have to stop at the entrance gate
4.2 congestion at the entrance gate will be removed
4.3 Hassel free payment
4.4 Higher security will be ensured
4.5 Less manpower will be needed

5.0 **Systems Overview**:

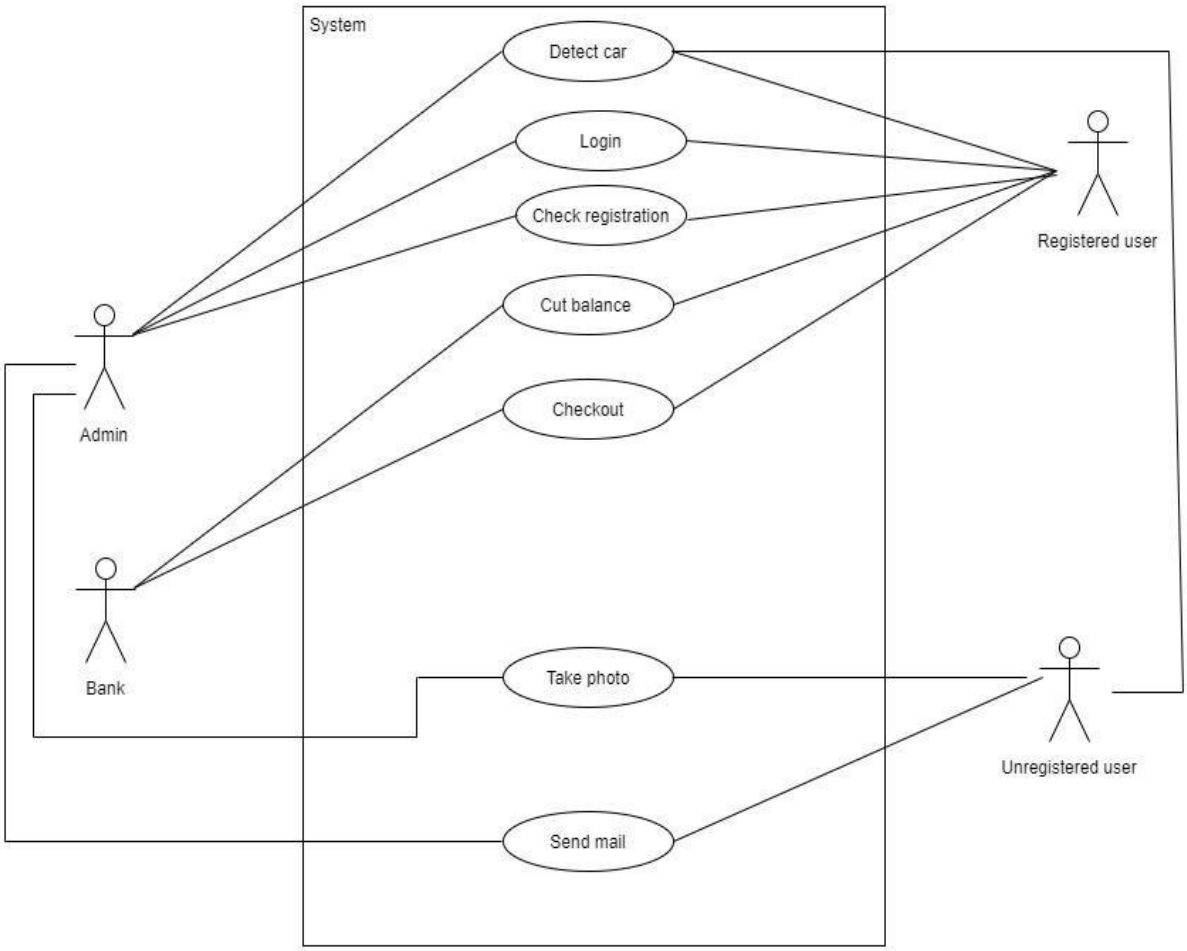


Figure 1: - Use case Diagram of automatic parking charge collection system

6.0 Stakeholders analysis

6.1. Internal Stakeholder:

1. Owner
2. Programmers
3. employees
4. Investors

6.2. External Stakeholders:

1. Clients
2. Users
3. Hardware suppliers
4. Bank
5. Bangladesh Road Transport Authority
6. Dhaka Metropolitan Police

7.0 Feasibility study

1. **Technical Feasibility**

The necessary number of software developers are available to build the software. The servers are also capable of providing the service without constant supervision of any onsite software engineer. It will notify the software engineers through cloud monitoring tools if any error occurs. Moreover, today there are excellent Internet service providers that offer over 99% service up-time that will consistently provide stable, quality service for the customers. We also have the required software tools and the hardware to develop the whole software system.

HW Requirement (Min)-

• Memory: 2 GB

• GPU: INTEL HD Graphics 520

• CPU: Intel Pentium Gold G6400

SW Requirement-

• OS: Windows 7/10/11

• Database software: XAMPP

• Language: PHP/HTML/CSS/JavaScript

It can be concluded that the project is feasible in terms of technical assessment.

7.2 Financial Feasibility

This project will reduce the hassle of manual processing and reduce the delay also. So, there are a huge number of people who are willing to pay that extra service charge to eradicate those hassles. That increases the chance of earning consistent profit through this business investment.

Development cost	BDT 6400000
Tester	BDT 600000
Project Manager	BDT 1120000
Project Co-Ordinator	BDT 800000
Consultant	BDT 1600000
Office space	BDT 800000
Utilities (water, internet, electricity, Miscellaneous)	BDT 160000
10% overhead cost for safety	BDT 1148000
Total Cost	BDT 12,628,000

Proposed budget to the client for the project is BDT 17,000,000

Total cost of the project with profit included: BDT 16, 500, 000

As the project costs are well within the reach to achieve a significant amount of profit from this project so it can be stated that the project is financially feasible.

Feasibility Study: Comparing with the bank's interest rate

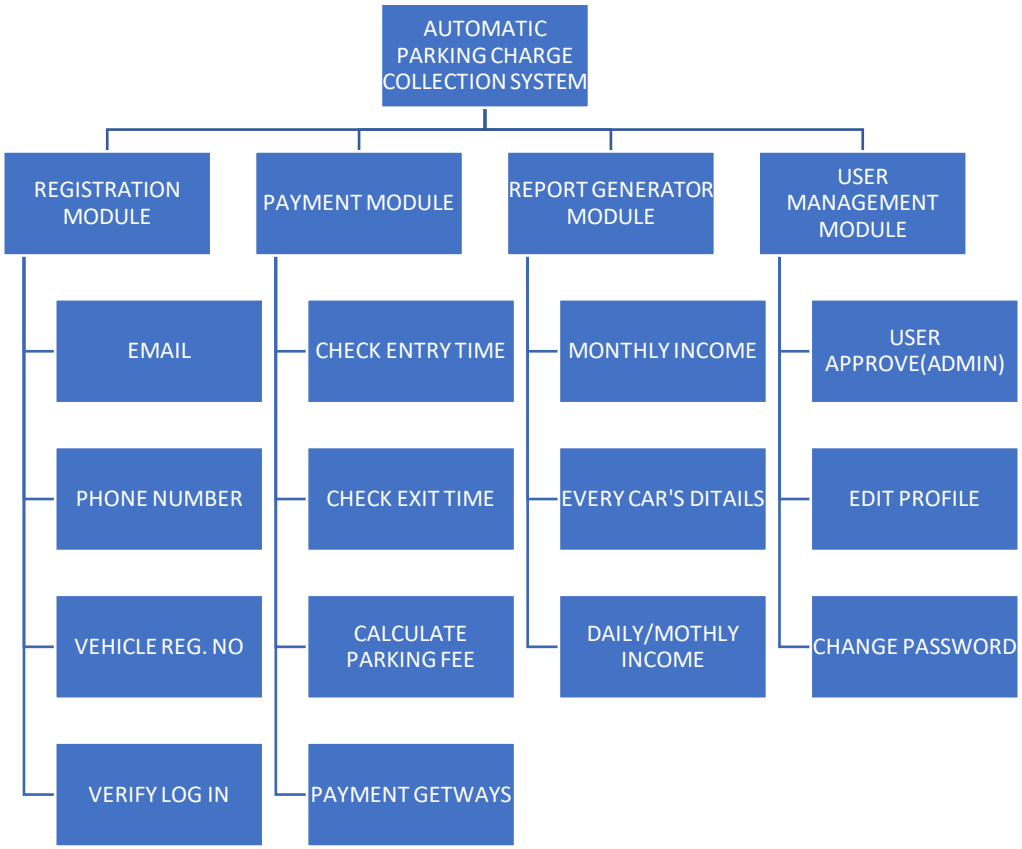
Since the local corporate banks offer 7% interest rate
Then the profit from BDT 12,628,000 investment will be
12,628,000*7% = BDT 883960 (yearly profit)

Then the profit for 16 months (project duration) would be
= (883960/12) *16 = BDT 1178614 (around 11 lacs)

On the contrary the estimated profit from the project is 30% of the entire budget of the project
Which is = 12,628,000*30% = BDT 3788400

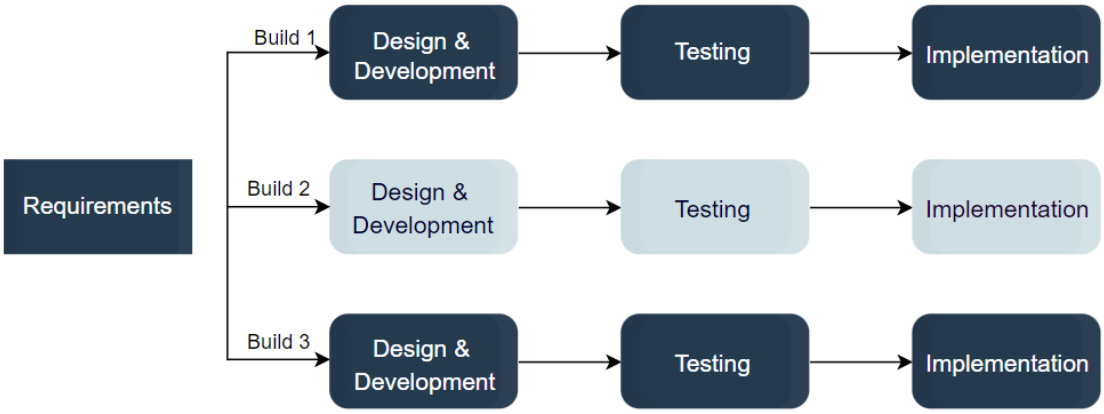
In the case we undergo with the decision of implementing the project, the profit margin is significantly higher than earning profit from bank interest. The metrics show that the profit from building the project is almost 4 times than the profit gained from bank interest. So, it can be stated that the project is financially feasible with the proposed budget of BDT 17,000,000.

8.0 Systems component:



9.0 Process Model

The iterative development model was selected for the development of this project. This was done for several reasons. The iterative development model develops a system through building small portions of all the features. This helps to meet initial scope quickly and release it for feedback. In the iterative model, you start off by implementing a small set of the software requirements. These are then enhanced iteratively in the evolving versions until the system is completed. This process model starts with part of the software, which is then implemented and reviewed to identify further requirements.



Advantages of iterative development process model

1. See the results at the early stages of development
2. Get early feedback from the customers
3. Easy to identify and fix any functional or design flaws
4. Manage risk and change requirements
5. Easier to handle large complex projects
6. Easily break down large software into small modules that are easier to build and manage

Moreover, after a group discussion with all members present it was concluded that due to getting early valuable feedback from the customers and being able to handle large complex projects easily during the development process, the iterative software development model would be best suited for "AUTOMATIC PARKING CHARGE COLLECTION SYSTEM".

10.0 Efforts estimation:

COCOMO (Constructive Cost Model) is used to estimate the effort for our project

Cost Estimation:

If we consider that our project is organic:

Then,
Coefficient<Effort factor>= 2•4

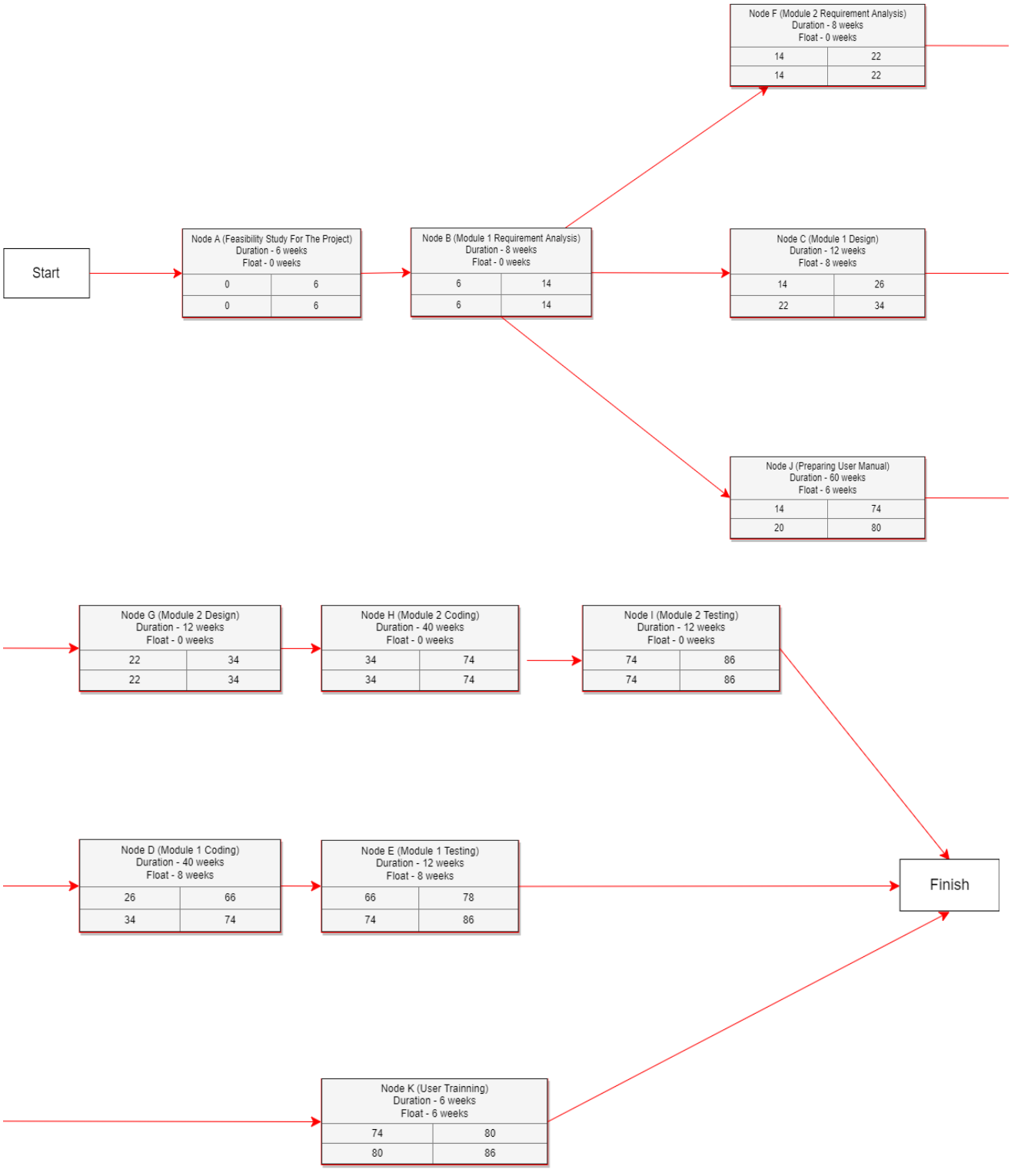
Let's
consider SLOC (Source line of coding) = 40000
For organic project the value of P (Project complexity) = 1.05
The value of T (SLOC-dependent coefficient) = 0.38

Effort = PM = Coefficient *(SLOC/1000) ^P
PM (Persons-months needed for project) = 2.4 (40000/1000) ^1.05= 115.44

DM = (Duration time in months for project)
= 2.5x (115.44) ^0.38
= 15.19

Required Number of people = PM/DM = 115.44/15.19= 7.6 ~ 8

11.Activity Network Diagram:



12.0 Risk Analysis:

The possible risk for the proposed project is given in the following risk table. The probability is given between 0% to 100% whereas 100 percent is the highest chance of occurrence. The impact value is ranged between 0 to 10 where the value 10 indicates that it would be catastrophic and 0 indicating negligible impact on the project.

	Risks	**Probability**	**Impact**	**RMMM**
1.	System failure	10%	9	Make sure the units or components pass the required test cases before integrating the system
2.	Late delivery	20%	7	Make sure the project progress is on track, other take immediate action.
4.	End users resist system	10%	5	The system passes the acceptance test, try to come to an understanding with the client
5.	Changes in requirements	60%	5	Check if the changed Requirementsare feasible, try to make the requirement change before starting the development phase. Deliver the product in short increments time-boxes so that the user gets less time to finalize the requirements and change their mind.
6.	Poor Productivity	30%	3	Set achievable timeframes and a sustainable pace during project estimations to avoid burn-out of staff.
7.	Inadequate Risk Management	40%	7	Including risk in estimations. Find out the root cause and attempt for risk reduction procedures.
9.	Unrealistic schedules and budgets	40%	7	Using historical data and using multiple models for estimation

13.0 Required Resources

13.1. Human Resources

- Project teams
- Team leads.
- Project managers
- Developers
- Analysts

13.2. Hardware and Software tools

- Parking management software
- Parking Access Control Equipment
- Sensors and detectors
- Task management software
- Accounting software

13.3. Time resources

- Time invested.
- Project schedule
- Project plan

13.4. Financial Resources

- Contingency funds
- Project budget

14.0 Budget for the project

Proposed project budget with profit included: BDT 16, 43, 000

Development cost	8*50000*16 =	BDT 6400000
Tester	2*50000*6 =	BDT 600000
Project Manager	1*70000*16 =	BDT 1120000
Project Co-Ordinator	1*50000*16 =	BDT 800000
Consultant	1*10000*16 =	BDT 1600000
Office space	16*50000 =	BDT 800000
Utilities (water, internet, electricity, Miscellaneous)	10000*16 =	BDT 160000
10% overhead cost for safety		BDT 1148000
Total Cost		**BDT 12,628,000**

15.0 Conclusion:

As our country is making progress and getting closer to be a developed country, the activity and number of vehicles on the road have increased significantly in the last two decades. If Manual parking charge Collection system is replaced with our Automated parking charge Collection system, people will get to know the benefits of it as it will save a lot of valuable time. People in Bangladesh spends a big amount of time in queue when giving parking fees. But in our system the registered user's RFID will be scanned automatically after detecting the vehicle with a laser sensor. It will be completely hassle free and the charge will be automatically deducted from the user's account