American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science &Technology (FST)

Fall 21_22

Section: H

Group No: 8

Bus Card App

A software Engineering project submitted
By

S/N	Student Name	Student ID	Contribution (%)
28	Afrida Mahrin Chowdhury	20-42729-1	30
03	Tanvir Chowdhury	20-42699-1	30
01	Sunjida Esha	20-42705-1	25
25	SM Asif Rahman	18-37673-1	15

The project will be Evaluated for the following Course Outcomes

Your Project will be Evaluated based on the following marking criteria	Total Marks
Requirements Analysis (functional, quality, and project requirements) [5Marks]	
System Design (UI/UX design) [5Marks]	
Test and Project Management Planning [5Marks]	
Submission, Completeness, Spelling, Grammar and Organization [5Marks]	

Submission Date: 10/12/21

Description of Student's Contribution in the Project work

Student Name: Afrida Mahrin Chowdhury
Student ID: 20-42729-1
Contribution in Percentage (%): 30
Contribution in the Project:

- Contribution Description :1.1,1.2 ,1.3
- Contribution Description :3

_Afrida Mahrin Chowdhury _____
Signature of the Student

Student Name: Tanvir Chowdhury
Student ID: 20-42699-1
Contribution in Percentage (%): 30%
Contribution in the Project:

- Contribution Description 1: 2
- Contribution Description 2: 4.1,4.2

__ Tanvir Chowdhury _____
Signature of the Student

Student Name: Sunjida Esha
Student ID: 20-42705-1
Contribution in Percentage (%): 25
Contribution in the Project:

- Contribution Description 1: 4

__ Sunjida Esha _____
Signature of the Student

Student Name: SM Asif Rahman
Student ID: 18-37673-1
Contribution in Percentage (%):15
Contribution in the Project:

- Contribution Description 1: 1.1

_ SM Asif Rahman _____
Signature of the Student

Signature of the Student

1. PRODUCT AND PROJECT DESCRIPTION

1.1 System Features

1. Payment method

Functional Requirements

1.1 The app will allow user to select one payment method from Bkash, Nogod, online credit or debit card and set it as default.
1.2 The default payment method can be changed any time.
1.3 Every single payment method a user adds will be verified.
1.4 If all the information is correct, the account will be approved and user can use the app freely.

Priority Level: High
Precondition: User must upload required documents and identification

Cross-reference: N/A

2. Scanning/Generating QR Code

Functional Requirements

2.1 The app will generate a unique QR code for every user. Scanner on the bus will read the QR code.
2.2 If QR coder scanner of a certain bus if broken, the user can also scan the QR code provided by the bus itself.

Priority Level: High

Precondition: User must have a smartphone with a working camera

3. Searching bus route

Functional Requirements

3.1 User can add destination and look for all available bus routes
3.2 User will be able suggested the easiest, fastest, and cheapest route through Google Map's API.

Priority Level: Medium
Precondition: User must be connected to the internet

4. Bus's live location

Functional Requirements
4.1 Every bus registered with the app will have a unique number associated with it.
4.2 The app will show the current location of every single bus on the user specified route.
4.3 User can click on any bus shown on the route and see how fast or slow its moving.

Priority Level: Medium

Precondition: User must be connected to the internet

5. Automatic Payment

Functional Requirements
5.1 The app will charge the user according to how many bus stops the user has crossed.
5.2 QR code reader on the bus's front and exit gate will scan user's QR code every time he gets on and off the bus. This will allow the system to charge fare accordingly.
5.3 If a user tries to commit fraud by getting off a bus without scanning during exit, their account will be automatically charged for 7 stops and will be locked.

Priority Level: High

Precondition: User must have a valid payment method

6. Membership

Functional Requirements

6.1 A user can check their travel history of past 365 days.

6.2 If a user follows the same route and rides the same bus company for a month, they will be offered a membership discount through the app.

Priority Level: Low

Precondition: User must use the app for at least a month

1.2 System Quality Attributes

- List of system quality attributes: Performance, Efficiency, Integrity, Interoperability, Flexibility, Reliability, Robustness & Usability.
- **Performance:** Every page will download in 6 seconds or less if the internet speed is 1 mbps.
- **Efficiency:** This app will use at least 10 percent of the processor capacity and RAM available to the application shall be unused at the planned peak load conditions.
- **Integrity:** Only users with verified NID/Passport and verified payment method will be allowed to register for the app.
- **Interoperability:** The search system will be able to show routes, traffic, bus's live location through Google Map's API.
- **Flexibility:** A maintenance programmer with 1 year experience will be able to run tests and make modifications in no more than 1 hour.
- **Reliability:** 2 or less experimental runs out of 100 may be lost because of software failures.
- **Robustness:** If the app crashes while searching for routes or looking at a bus's location, the app will take the user right back at the same page if reopened within 10 minutes.
- **Usability:** An experienced user will be search, select and see bus's movement in an average of 1 minute.

1.3 Project Requirements

- **Phases**: Initial Phase
  Environment: This is a mobile app for people who use public transportation daily or occasionally.
  Resources: There are no applications available as such in Bangladesh currently.

Duration: 1 week.
Cost: 100000.

- **Phases:** Planning phase
  Environment: This application can be used on any mobile device. Its database will be built with.NET Core, C#, and MySQL.
  Resources: .NET Core, C# and MySQL will be used to develop this app.
  Duration: 1 week.
  Cost: 15,000.

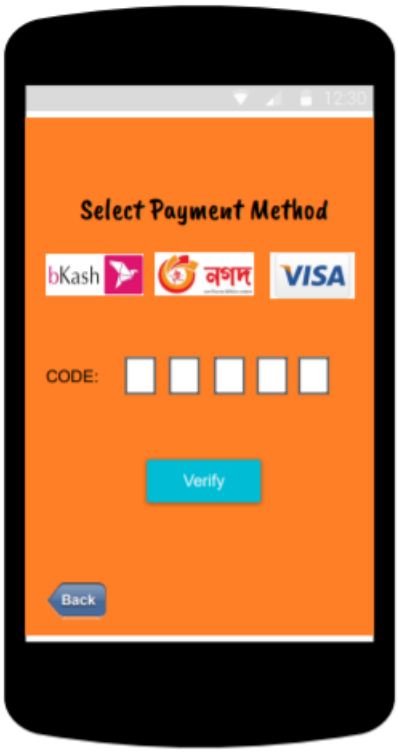
- **Phases:** Development phase
  Environment: A development team of 10 programmers will be divided into groups of 2 or 3, each of which will work at a single workstation.
  Resources: The development teams will be provided all the documents required.
  Duration: 6 weeks.
  Cost: 200000.

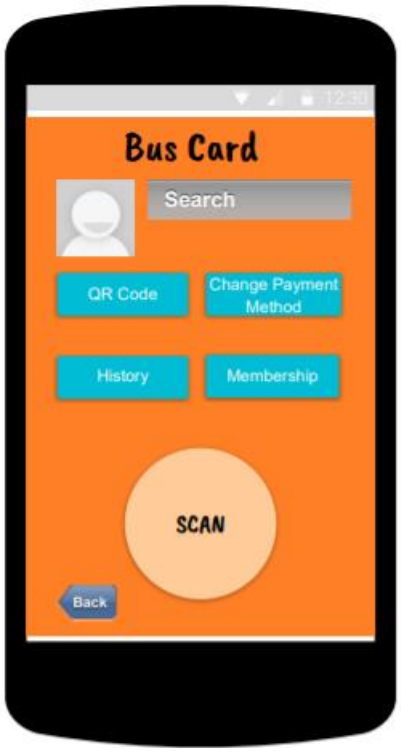
- **Phases:** Testing Phase
  Environment: The initiative has a good probability of success.
  Resources: The Project Manager will appoint a Software Testing Team to execute the project's test cases.
  Duration: 2 weeks.
  Cost: 50000.

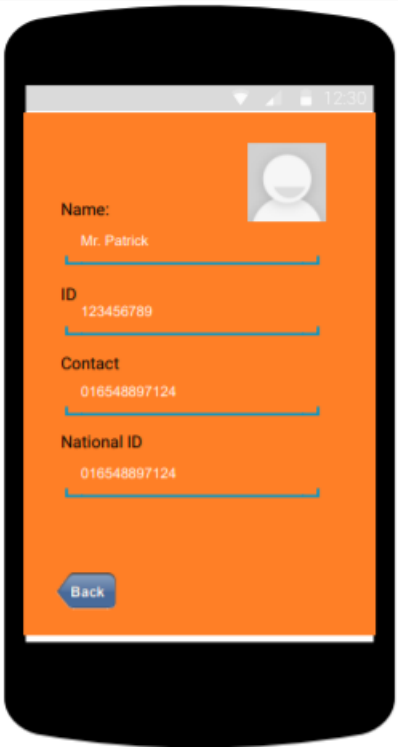
2. SYSTEM DESIGN SPECIFICATION

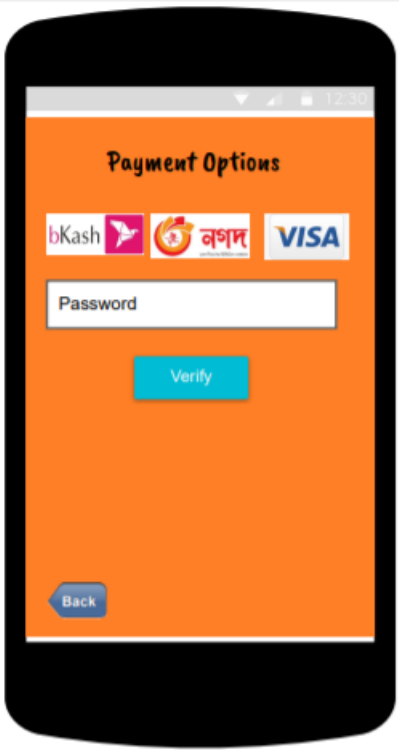
2.1 UI/UX Design

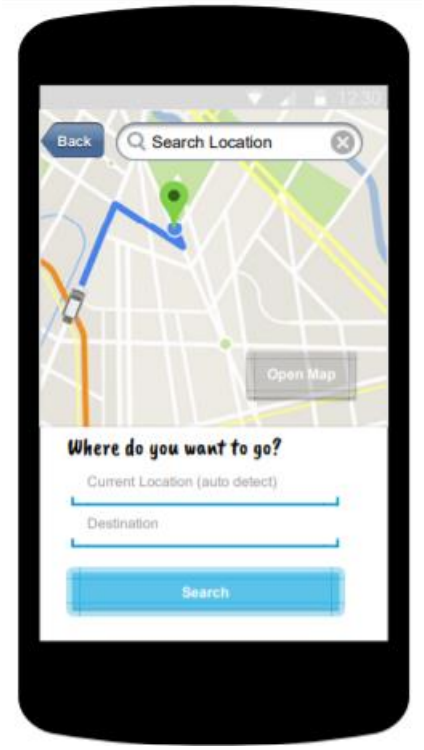

Sign up
Fill in this form to create account
First Name
Last Name
Date Of Birth
NID/Passport No:
Upload
Password
Confirm Password
Sign Up


Select Payment Method
bKash
নগদ
VISA
CODE:
Verify
Back


Bus Card
Search
QR Code
Change Payment Method
History
Membership
SCAN
Back

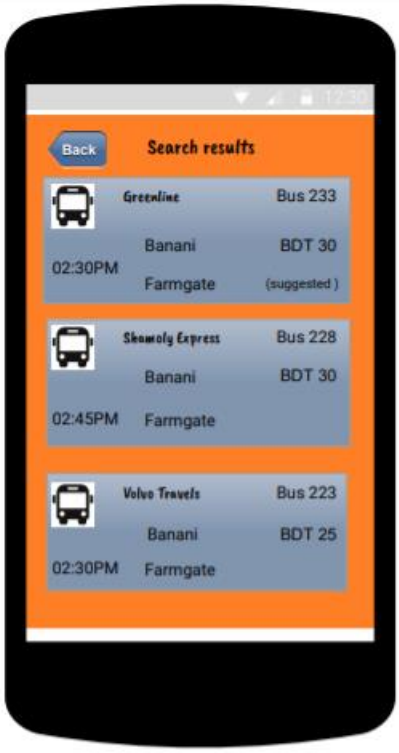

Name:
Mr. Patrick
ID
123456789
Contact
016548897124
National ID
016548897124
Back



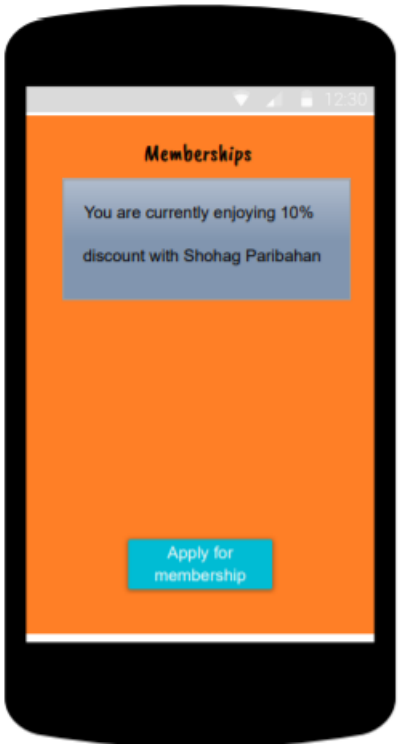

Back
Search Location
Open Map
Where do you want to go?
Current Location (auto detect)
Destination
Search


Hold your QR code over the scanner
Back


Back


Back
Search results
Greenline
Bus 233
Banani
BDT 30
02:30PM
Farmgate
(suggested)
Shamoly Express
Bus 228
Banani
BDT 30
02:45PM
Farmgate
Volvo Travels
Bus 223
Banani
BDT 25
02:30PM
Farmgate


History
02:30PM 11\06\21 Mirpur --- Farmgate
01:00PM 14\06\21 Shahbag --- Dhanmondi
04:30PM 25\07\21 Motijhil --- Gulshan
02:30PM 07\06\21 Banani --- Shamoli
05:45PM 31\07\21 Gulshan --- Badda


Memberships
You are currently enjoying 10% discount with Shohag Paribahan
Apply for membership

3. SYSTEM TEST PLAN

- Bus card application is a mobile exclusive app.

Test case 1:

Project Name: Bus Card App			Test Designed by: Afrida Mahrin	
Test Case ID: FR_1			Test Designed date:10.03.21	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Search option			Test Execution date:	
Test Title: Bus route search				
Description: Search and show all the available bus routes from one location to another and suggest the easiest route				
Precondition (If any): User must have internet connection				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the app 2. Press search 3. Enter current location 4. Enter destination 5. Click search	Current location: Shemoli Destination: Mohakhali	Users will see all the busses available on that route		
Post Condition: User is shown the bus routes and suggested the fasted bus.				

Test case 2:

Project Name: Bus Card App			Test Designed by: Afrida Mahrin	
Test Case ID: FR_2			Test Designed date:19.03.21	
Test Priority (Low, Medium, High): Medium			Test Executed by:	
Module Name: Location ping			Test Execution date:	
Test Title: Bus live location				
Description: Click on a certain bus generated from search and see its live location				
Precondition (If any): User must have internet connection				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
6. Search for route or a certain bus number 7. Click on the bus	Search: Bus #22	Users will see bus #22's current location		
Post Condition: User is shown bus's live ping and shown how fast it will arrive				

Test case 3:

Project Name: Bus Card App			Test Designed by: Afrida Mahrin	
Test Case ID: FR_3			Test Designed date:29.03.21	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: QR code			Test Execution date:	
Test Title: Scan QR code				
Description: Scan QR code on bus to validate payment				
Precondition (If any): User must have internet connection				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
8. Go to homepage 9. Click on "Scan QR code" 10. Hold phone's camera in front of the QR code	N/A	QR code is scanned		
Post Condition: User payment is validated				

Test case 4:

Project Name: Bus Card App			Test Designed by: Afrida Mahrin	
Test Case ID: FR_4			Test Designed date:29.03.21	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Efficiency			Test Execution date:	
Test Title: Verify how much unused space remains				
Description: Test how much resource the app consumes				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
11. Go to app 12. Use any function	N/A	There should be at least 85% space free in ram and processor.		
Post Condition: N/A				

Test case 5:

Project Name: Bus Card App			Test Designed by: Afrida Mahrin	
Test Case ID: FR_5			Test Designed date:30.03.21	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Reliability			Test Execution date:	
Test Title: Verify Reliability of the software				
Description: Test how many times the software fails				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
13. Go to app 14. Run the app 100 times	N/A	The system should not fail more than 2 times		
Post Condition: N/A				

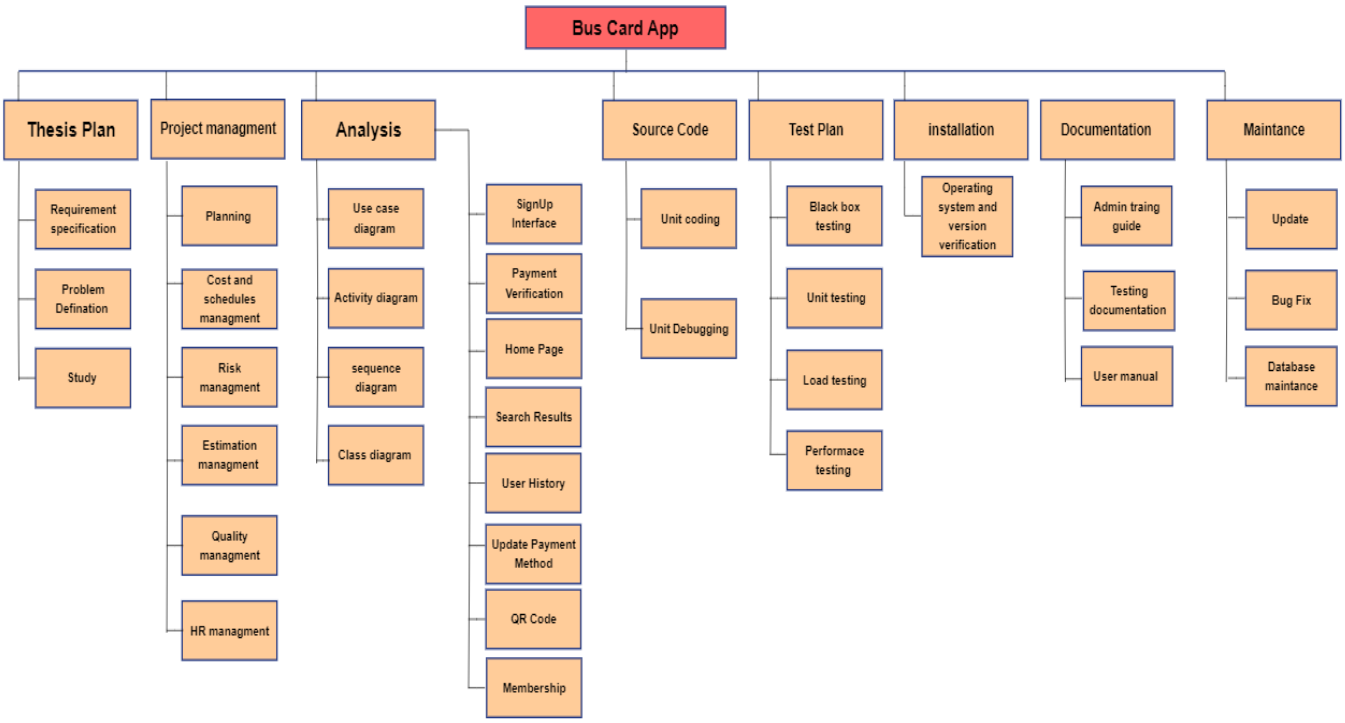
Test case 6:

Project Name: Bus Card App			Test Designed by: Afrida Mahrin	
Test Case ID: FR_6			Test Designed date:31.03.21	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Usability			Test Execution date:	
Test Title: Verify Interface				
Description: Test how friendly interface is				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
15. Go to app 16. Click on search, click on bus	From: Mirpur To: Banani	The interfaces should not take more than 2 second to change to another.		
Post Condition: N/A				

4. PROJECT MANAGEMENT PLAN

4.1 Project Scheduling

- Project Management and Categorize:



- Effort estimation and schedule:

Effort = PM = Coefficient<Effort Factor> * (SLOC/1000)^p

= 2.4 * (6000/1000)^1.05

= 15.75

Development Time = DM

= 2.50*(PM)^T

= 2.50* (15.75)^0.38

= 7.13 months

= 28 weeks

Required number of people = ST

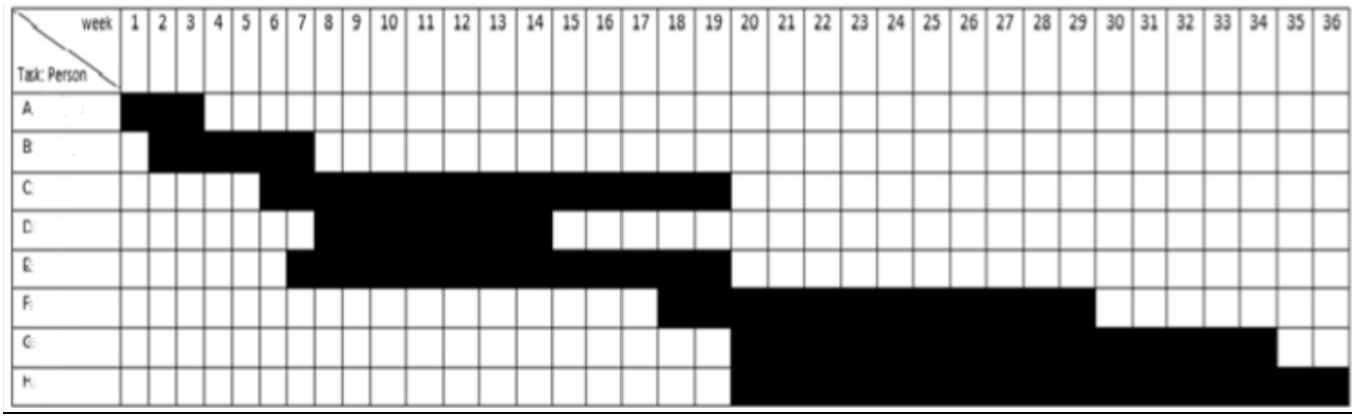
= (PM/DM)

= (15.75/7.13)

= 2.20

=3

- Timeline Charts:



Activity key: A: Analysis B: Project Management
C: Design D: Software Build
E: Testing F: Documentation
G: Installation H: Maintenance

4.2 Risk Analysis

S/N	Risk Description	Probability	Impact	Mitigation Plan
1	Addition of unknown features	30%	High	Proper planning
2	Over optimistic schedule	40%	Medium	Distribute enough time
3	New graphic system unstable	30%	Medium	Launching app with latest graphics sub system
4	Facilities not ready in time	40%	High	Acquiring necessary documentation ahead of time
5	Management reporting taking more time than expected	40%	High	Keeping management on a strict schedule
6	Project approval takes longer	50%	Medium	Setting up Meetings with higherups