**Question 1**

According to the characteristics of this situation, I suggest the **AGILE**

methodology, because:

**I/ Requirements characteristics:**

- **Flexibility**: The requirements are not well-defined at the beginning of the project. Moreover, it is said that there will be many changes throughout the project.

- **Adaptability**: Because this is a completely new project that has never been developed before, it is a must to get users’ feedback. Then, based on that feedback, the project must adapt to the needs of users.

- The requirements have already included both functional and non-functional requirements:

+ **Functional**: register bus routes, change bus routes, view currently registered bus routes, record and summary cost, view vehicle cost summary, …

+ **Non-functional**: allow only FU’s email to ensure information security, have high performance and reliability, …

- It is said to have a testing period and a finished period so Agile is a suitable choice for this project.

**II/ Development team :**

**+ Team composition:** The team comprises 4-6 extensive experience and skills developers and some support employees, rendering it well-suited for a project employing the Scrum development methodology.

**+ Effective collaboration and communication skills:** The team members share a common language, facilitating seamless communication and productive teamwork. This advantage significantly contributes to timely task completion.

**+ Proficiency in designated roles and responsibilities**: Each team member possesses a high level of expertise and experience in their assigned roles and responsibilities.

**+ Adaptability to changes:** The team demonstrates a robust ability to adapt to changing circumstances.

**III/ User involvement in the project**:

- **Project size**: Large, because this is a system that may be deployed in many FPT campuses.

- **At an early stage**, the users can be people from different departments to give some feedback. But after deploying the project, the main users are lecturers, students, and academic staff.

**IV/ Manager’s expectation and Time constraints :**

**Manager’s expectation:**

-Based on requirements the manager wants to commit that the project must run after 3 months and be completed after 9 months

**Time constraints:**

-In this project, we have a team with so much experience and commitment from another department so we totally can run this project after 3 months of development and finish in the 9th month => adapth the manager’s expectation.

**V/Customer:**

In Agile methodology, the "customer" is the university and end users (lecturers/staff, admin manager, admin staff, academic staff) who will use the system. They provide ongoing feedback, ensuring the product meets their needs. The Product Owner represents the customer's interests, prioritizing features and tasks to align the development with the customer's requirements. This close involvement helps ensure the project's success and satisfaction for all stakeholders.

**VI/** **Summary**

In conclusion, I suggest the **AGILE** model be applied to this situation according to those characteristics as I noticed before. Because the project's requirements are well-defined and likely to change a lot. AGILE was also utilized in the management system. Development in stages is unnecessary because the system's requirements don't specify which parts of the system should be deployed first.

**Question 2:**

**Testing Levels/Stages for the Shuttle Bus Management System (SBMS) Project:**

**Unit Testing:**

Who tests this case: Developers

This initial testing level involves assessing individual software components to ensure their correctness.

**Integration Testing:**

Who tests this case: Developers or a dedicated integration testing team

Focused on testing the interaction and compatibility of individual components to ensure seamless operation.

**System Testing:**

Who tests this case: A dedicated team of testers

Comprehensive testing of the entire system to verify compliance with specified requirements.

**User Acceptance Testing (UAT):**

Who tests this case: End users, such as lecturers, students, and academic staff

The final stage involves real users testing the system to ensure it meets real-world requirements and specifications.

**Regression Testing:**

Who tests this case: A dedicated testing team or automated using software testing tools

Ensures that changes or enhancements to the system do not negatively impact existing functionalities.

**Performance and Load Testing:**

Who test this case: Specialized testers or engineers

Essential for ensuring high performance and reliability, evaluating the system under both normal and peak load conditions.

**Question 3:**

**Functional Requirements for the Shuttle Bus Management System (SBMS):**

* Lecturer/staff Activity bus route:

Lecturers and staff should be able to register bus routes.

Has the ability to Update the bus route which was registered before.

The system should able for lecturer can view the currently registered bus route.

* Admin staff handle schedules:

The system allows administrative staff to synthesize weekly bus schedules of staff and lectures, schedule vehicles for bus routes, and record and summarize cost.

* Admin Manager Functions:

Admin Manager can:

View bus schedules for weekly trips.

Approve weekly bus schedules.

View vehicle cost summary.

* Academic Staff Functions:

Academic staff should be able to:

The system must be allow entering lecturers’ lecturer schedule export from FAP.

Synthesizing lecturers’ bus schedules from lecturers’ lecturer schedules.

Transferring lecturers’ bus schedules to the administrative department

**Non-Functional Requirements:**

* + Authentication and Security:

Users should log in using their FU's email account on the Gmail platform.

The system must prioritize secure authentication and data protection, adhering to information security standards.

* + Performance and Reliability:

The system must ensure high performance, robustness, and reliability.

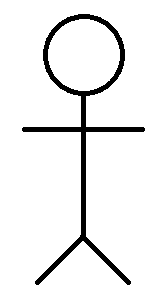
It should handle multiple users concurrently, functioning effectively without crashes or unnecessary delays.

**Question 4:**

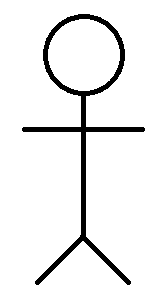
USER CASE DIAGRAM:







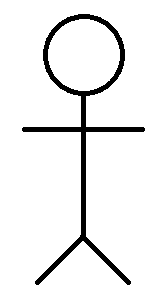






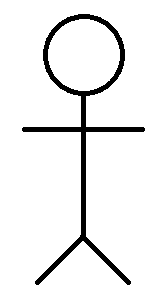


Lecturer/Staff



Admin Staff



Admin Manager







Academic staff

**Question 5:**

**Four test cases:**

*Test case 1:*

+ Description: test performance of the system

+ Input : 10000 user(lecture/staff) register bus route in this time.

+ Expected: All users(lecture/staff) register bus route successfully.

+ Output: All users(lecture/staff) register bus route successfully.

+ Exception: System inform error message “API Connection Fail"

*Test case 2:*

+ Description: Test layout for each device

+ Input: Open the screen of the system in a mobile device

+ Expected: Display successfully different layout for each device

+ Output: Display successfully different layout for each device

+ Exception: The UI does not meet the requirements

*Test case 3 :*

+ Description: Test export schedule from FAP.

+ Input: export all of the schedule from FAP at the same time

+ Expected: all files of schedule can be exported

+ Output: The system informs error message “error: server was disconnected"

+ Exception: The system informs error message “error: server was disconnected”

*Test case 4 :*

+ Description: Test statistic cost summary

+ Input: System run statistic 10000 bill cost from lecturer/staff.

+ Expected: The system informs success message: “successfully".

+ Output: The system informs error message: “error: server was disconnected”.

+ Exception: The system informs error message “error: server was disconnected”

**Question 6:**

* *Two user stories based on my answer is*

+ As an Admin Manager, I want to view bus schedules for weekly trips, so that I can handle and optimize the cost of running the process

+ As an Academic staff, I want to allow entering lecturers’ lecturer export from FAP, so that I can handle the permission who can view and use the file export from FAP.

**Question 7: 3540**

| **USER ROLE** | **STAFF** | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **User activities** | Register Bus Route | | Change bus Route | | | |
|  | Register Route | Delete route | Change bus route | View bus route | Export FAP | Search bus route |
| **Release 1** | Register bus routes manually | Delete bus route manually | Automatically change bus route if has issue | View all bus route schedule | Can export schedule from FAP | Search bus route by time |
|  | Show schedule for register by button | Auto remove schedule if has another important task | Change bus route manually | Customize the start and end day to view the bus route | Select the start day and end day for the export | Search bus route combination of time, day, year |
|  |  | Alert when deleting some bus routes daily |  | Automatically for show daily bus route |  |  |
| **Release 2** | Set daily register for week, month | Use an assistant to help delete bus route | Change all daily Route | Connect which other app to view bus routes (mail, zalo,… ) |  | Use Voice for searching |
|  | Customize Register in schedule weekly or monthly | Automatically delete all schedules of staff if they leave FPT | Use assistant to help change bus route |  |  |  |