Q1:

In this circumstance, I recommend using Agile methodology for the following reasons:

a, In term of requirements characteristics:

* Reliability:

+ The project requirements are well-defined and possible.

+ It can run while the project finished.

=> The project is expected to be highly reliable.

- Types and number of requirement:

+ In this project, there are both functional and non-functional requirements.

- The project has a lot of functional and non-functional. The project need to device functions to each people such as:

+ For Lecturer/Staff : The system allows lecturer and staff to register bus routes, change bus routes and view currently registered bus routes.

+ For Admin Staff: The system allows administrative staff to synthesize weekly bus schedules of staffs and lecturer, schedule vehicles for bus routes, record and summarize costs for bus trips.

+ For Admin Manager: The system allows managers to view bus schedules for weekly trips, approve weekly bus schedules, and view vehicle cost summary.

+ For Academic Staff: The system allows entering lecturer’s lecturer schedules exported from FAP, synthesizing lecturers’ bus schedules from lecturers’ lecturer schedules, transferring lecturers’ bus schedules to the administrative department.

+ Moreover, there are a lot of functions that need to create such as: allow users to log in with FU’s email account. Needing some non-functional as security, high performance, reliability,..

=>Types and number of requirements defined this project is very complex and many functions.

* How often the requirements can change (Frequency of requests may change):

+ Because this is a new development system. Also, it has not had a similar system before. So that, it may be change during the development process.

+ Furthermore, this is a new system for an university with the number of lecturer and staff enrolling has increased very rapidly, therefore, the system will change a lot to provide user’s requirements.

=> The requirements may be changed regularly in the future.

* Determination of requirements at an early stage:

The requirements determinate early and have well-defined. However, this is the new system, so that, the project may encounter changes or adjustments throughout the development process to accommodate customer requirements.

=> It is well-defined but not enough.

b, In term of development team:

Team size: Our team will include 4-6 extensive experience and skills developers.

* + Level of understanding of user requirements by the developers:

+ Our team is supported by IT department in FU. Therefore, members in IT department can help our team understand about requirements.

+ Also, other departments commit to sending employees to join the project to support out team. So, all of the requirements defined clearly above and our members can understand.

+ Moreover, all members in our team has a lot of experience and skills.

=> Our team can easily understand and build an application that meets the requirements.

c, In term of user involvement:

- Our team is supported by IT department in FU. Also other departments commit to sending employees to join the project to support out team.

=> The organization can provide additional resources and information when needed. The user involvement is high.

In conclusion, the software development methodology that I suggest for this situation is Agile. This is a complex project, so that our team need to device project into smaller parts to be more easily. Also, this project can be change easily due to the new system and change to provide use requirements. Our team is a professional team with the supportive of FU’s members, they can support our team to provide more resources when needed. It can assist customers in deploying the product early and collecting reviews and feedback from users to improve the product better. Overall, the Agile/Scrum methodology is well-suited for this software development project and will likely result in a high-quality end product.

The development model that I bests fits the factors I identified is Scum. Because scum model suitable for complex projects with multiple requirements and the project needs to be completely completed within 6 months, it is very suitable. When apply Scrum model, our team can early detection of errors, and customers quickly see the product and provide early feedback.

Q2:

Our team is a professional team, and team is supported by FU’s members. The type of testing that I recommend the team to do for this project is a combination of unit testing, performance testing, system testing and security testing.

+ Unit Testing: Since requirements are clearly classified in terms of functionality => Test individual code modules or functions to ensure that they work as expected by the requirement.

+ Performance testing: An university has a lot of lecturer and staff so that performance testing very important. To satisfy non-functional requirements -> Test to ensure the system performs well under the expected load of a large number of concurrent users without degrading performance and behavioral response of the user without significant latency.

+ System testing: is the process of testing the entire application. This is important to ensure that the application meets all its requirements and that it is stable and reliable.

+ Security testing: The information regarding an university is very important. If the information is leaked, it is very risk. Therefore, security testing is the most important. Security testing involves evaluating a system's defenses to identify vulnerabilities and ensure that confidential data, integrity, and functionality are protected from unauthorized access, attacks, or any form of security risks.

=>So I believe this combination of testing will provide the team with comprehensive and thorough testing coverage for this project, helping to ensure that the application is tested properly and any bugs are found and fixed early during development. It will help ensure that the application is high quality, reliable, secure.

Q3:

* Four functional requirements:

+ The system allows lecturer and staff to register bus routes, change bus routes and view currently registered bus routes.

+ The system allows administrative staff to synthesize weekly bus schedules of staffs and lecturer, schedule vehicles for bus routes, record and summarize costs for bus trips.

+ The system allows managers to view bus schedules for weekly trips, approve weekly bus schedules, and view vehicle cost summary.

+ The system allows entering lecturer’s lecturer schedules exported from FAP, synthesizing lecturers’ bus schedules from lecturers’ lecturer schedules, transferring lecturers’ bus schedules to the administrative department.

* Two non-functional requirements:

+The system allow users to log in with the FU’s email account on the Gmail platform.

+ The system need to ensuring information security.

Q4:

|  |  |  |  |
| --- | --- | --- | --- |
| Lecturer and staff | Admin Staff | Admin Manager | Academic Staff |
| Lecturer and staff to register bus routes | Administrative staff to synthesize weekly bus schedules of staffs and lecturer | Managers to view bus schedules for weekly trips, approve weekly bus schedules | entering lecturer’s lecturer schedules exported from FAP, synthesizing lecturers’ bus schedules from lecturers’ lecturer |
| change bus routes and view currently registered bus routes. | schedule vehicles for bus routes, record and summarize costs for bus trips. | view vehicle cost summary. | schedules, transferring lecturers’ bus schedules to the administrative department. |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Q5:

-4 functional test cases is:

a, Test case 1: Load testing:

- Description:  Test the system when a lot of lecturer and staff assign to app

- Objective: Ensure the system can handle high traffic without crashing or significant slowdown.

- Test Steps:

+ Simulate a gradual increase in the number of concurrent users.

+ Measure system response times at different load levels.

+ Monitor server resource utilization (CPU, memory, etc.).

+ Identify the maximum concurrent users the system can handle.

* Expected Result:

+ Response times should remain within acceptable thresholds.

+ Server resources should be monitored to ensure they do not reach critical levels.

+ Identify and document the maximum load the system can handle without degradation.

b, Test case 2: Navigation and User Interface Consistency

- Description: Perform user interface testing on different devices such as tablets, -Desktop computers, and mobile phones.

- Objective: Confirm that the user interface is displayed correctly and is fully functional across all device types.

* Test Steps:

+ Navigate through different sections of the application.

+ Check for consistent menu structures and navigation paths.

+ Verify that UI elements (buttons, menus, headers) are uniformly styled.

+ Test the application on different devices and screen sizes.

* Expected Result:

+ Users should experience consistent navigation throughout the application.

+ UI elements should maintain a uniform style and appearance.

+ The application should be responsive and display correctly on various devices.

c, Test case 3: View users register successfully

- Objective: To identify that the new user can be register successful on the web

- Test Steps:

+ Enter new account you want to test

+ Check the new account can register on the web successfully

+ Check the time user can register on the web

+ Test a lot of other accounts.

* Expected Result:

+ The new account can be registered on the web successfully.

+ The new account can be registered for 2 minutes.

d, Test case 4: View list lecturer/staff and information of lecturer/staff.

- Objective: To ensure information of lecturer and staff are correctly

- Test steps:

+ Enter the information of lecturer and staff.

+ Check information of lecturer and staff who created.

* Expected Result:

+ The information of lecturer and staff are correctly.

+ The information of lecturer and staff can be save.

Q6:

- Two user stories:

+ As a lecturer, I want to view bus schedules for weekly trips, so that I can be more easily to follow my schedule.

+ As a Admin Manager, I want to browser compatibility, so that I want more users to join. Because the number of people use Chrome, Edge,… is really higher and higher.

Q7:

