**Red**: functional requirements

**Green**: non-functional requirements

The ABC company wants to develop a new system to allow employees to record timecard information electronically and automatically generate paychecks based on the number of hours worked and the total amount of sales (for commissioned employees). The new system allows **employees** to **enter timecard information, enter purchase orders, change employee preferences (such as payment method), and create various reports** through the website.

The system will retain information on all employees in the company (ABC currently has around 5,000 employees world-wide). The system must **pay each employee the correct amount, on time, by the method that they specify**. For cost reasons, ABC does not want to replace one of their legacy databases, the Project Management Database, which contains all information regarding projects and charge numbers. The new system must work with the existing Project Management Database, which is a **SQL Server database.(software requirements)**

The Payroll System will access, but not update, information stored in the Project Management Database.

Some employees work by the hour, and they are paid an hourly rate. They submit timecards that record the date and number of hours worked for a particular charge number. **If someone works for more than 8 hours, ABC pays them 1.5 times their normal rate for those extra hours. Hourly workers are paid every Friday. (business rules)**

Some employees are paid a flat salary. Even though they are paid a flat salary, they submit timecards that record the date and hours worked. This is so the system can keep track of the hours worked against particular charge numbers. They are paid on the last working day of the month.

Some of the salaried employees also receive a commission based on their sales. They submit purchase orders that reflect the date and amount of the sale. **The commission rate is determined for each employee and is one of 10%, 15%, 25%, or 35%. (business rules)**

One of the most requested features of the new system is employee reporting. **Employees** will be able to **query the system for the number of hours worked, totals of all hours billed to a project (i.e., charge number), total pay received year-to-date, remaining vacation time,** etc.

The Payroll Administrator maintains employee information. **The Payroll Administrator** is responsible for **adding new employees, deleting employees, and changing all employee information such as name, address, and payment classification (hourly, salaried, commissioned**), as well as running administrative reports.

**The payroll application will run automatically every Friday and on the last working day of the month (business rules + non-func).** It will pay the appropriate employees on those days. **The system will be told what date the employees are to be paid, so it will generate payments for records from the last time the employee was paid to the specified date. (system handler notifies…)**

The new system is being designed so that the **payroll will always be generated automatically**, and there will be no need for any manual intervention.

To start with, the team working on this project consists of 6 developers, 2 QA, and a Team Lead. The company has NOT the Information Technology department to support the development team to understanding the terms of this business.”

As Payroll’s Admin, I want to access to information stored in the Project Management Database in order to adding new employees.

As Payroll’s Admin, I want to access to information stored in the Project Management Database in order to deleting employees.

As Payroll’s Admin, I want to access to information stored in the Project Management Database in order to changing all employee information such as name, address, and payment classification (hourly, salaried, commissioned)

running administrative reports.

As Commissioned Employee’s, I want to be able to query the system in order to enter timecard information.

As Commissioned Employee’s, I want to be able to query the system in order to enter purchase orders.

As Commissioned Employee’s, I want to be able to query the system in order to change employee preferences (such as payment method).

As Commissioned Employee’s, I want to be able to query the system in order to create various reports.

the most suitable software development model to build this system is agile. Because the team is new to the project and need to build step by step module to check if that module meets the requirements or not. (chưa đủ)

Agile model would be ideal for this project since the size of the development team is small with about 9 peoples considering: 6 developers, 2 QA and a Team Leader, user involvement in this project is small so each of the agile sprint we can get user feedback to enhance our system.

1. Requirements characteristics

- reliability

- types and number of requirements

- how often the requirements can change

- can the requirements be defined at an early stage

2. Development team

- team size

- level of understanding of user requirements by the developers

3. User involvement in the project (Small/Average/Large)

1. List out functional requirements, non-functional requirements. (red is functional, green is non-functional)
2. Payroll’s Admin role and Commissioned Employee’s role.
3. Suggest the most suitable software development model to build this system and clarify why you choose this model by the following criteria.

Payroll Administrator

View salary

Worked hours

Charge number

Total pay

Vacation time

Create reports

Change employee’s info

Deleting employee ‘s information

Adding new employee ‘s information

Web browser

deposit

Check image

Select account

Enter details

Fraud proof

Delete acc

Update acc

Create acc

Share advertise

Deposit checks

View balance

Login

Download an app

Doe the customer

**CÂU TRẢ LỜI MANG TÍNH THAM KHẢO**

A Ronald university would like to automate various academic and administrative activities of the institute. Users of the campus automation software include students, faculty members, administrative staff members, and sometimes the general public who wish to access information about the institute.

The system shall have 4 main sections:

1. Academic activities management.
2. Administrative activities management.
3. Accounting and Finance management.
4. Facilities management.

You are required to lead this project but only implement 1 section in the first phase. The Academic activities management should be finished on time and within budget, but it is even more important to provide high-quality service and avoid any potential technical or user problems after implementation.

The team to work on this project has 4 developers, 2 testers. Most of the developers and testers have offices on different floors of the building and generally works in their office. The team members have some experience in web development but none in mobile development. Nobody on the team has performance familiar with engineering practices like automated testing, continuous integration, etc.

The Business stakeholders who wrote the high-level vision for the web application are going to help refine or define the user needs. They currently sit in a different building. Ther are working on writing detailed requirements and planning to hand-off them to you in 2 weeks. In the beginning, a minimal set of features/functionalities and a set of non-functional requirements are described as below:

**Academic Program:**

Enrolling new students: for external users who have not an account or Ronald University, the system would provide an online application form that is filled in by the applicant.

Course registration (enrollment for desired courses): login by registered account and register for courses for one semester. The student shall pay the fee courses through a banking account. During Course Registration an estimate of 10,000 students should be able to register over an interval of 2 days.

Evaluation and Grading: Lecturer shall be able to import progress marks, the CSV or Excel file format is required. They also give marks directly on the Web form.

Viewing and printing grade reports: the system should provide the reports for Students/ Academic departments after they are logged in to the system.

**Student Information**: Student records management.

**Training and Placement**: Displaying schedules of Campus interviews, Putting up shortlists and declaring results.

1. What software development methodology would you suggest for this situation and why?

according to the situation, it’s best to implement the Agile mindset (specifically Scrum) to build the software.

**Requirements characteristics:**

Reliability: the requirements are clear and detailed.

**Types and number of requirements:**

Non-functional requirements:

* + The student shall pay the courses fee through a bank account.
  + During Course Registration an estimate of 10,000 students should be able to register over an interval of 2 days.
  + Student records management.
  + When lecturer imports progress marks, the CSV or Excel file format is required.

Functional requirements:

* + - Enrolling new students.
    - Course registration (enrollment for desired courses).
    - Viewing and printing grade reports.
    - Displaying schedules of Campus interviews, putting up shortlists and declaring results.

**How often the requirements can change:**

**Can the requirements be defined at an early stage**: it can be defined by 4 main sections.

**Development team:**

Team size: 4 developers, 2 testers.

Level of understanding of user requirements by the developers: have some experience in web development but none in mobile development; nobody has performance testing experience or user experience and not familiar with engineering practices like automated testing, continuous integration, etc.

**User involvement in the project:** average at first to collect sizeable feedback.

1. Despite the software development methodology, you have chosen, your manager requires you to choose Agile Software Development to apply this project.

Identified the reason for choosing Agile, and the explanation was appropriate: According to the situation, it’s best to implement the Agile mindset to build the software needed. As the team have little to none experience in mobile development, performance testing or user experience expertise, a demo for one section is appropriate for gathering feedbacks, further understanding user requirements and avoid potential user problems in the final product.

1. Are there any project constraints laid out in the case study that need to be changed/managed since you will be using Agile regarding planning, estimation, and tracking happens differently? The team needs to be trained about mobile development, performance testing, user experience, automated testing, continuous integration, etc. ; The development team should meet with the Business stakeholders for a better understanding of user requirements.
2. List out of 2 non-functional requirements:

The student shall pay the courses fee through a bank account.

During Course Registration an estimate of 10,000 students should be able to register over an interval of 2 days.

1. Write 2 user stories for student actor:

As a student, I want to create a new account so that I can study at Ronal University.

As a student, I want to enroll in new courses so that I can start to learn.

(As a student, I want to see my student records so that I can print.)

1. Draw a story map (at least 3 levels) for the "Academic program" feature. Students could use the bullet and indentation of Ms.Word to illustrate the story map.

Academic Program

Fill in the form

Import progress marks

Register for courses

Login

Application form

Course registration

Evaluation and Grading

Enrolling new students

6. Select two quality attributes that are likely to be important when deciding a website architecture for the website: https://fap.fpt.edu.vn. You can use usability, security, performance, reliability, or any other reasonable quality attribute as the basis of your selection. Briefly explain the importance of this quality attribute as it relates to the software/service you selected. Then, write the scenario here. (2p)

1. Security

The website needs good security since this is a private academic website for only students or teachers to access.

Scenario context - Security

Source:

People using standard web version or mobile version.

Stimulus:

Random user tried to login.

Environment:

Internet environment. (hundreds thousand of active accounts)

Artifact:

FPT school server.

Response:

Deny users that are not from FPT University

Response measures:

80% under 5 seconds.

99.9% under 5 minutes.

2. Performance

The website needs a good performance for good stability as the fap website will be use by hundred thousand of student across VN country

Scenario context - Performance

Source:

People using standard web version or mobile version.

Stimulus:

Student or teacher try to login.

Environment:

Academic environment. (hundreds thousand of active accounts)

Artifact:

FPT school server.

Response:

Allow user to login.

Response measures:

80% under 5 seconds.

99.9% under 5 minutes.