

**VIETNAM NATIONAL UNIVERSITY HO CHI MINH CITY
UNIVERSITY OF TECHNOLOGY FACULTY OF COMPUTER
SCIENCE AND ENGINEERING**



HOSPITAL MANAGEMENT SYSTEM

Student:

Nguyễn Thanh Tùng

ID: 2152337

Feb - March 2024

TABLE OF CONTENT

1. REQUIREMENT ELICITATION.....	2
1.1. Project description.....	2
1.2. Describe all functional and non-functional requirements of the project.....	4
1.2.1. Functional Requirements.....	4
1.2.2. Non-Functional Requirements.....	5
1.3. Draw use case diagram for the system and main module.....	6
1.3.1. System use case diagram.....	6
1.3.2. Component Module.....	6
1.3.2.1. Use case diagram.....	6
1.3.2.2. Table description.....	6
2. SYSTEM MODELLING.....	6
2.1. Draw activity diagrams.....	6
2.2. Draw User Interface.....	6
3. ARCHITECTURE DESIGN.....	11
3.1. Presentation Strategy.....	11
3.2. Data Storage Approach.....	11
3.3. External services / APIs.....	11
4. IMPLEMENTATION - SPRINT 1.....	12
4.1. Setting up an online repository (github) for version control.....	12
5. IMPLEMENTATION - SPRINT 2.....	12
5.1. MVP 2.....	12
6. CONCLUSION.....	13
6.1. Challenges.....	13
6.2. Solutions.....	13
6.3. Lessons Learned.....	13

1. REQUIREMENT ELICITATION

1.1. Project description

A hospital X needs to build a management information system to manage the information of their patients, doctors, and nurses.

The database of hospital X needs to store the information of employees (doctors and nurses) including: a unique code, full name consisting of first name and last name, date of birth, gender, address, start date (first day of work), phone number(s), and speciality with its related name and degree's year. The hospital has many departments. Each department has a unique code, a title, and a dean who is a doctor.

The employees have to belong to a specific department. A department has at least one or many employees. The dean must hold a specific speciality and has had more than 5 years of experience since the date he or she was awarded the speciality degree.

The patients have to provide with the hospital their information such as: full name (first name and last name), date of birth, gender, address, and phone number. After receiving their information, the system will store them into the database, and generate a unique code to identify each patient simultaneously. Patients are divided into two types: outpatients and inpatients.

- For outpatients, the information of the examining doctor needs to be stored. The outpatients can have many examinations with their examining doctor. The hospital needs to store the details of each examination such as: examination date, diagnosis, the next examination date if any, medications, and fee.

- For inpatients, some information is added such as: date of admission, treating doctors, caring nurse, diagnosis, sickroom, date of discharge,

and fee. After admission to the hospital, a patient can receive treatment from at least one doctor.

A doctor can treat many patients at the same time, or sometimes, he has no patients to treat. The hospital needs the details of each treatment such as: treatment period (start date and end date), result, and medications. Each inpatient is taken care of by a nurse; a nurse can take care of many inpatients at the same time. Furthermore, when a patient is recovered and his or her last treatment has been confirmed as "recovered" by the doctor, he or she will be discharged from the hospital. As a result, the discharge date must be recorded by the system. The information of a medication is also stored in the database. This information consists of a unique code, name of the medication, effects, price, and expiration date. A medication is provided by one or more providers, and one provider may provide many types of medication. A provider is tracked by its unique number, name, address, and phone. Moreover, the hospital also wants to keep the imported medication information including imported date, price, and quantity. In case one medication is out-of-date, it will be automatically marked so in the database.

1.2. Describe all functional and non-functional requirements of the project.

1.2.1. Functional Requirements

- **Administrators**

- Administrators shall be able to access, review and remove information of the hospital via corresponding buttons.
- Administrators shall be able to add medication and provider of that medication to the database

- **Doctors**

- Doctors shall be able to report patient treatment / examination to the database.
- Doctors shall be able to view the department they belong to.

- **Nurses**

- Nurses shall be able to view patients that are assigned to them.
- Nurses shall be able to view the department they belong to.

- **Receptionists**

- Receptionists shall be able to add patient information to the database and assign patients to doctors and nurses.

- **All stakeholders**

- Stakeholders shall be able to login into their account after entering the correct code and password.
- Stakeholders shall be able to filter results via search bar.
- Stakeholders shall be able to navigate between pages via the sidebar.

1.2.2. Non-Functional Requirements

- **Performance:**

- The system should respond to user interactions within 2 seconds, even under peak load conditions.
- Database queries should be optimized for efficient retrieval and manipulation of data.

- **Scalability:**

- The system should be scalable to accommodate an increasing number of patients, doctors, nurses, and other entities over time.

- **Security:**

- Access to different functions of the database like add, delete is restricted based on user roles and permissions.
- Passwords should be encrypted to protect it from unauthorized access or tampering.

1.3. Draw use case diagram for the system and main module

1.3.1. System use case diagram

1.3.2. Component Module

1.3.2.1. Use case diagram

1.3.2.2. Table description

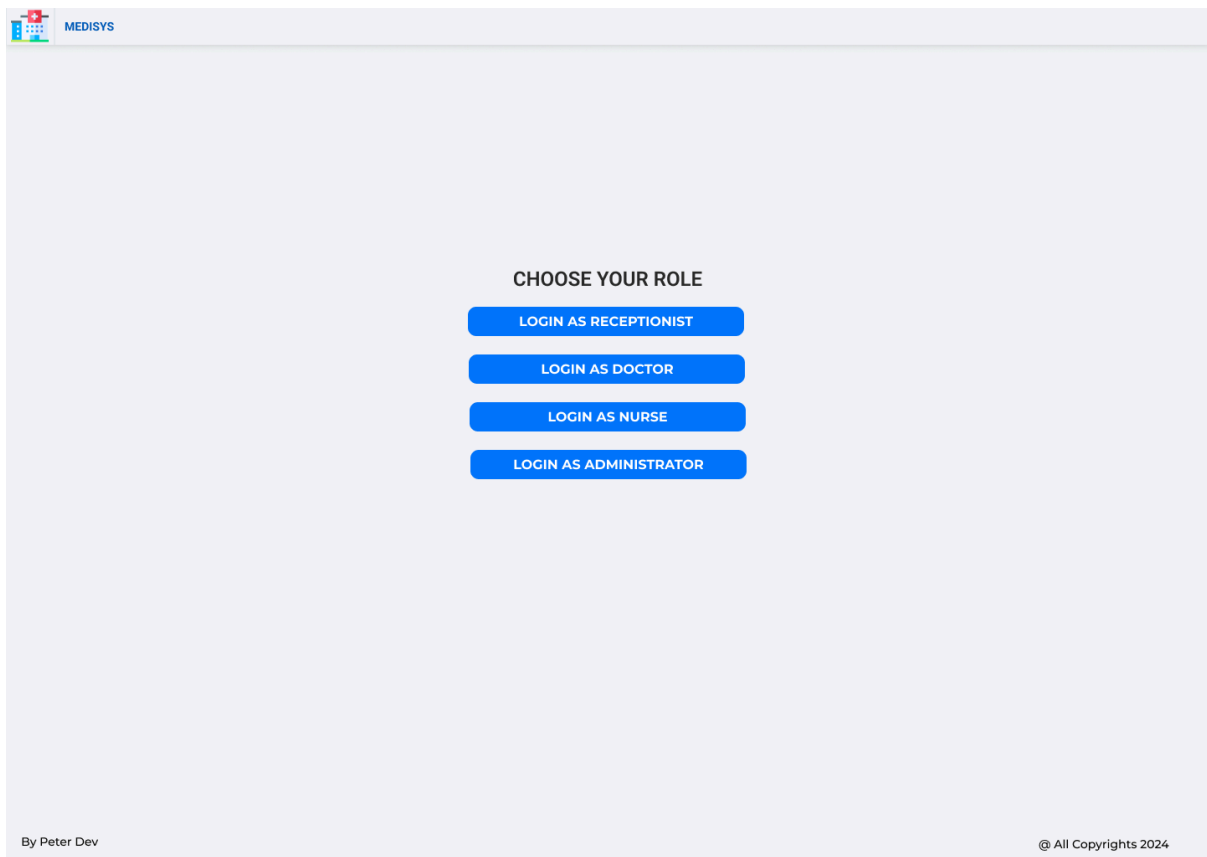
2. SYSTEM MODELLING

2.1. Draw activity diagrams

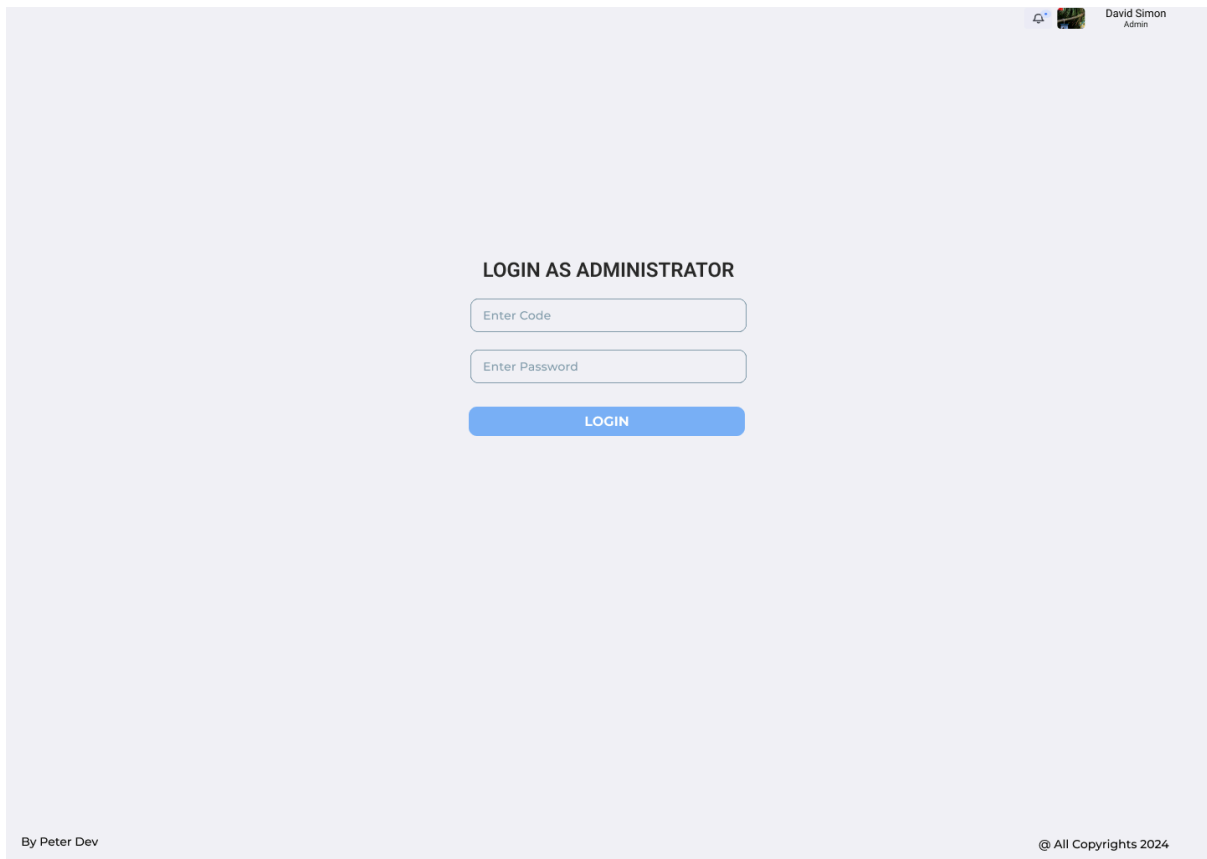
2.2. Draw User Interface

User Interface

Login Page: User chooses the role to login.

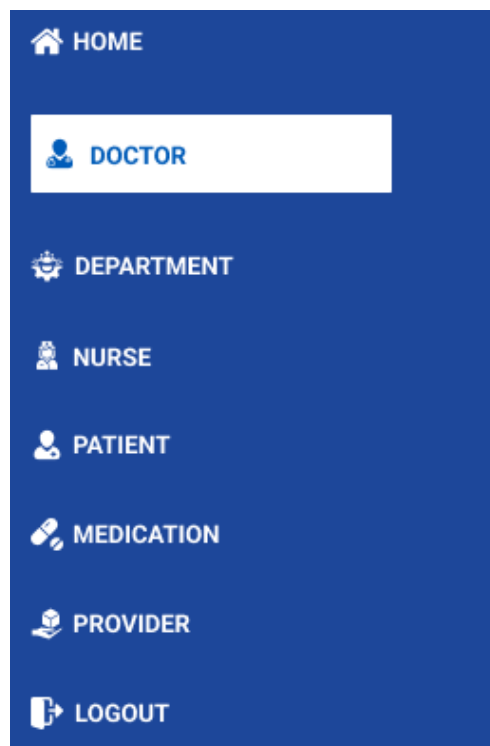


Authentication: Enter user code and password



The image shows a login interface for an administrator. At the top right, there is a user profile icon and the text "David Simon Admin". The main content area is light gray and contains a centered form titled "LOGIN AS ADMINISTRATOR". The form has two input fields: "Enter Code" and "Enter Password", both with rounded borders. Below these fields is a blue button labeled "LOGIN". At the bottom left, it says "By Peter Dev", and at the bottom right, it says "@ All Copyrights 2024".

Navbar: displayed on the left side, is included in all pages to navigate between different pages by clicking on corresponding buttons.



Sample page: Below is Doctor Page for admin, contains a button to Add doctor, a button to Remove doctor, and some search bar for searching. Pagination is also supported for better view.

MEDISYS D David Simon

HOME
DOCTOR
DEPARTMENT
NURSE
PATIENT
MEDICATION
PROVIDER
LOGOUT

ADD DOCTOR

Search By Doctor Code Search By Department Code Search By Name

Doctor Code: E00000001 Full Name: Freddy Zuniga Department: 1
Gender: Male Birthdate: 18/12/1983 Address: 20 Wall Street Phone number: 0123456789, 123456789
Speciality: Cardiologists Date Achieved: 12/07/2015 Start Date: 05/04/2022
Inpatient in-charge: 000000001, 000000002
Outpatient in-charge: 000000002, 000000123 REMOVE

Doctor Code: E00000001 Full Name: Freddy Zuniga Department: 1
Gender: Male Birthdate: 18/12/1983 Address: 20 Wall Street Phone number: 0123456789, 123456789
Speciality: Cardiologists Date Achieved: 12/07/2015 Start Date: 05/04/2022
Inpatient in-charge: 000000001, 000000002
Outpatient in-charge: 000000002, 000000123 REMOVE

Doctor Code: E00000001 Full Name: Freddy Zuniga Department: 1
Gender: Male Birthdate: 18/12/1983 Address: 20 Wall Street Phone number: 0123456789, 123456789
Speciality: Cardiologists Date Achieved: 12/07/2015 Start Date: 05/04/2022
Inpatient in-charge: 000000001, 000000002
Outpatient in-charge: 000000002, 000000123 REMOVE

Doctor Code: E00000001 Full Name: Freddy Zuniga Department: 1
Gender: Male Birthdate: 18/12/1983 Address: 20 Wall Street Phone number: 0123456789, 123456789
Speciality: Cardiologists Date Achieved: 12/07/2015 Start Date: 05/04/2022
Inpatient in-charge: 000000001, 000000002
Outpatient in-charge: 000000002, 000000123 REMOVE

Prev 1 Next

By Peter Dev @ All Copyrights 2024

Confirm Modal: displayed when clicking the “Remove” button for confirmation.

CONFIRM

Are you sure to remove this item?

CONFIRM CANCEL

Add Form: displayed when clicking the “Add” button for filling data.

ADD DOCTOR FORM

First Name (*)

Bellen

Last Name (*)

Valhez

Department Code (*)

2

Speciality (*)

Nephrologist

Year Achieved (*)

2013

Gender (*)

Male

Birth date (*)

09/04/1984

Address (*)

14 Hemington Street

Start date (*)

03/05/2022

SAVE

CANCEL

Patient detail: displayed when clicking on the “Detail” button in the Patient page. The visit logs of each patient will be displayed by dropdown form for better responsiveness to the page.

MEDISYS

David Simon

HOME

DOCTOR

DEPARTMENT

NURSE

PATIENT

MEDICATION

PROVIDER

LOGOUT

Search By Name

Search By Phone Number

Patient Code: 000000001

Full Name: Selene Evy

REMOVE

Gender: Female

Birthdate: 23/12/1990

Address: 42 Seven Street

Phone number: 2451353153

DETAIL

Patient Code: 000000001

Full Name: Selene Evy

REMOVE

Gender: Female

Birthdate: 23/12/1990

Address: 42 Seven Street

Phone number: 2451353153

DETAIL

Patient Code: 000000001

Full Name: Selene Evy

REMOVE

Gender: Female

Birthdate: 23/12/1990

Address: 42 Seven Street

Phone number: 2451353153

DETAIL

Patient Code: 000000001

Full Name: Selene Evy

REMOVE

Gender: Female

Birthdate: 23/12/1990

Address: 42 Seven Street

Phone number: 2451353153

DETAIL

Patient Code: 000000001

Full Name: Selene Evy

REMOVE

Gender: Female

Birthdate: 23/12/1990

Address: 42 Seven Street

Phone number: 2451353153

DETAIL

Prev

1

Next

By Peter Dev

@ All Copyrights 2024

HOME

DOCTOR

DEPARTMENT

NURSE

PATIENT

MEDICATION

PROVIDER

LOGOUT

<

PATIENT DETAIL

Patient Code: 000000001

Full name: Selene Evy

Gender: Female

Birthdate: 23/12/1990

Address: 42 Seven Street

Phone number: 2451353153

Inpatient Visit 1

Discharge Date: 16/09/2021

Diagnosis: Heart rate abnormal

Sickroom: 1

Nurse: E00000002

Nurse Fee: \$200

Total Fee: \$800

Treatment 1

Doctor: E00000001

Start time: 09:20:00 09/12/2020

End time: 11:40:00 23/01/2021

Result: Recovered

Doctor Fee: \$400

Med1: 80 pills

Med2: 60 pills

Med3: 30 pills

Medication Fee: \$100

Inpatient Visit 2

Discharge Date: 16/09/2021

Diagnosis: Heart rate abnormal

Sickroom: 1

Nurse: E00000002

Nurse Fee: \$200

Total Fee: \$800

Treatment 1

Doctor: E00000001

Start time: 09:20:00 09/12/2020

End time: 11:40:00 23/01/2021

Result: Recovered

Doctor Fee: \$400

Med1: 80 pills

Med2: 60 pills

Med3: 30 pills

Medication Fee: \$100

Inpatient Visit 3

Discharge Date: 16/09/2021

Diagnosis: Heart rate abnormal

Sickroom: 1

Nurse: E00000002

Nurse Fee: \$200

Total Fee: \$800

Treatment 1

Doctor: E00000001

Start time: 09:20:00 09/12/2020

End time: 11:40:00 23/01/2021

Result: Recovered

Doctor Fee: \$400

Med1: 80 pills


Med2: 60 pills


Med3: 30 pills

Medication Fee: \$100

By Peter Dev

@ All Copyrights 2024


MEDISYS


David Simon

HOME

DOCTOR

DEPARTMENT

NURSE

PATIENT

MEDICATION

PROVIDER

LOGOUT

ADD PROVIDER

Search By Code

Search By Name

Provider Code: P00000001	Name: Company A	Address: 19 Wesley Street	Phone number: 0963597194	IMPORT	REMOVE
Provider Code: P00000001	Name: Company A	Address: 19 Wesley Street	Phone number: 0963597194	IMPORT	REMOVE
Provider Code: P00000001	Name: Company A	Address: 19 Wesley Street	Phone number: 0963597194	IMPORT	REMOVE
Provider Code: P00000001	Name: Company A	Address: 19 Wesley Street	Phone number: 0963597194	IMPORT	REMOVE
Provider Code: P00000001	Name: Company A	Address: 19 Wesley Street	Phone number: 0963597194	IMPORT	REMOVE

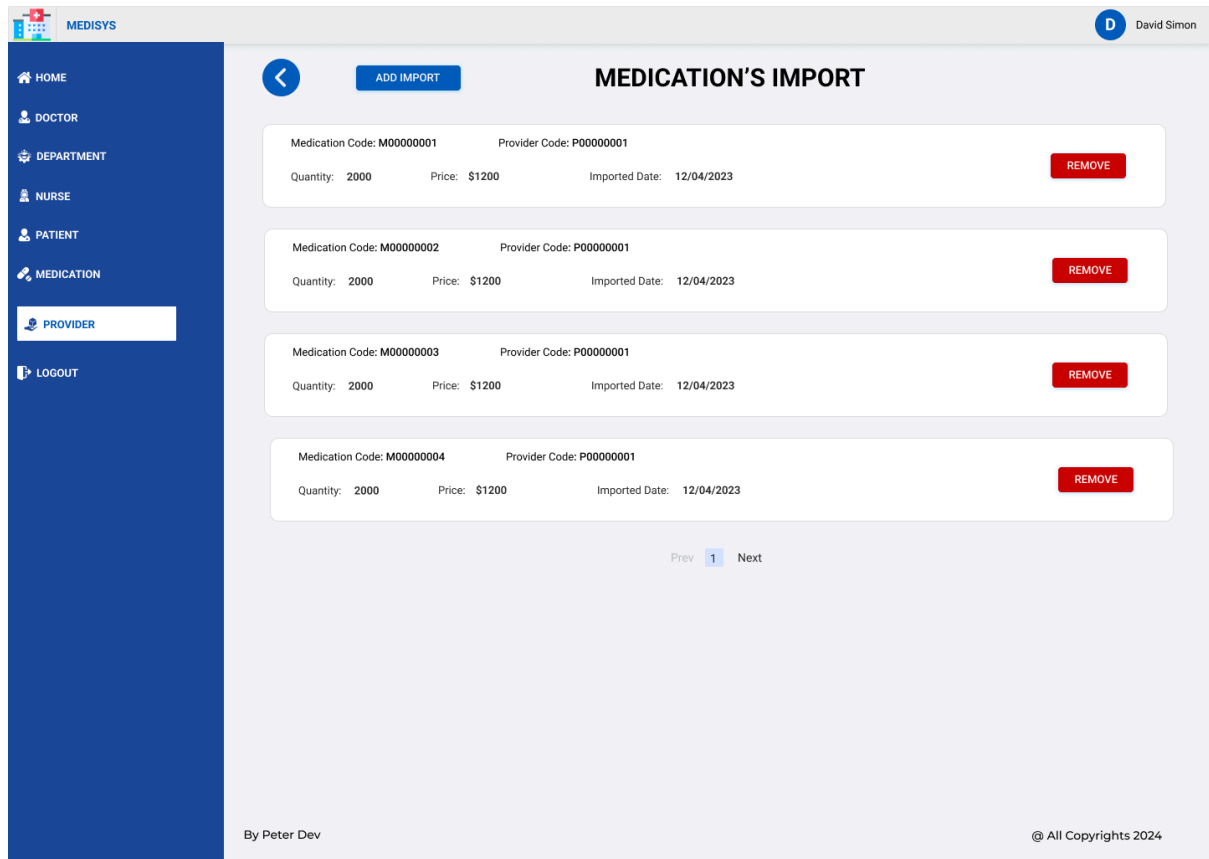
Prev

1

Next

By Peter Dev

© All Copyrights 2024



3. ARCHITECTURE DESIGN

3.1. Presentation Strategy

3.2. Data Storage Approach

3.3. External services / APIs

4. IMPLEMENTATION - SPRINT 1

4.1. Setting up an online repository (github) for version control.

The version control system chosen is Git, and the remote repository service chosen is GitHub. The official repository is available here:

[Link Github Project](#)

5. IMPLEMENTATION - SPRINT 2

5.1. MVP 2

Some compelling reasons why React.js was chosen for this project:

- **Component-Based Architecture:** React breaks down the interface into small, easy-to-handle parts, making it simpler for developers to create, manage, and test different pieces of the Student Interface Module.
- **Virtual DOM:** React's Virtual DOM only updates what's needed, helps the student interface work smoothly.
- **Declarative Syntax for Readability:** React simplifies code readability, helping developers to describe the desired UI state. This makes it easier to reason about how the UI should behave and predict component behavior.
- **Active Community and Ecosystem:** Many developers use React, so there's a big group of people ready to help and share useful tools, making it easier for us to build the interface.

This MVP mainly resembles the look and feel of the system as in the user view, following with some illustrations of the user actions.

6. CONCLUSION

6.1. Challenges

6.2. Solutions

6.3. Lessons Learned