Appointment, diagnosis and invoicing system for individual clinics

Zheng Wang 14403000

<https://login.salesforce.com/>

Username: [zheng.wangforsalesf@gmail.com](mailto:zheng.wangforsalesf@gmail.com)

Password: 91199188Sm$$

**Abstract**

This project plans to design an application on force.com for individual clinics for a group that operates several small clinics. This small system consists of three modules: appointment, diagnosis and billing. Each module is implemented by 1-2 objects, including patient information, appointments, diagnosis, referrals, invoices and discount approvals. This small system implementation demonstrated that the benefits of PAAS in practice include low cost (no system development and hardware deployment required), usability and scalability (new modules can be added at any time to meet demand).

**1 Introduction**

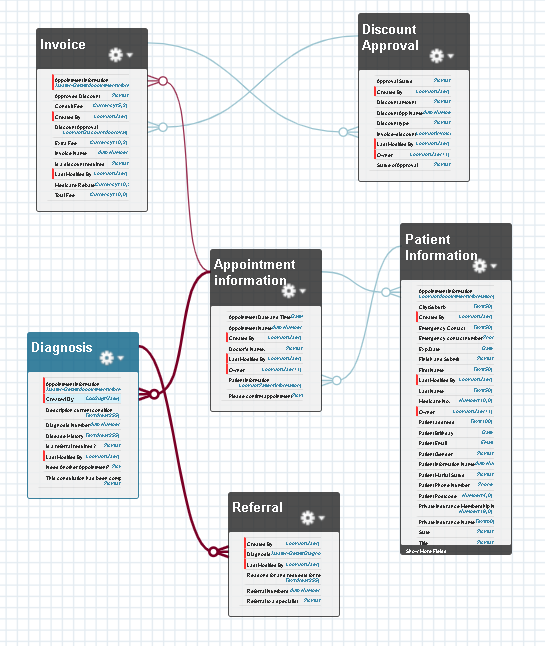
Clinic A is a small clinic in Sydney operated by a large clinic operating group. The clinic mainly provides GP consultation, treatment, and referral services. The business process involves the patient registering and entering their personal details, booking an appointment, and making a diagnosis or referral with doctors. At the end of the consultation, an invoice is issued to the patient, and a discount is given depending on the patient's circumstances. As it is one of the small clinics operated by the group, the clinic does not need to be equipped with finance and HR but is managed by the group. The clinic's daily staff (system users) are admins, doctors, and managers.

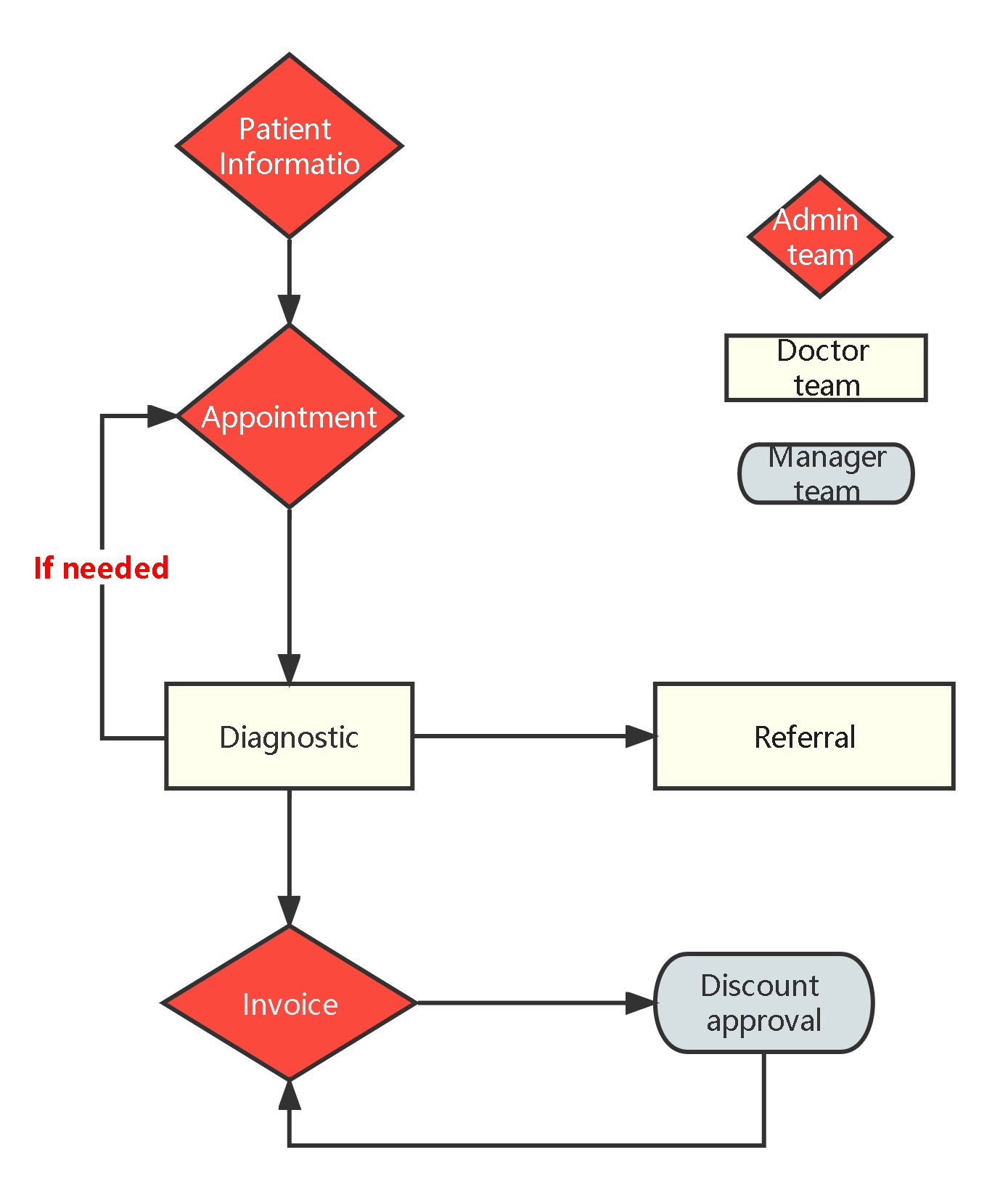
Admin is responsible for entering or assisting in entering patient information confirming and modifying appointments. At the end of the consultation, Amidn issues invoices and applies discounts for patients.

Doctors provide consultation and diagnosis based on appointments and make referrals for patients who need them.

Duty Managers are the on-site managers of the clinic and are responsible for the day-to-day management of the clinic, reviewing information, and approving discounts.

Managers are group administrators and are responsible for the management of several clinics. They have the highest authority over the clinics and are responsible for approving 100% discounts.





1.1 Dataflow

1.2 Schema

A diagram of a company

Description automatically generated

1.3 Clinic Organisation Structure

**2 System Modelling Section:**

a) Data Model for the PaaS Application

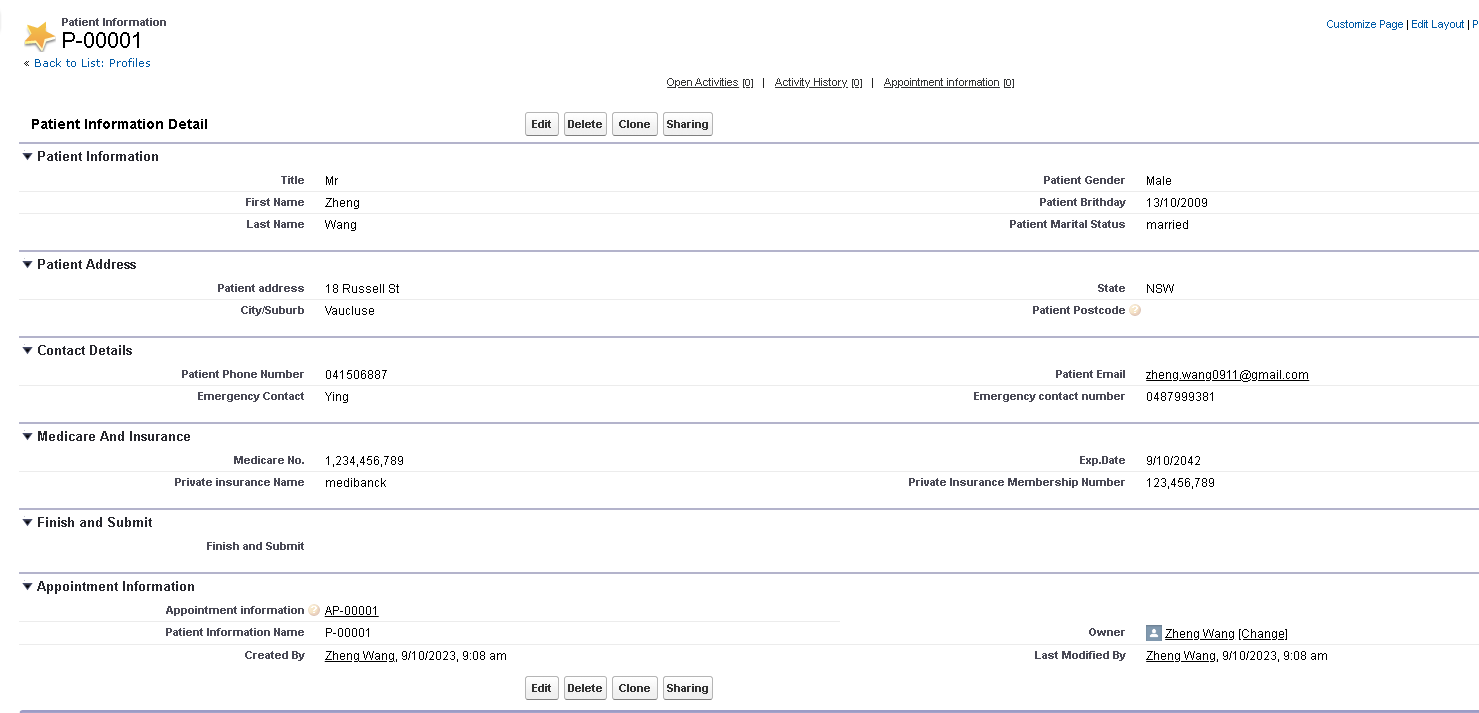
The data model is relatively simple as this small practice only has GP consultation, diagnosis and referral services. As shown in Figure 1.2, the patient's personal information is entered into the system. Necessary information is collected to ensure future services. In the patient's personal information, the patient's birthday and medicare number are verified by setting validation rules to ensure the correct data. Patient information is connected to the appointment information through lookup-relationship. It allows the patient's appointment history to be looked up in the patient information.

A screenshot of a computer

Description automatically generated

A screenshot of a computer

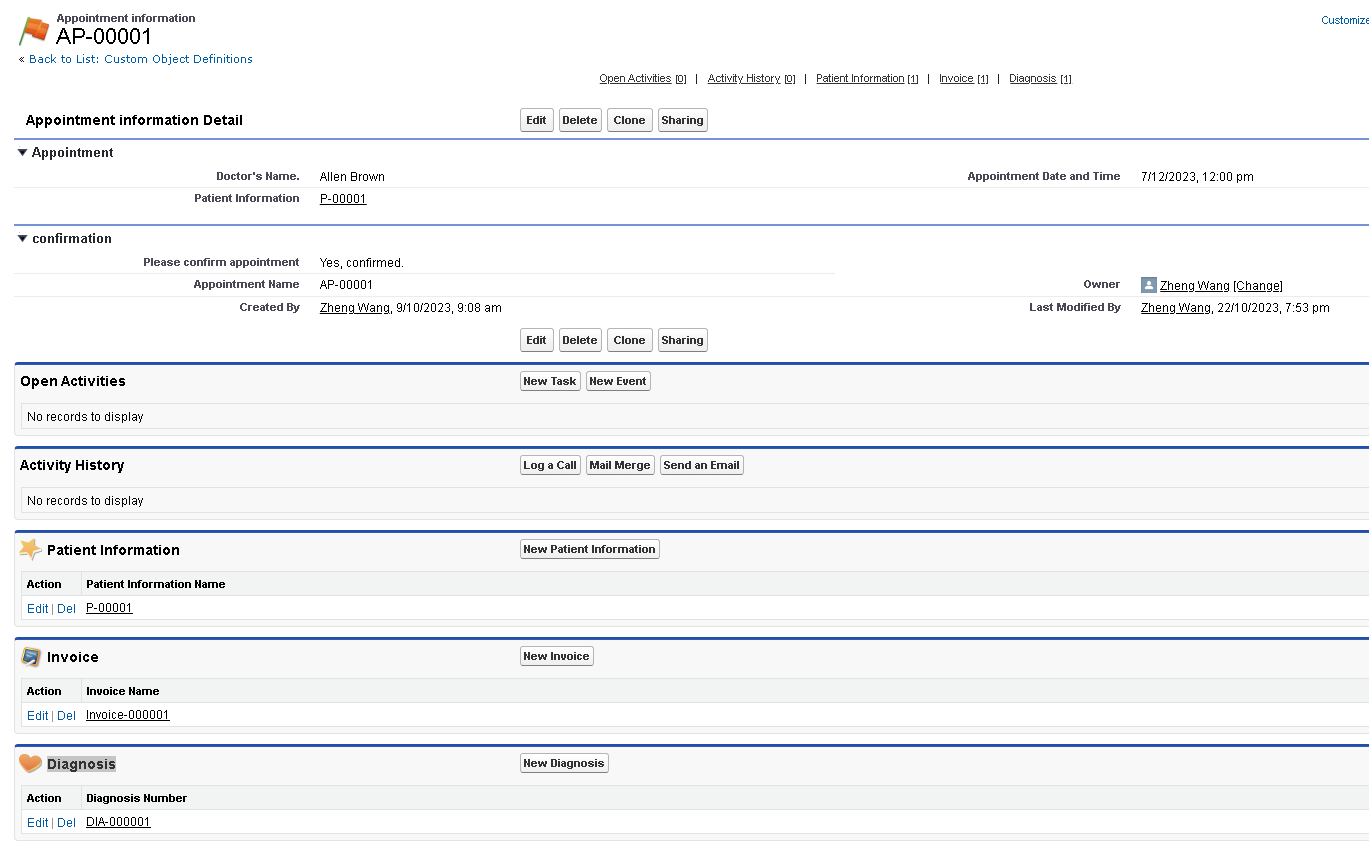
Description automatically generated



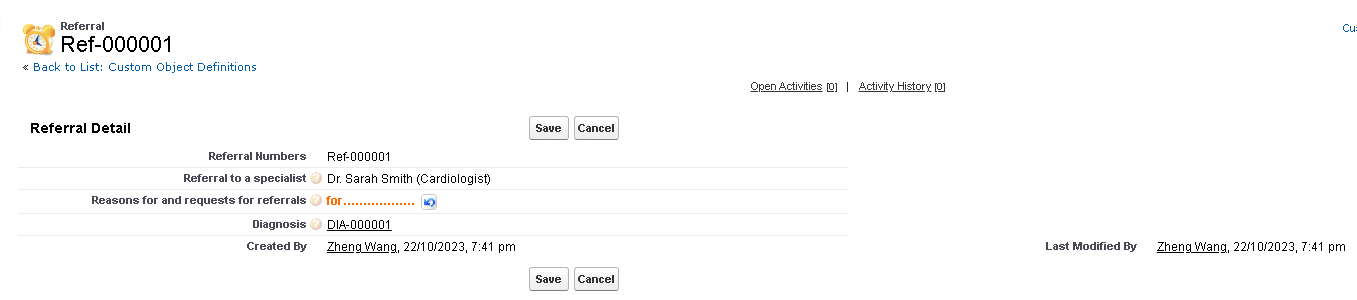
The Appointment Information module allows you to select a doctor and an appointment time and get patient information through lookup relationships. Finally, all information must be selected through a checklist to confirm the appointment. A validation rule verifies the appointment time, and the appointment time must be after the registration of the appointment. After completing all workflows, appointment Information displays completed invoice and diagnosis information through the Master-Detail Relationship.

A screenshot of a computer

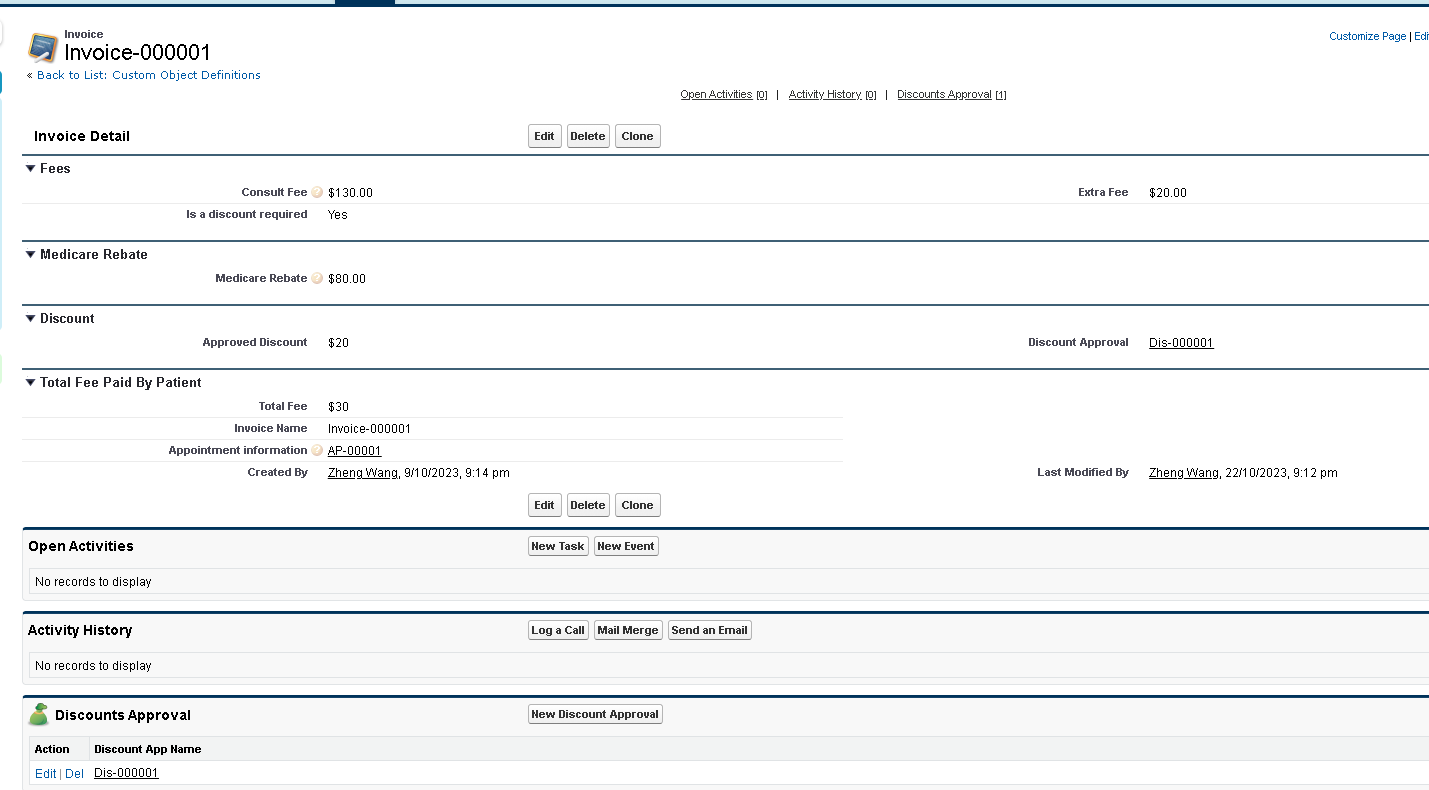
Description automatically generated



The referral module will be accessed if a referral is required at the end of the GP consultation and diagnosis. The referral module requires the doctor to select a specialist and fill in the reason and referral request. In the referral module, all the information about the previous diagnosis can be reviewed directly through the Master-Detail relationship.



After the diagnosis and consultation are completed, the invoice object obtains the information about the appointment according to the Master-Detail relationship. It fills in the relevant information by the Admin team, and the invoice object selects whether it is necessary to apply for a discount and obtains the information about the post-discount approval from the Discount Approval object. The amount in the invoice object is validated according to the validation rules to ensure the data is correct.

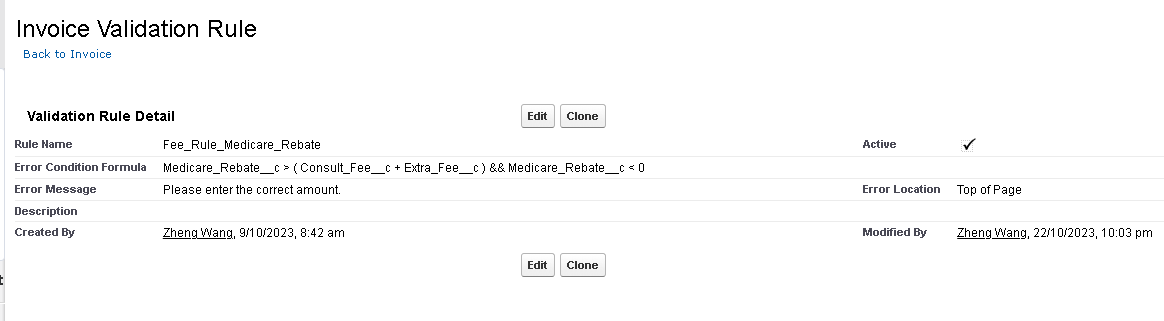


A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated



A screenshot of a computer

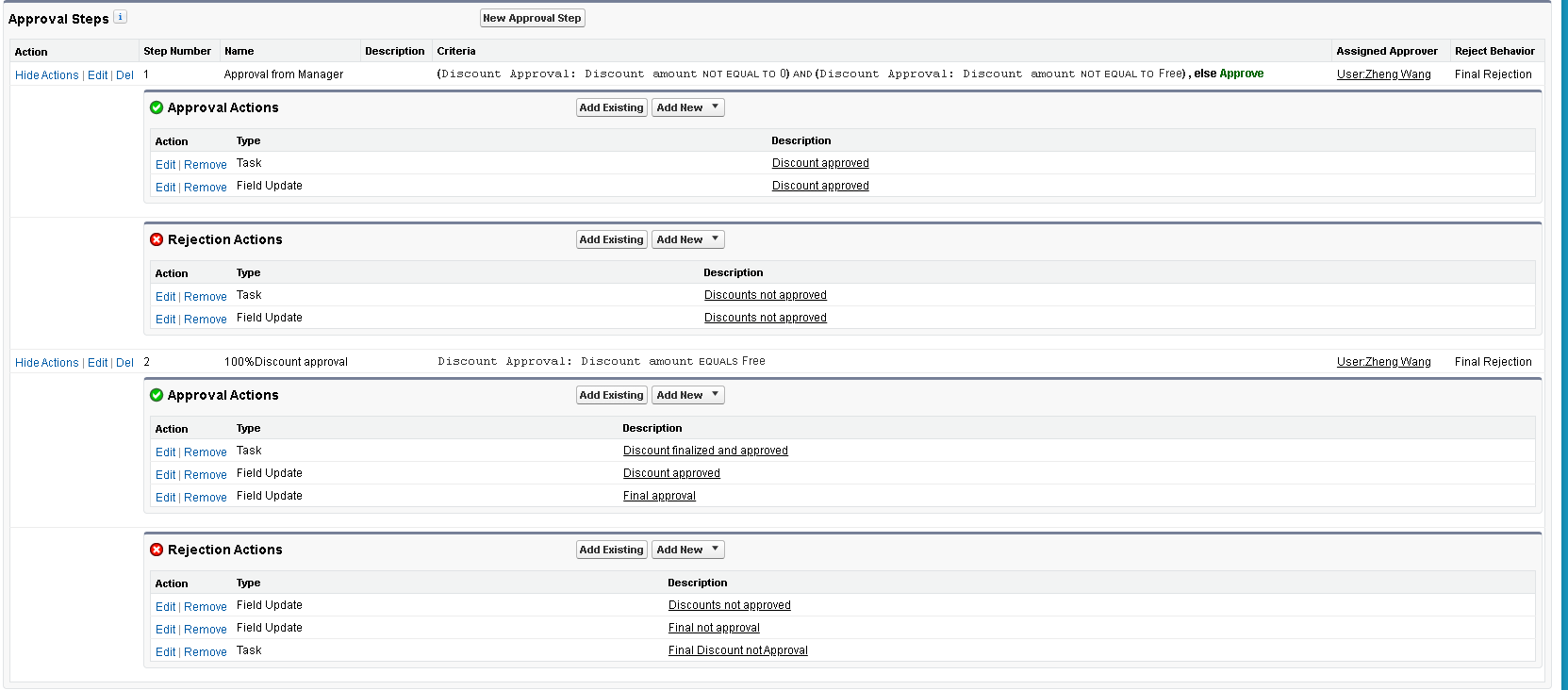
Description automatically generated

Discount Approvalobject approves modules for discounts. Approving discounts is the responsibility of the Manager team. All discounts can be approved by the manager on duty, except for Totally Free, which requires manager approval. Discount types are differentiated by concession card, senior card, student card and others, and discounts range from $10 to free.

A screenshot of a computer

Description automatically generated

The discount approval process is divided into two steps. When there is a discount amount, but it does not reach 100% free, it is approved by the manager on duty, and after approval, the task is assigned to the Admin team and the related field is updated. If the discount is free, it requires manager approval. After approval, the task will also be assigned to the Admin team, and the relevant field will be updated.

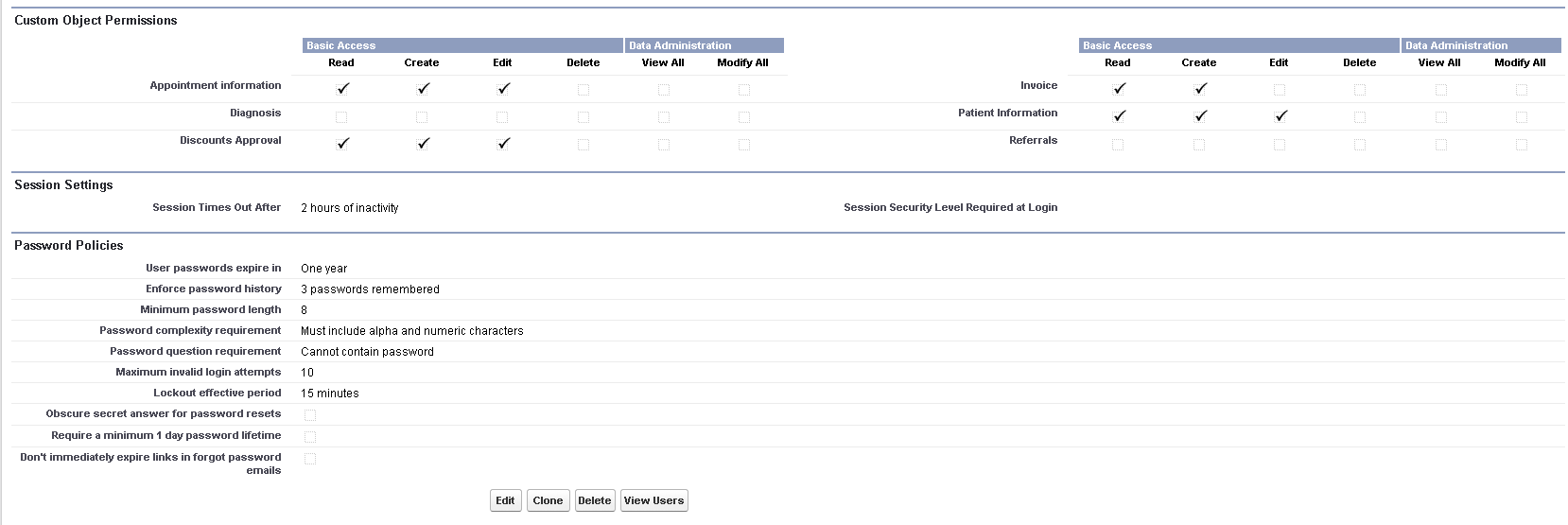


b) Custom User Profile/s with descriptions of each profile

As previously stated, this system has four users. Manager, Duty Manager, Admin, and Doctor. Being a system used by a small clinic, all tabs appear on each user's page and are not hidden for easy access to information.



The admin team is responsible for patient information, patient appointments and invoices and reading discount approvals.



The doctor team is responsible for diagnosing and referring objects and needs to read patient information and appointment information. The doctor needs to create the next appointment for the patient if needed.

A screenshot of a computer

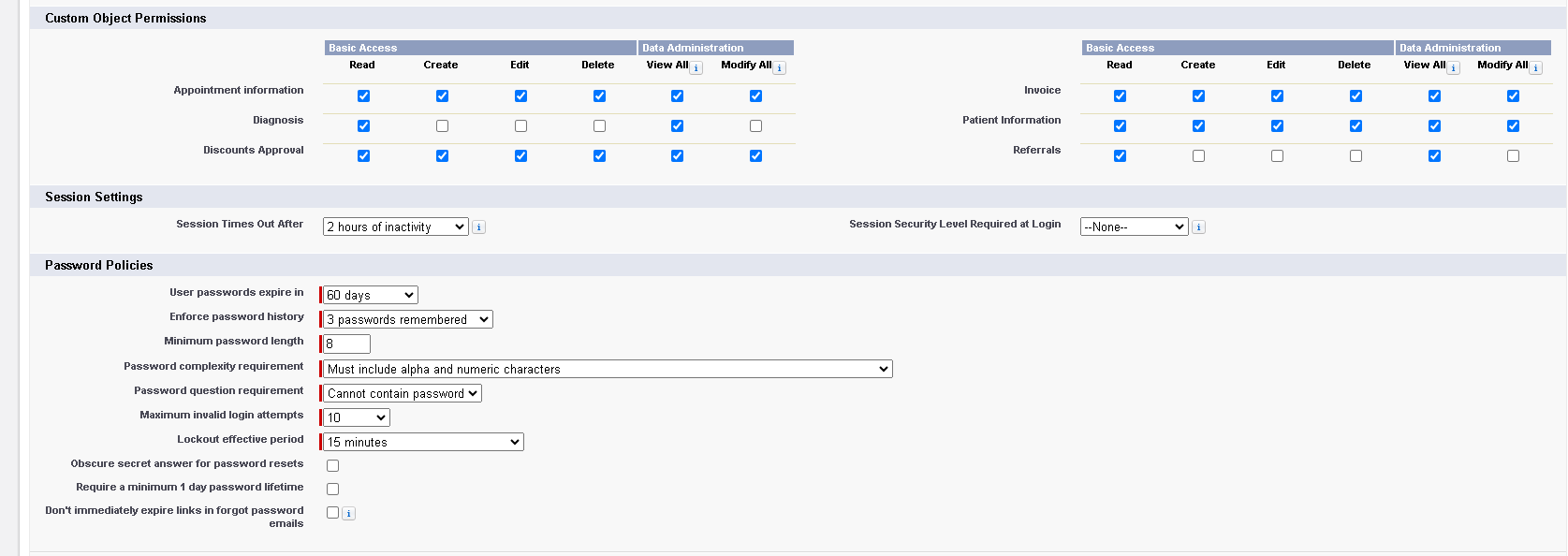
Description automatically generated

The Duty Manager is responsible for the clinic's day-to-day running, needs de-reading access to all information, and can complete all tasks except diagnosis and referrals.

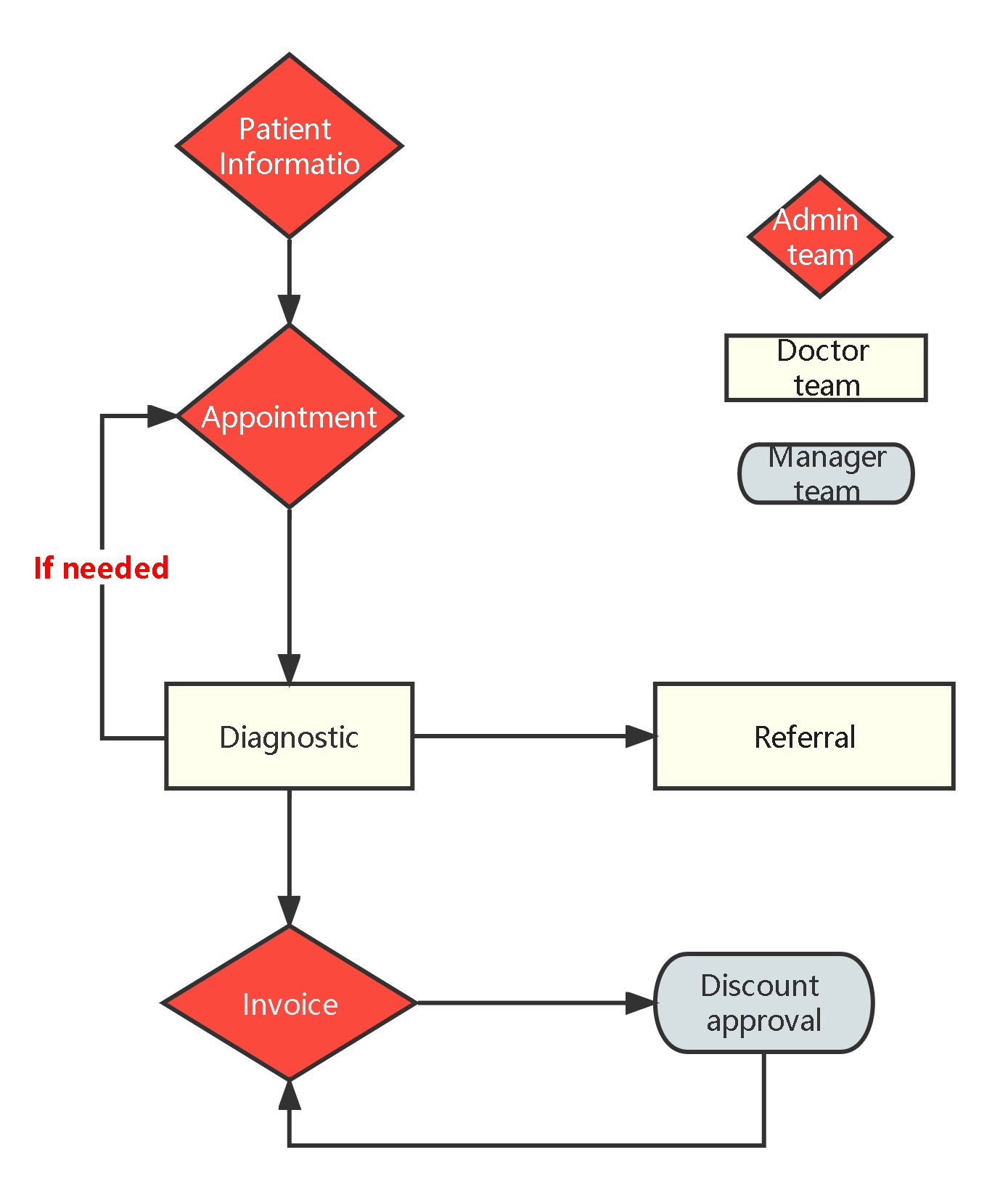
A screenshot of a computer

Description automatically generated

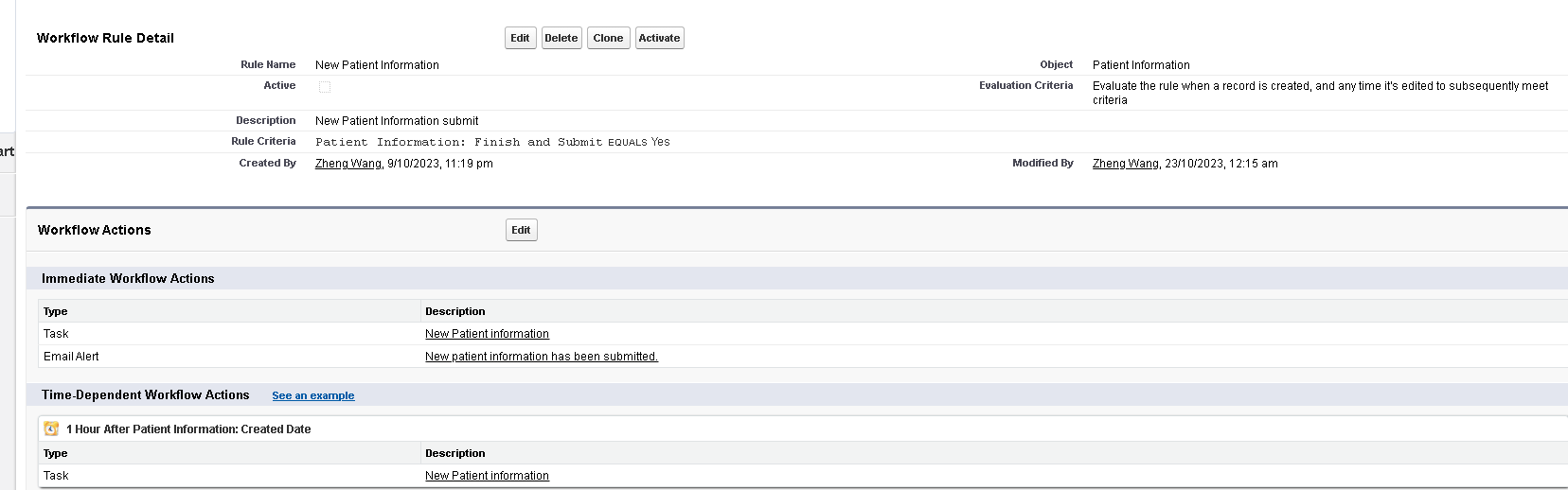
The manager has the highest level of access to the clinic and can read, create, edit, and delete information except for diagnoses and referrals.



c) The workflow diagrams



When new patient information is entered, the system automatically sends a work target to the Admin team requesting team members to review the new patient information. And an email is sent to the patient using the email address in the patient information to confirm that the information has been uploaded into the system.





A screenshot of a computer

Description automatically generated

When a patient appointment is created, the system assigns the task to the Admin team and Doctors, respectively. The system will directly inform the new appointment that is created.

A screenshot of a computer

Description automatically generated

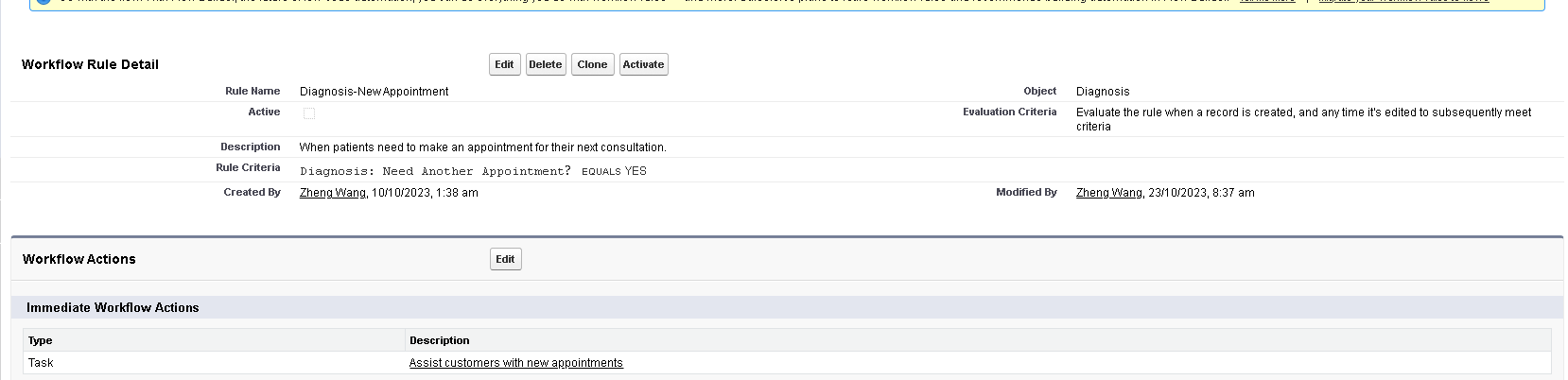
A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

If a patient needs to create a new appointment after the diagnosis is completed, the system automatically assigns a task to the admin team after the physician selects "Need New Appointment". The task will require the admin team to assist the patient in completing the new appointment.



A screenshot of a computer

Description automatically generated

When the doctor selects "yes" for the Referral Needed option in the Diagnostics module, the task will be assigned to the Information Owner, prompting the need to complete the referral record.

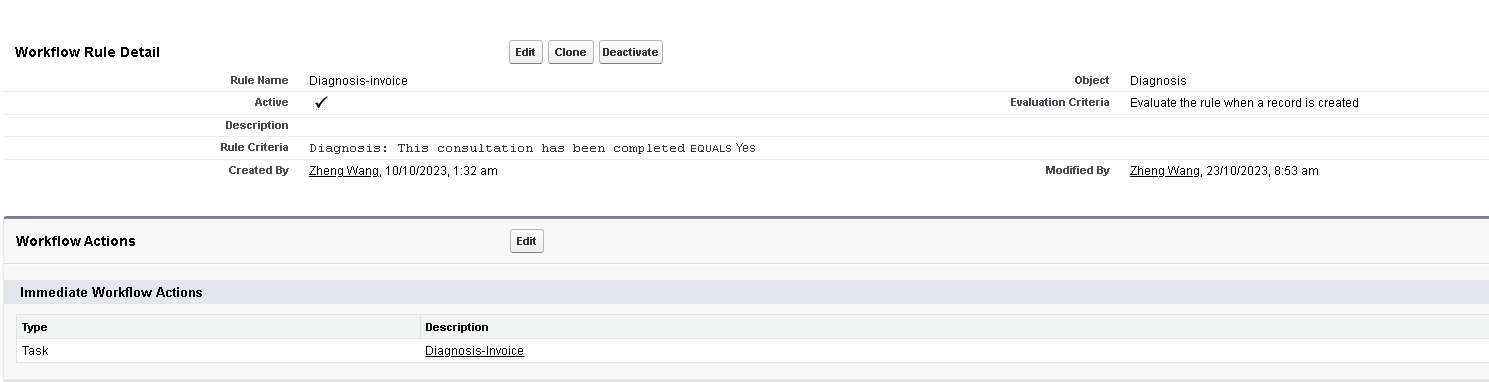
A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

When the physician chooses to complete the current diagnosis, requesting an invoice to be issued to the patient is assigned to the admin team.



A screenshot of a computer

Description automatically generated

When a discount is selected as required in the invoice module, the system assigns two tasks directly to the Duty Manager, reminding the Duty Manager to complete the Discount Approval module for completion and review. At the same time, an email will be sent to the Duty Manager and Manager, alerting them that a new discount request needs to be reviewed.

A screenshot of a computer

Description automatically generated

A screenshot of a computer

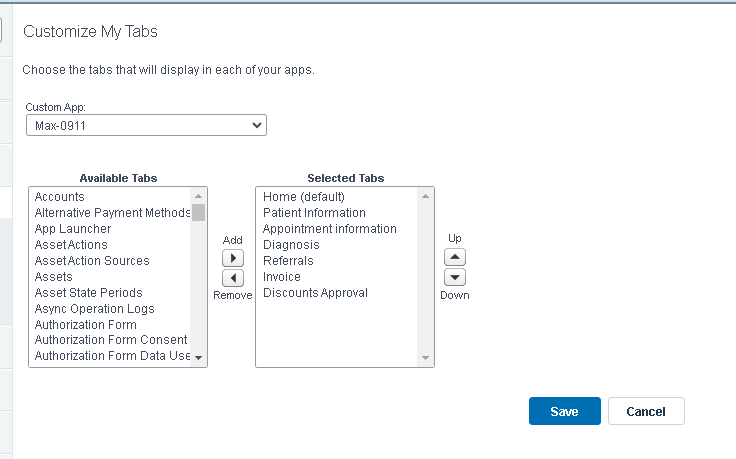
Description automatically generated

A screenshot of a computer

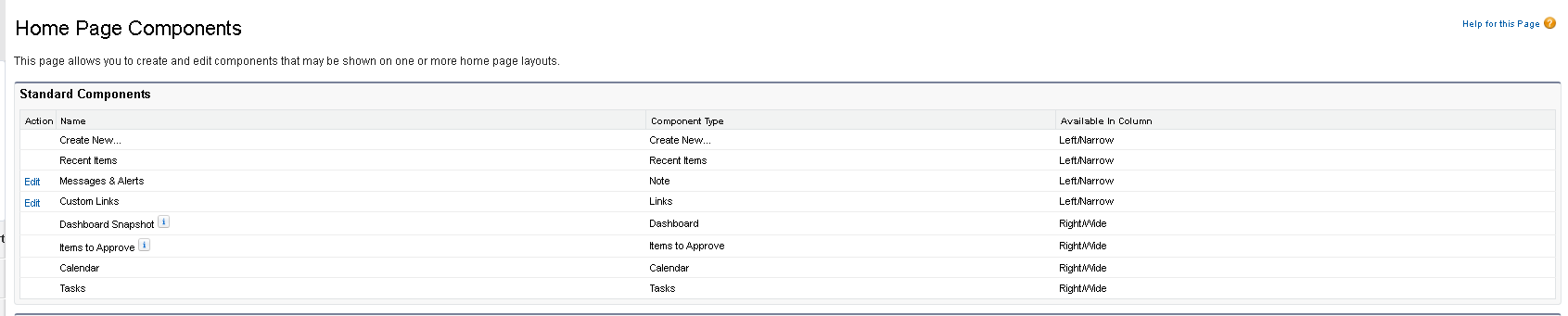
Description automatically generated

d) Prototype System Screens

The original interface begins with the inclusion of Home and all tabs. As previously mentioned, the system can restrict job permissions in a small clinic work environment. Use 'Customize My Tabs' to select the Tabs on the home page.



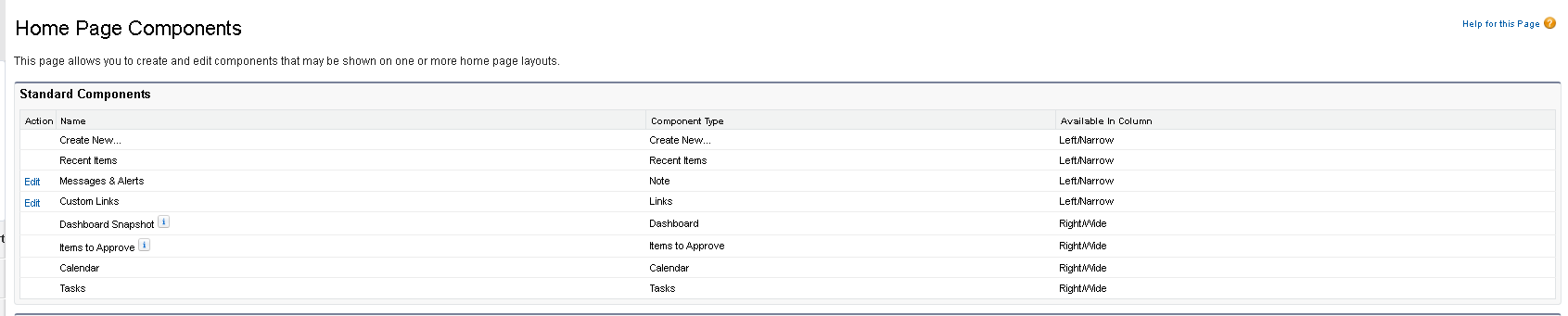
On the left side of the screen are 'Create New', 'Recent Items', 'Messages and Alerts' and 'Custom Links'. The main screen displays Calendar, My Tasks, Dashboard, Pause Flow Interviews and Items to Approve. Use 'Home Page Components' in 'Customize' to select the desired components. Furthermore, set the position of each component in 'Home Page Layouts'.



A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

So the resulting page is as follows.

A screenshot of a computer

Description automatically generated

**3 Contribution of each group member:**

Zheng Wang 14403000

4 **Conclusion and Future Work Section**

A. Conclude the report with your experience(s) with PaaS-based Software Development

I have deepened my understanding of the advantages of PaaS by conducting PaaS program development. First, PaaS is easier and more convenient than a programming language (Java, Python, etc.). The entire development process follows the step-by-step instructions taught in the course and is very interesting. Following the lessons and trying out new features and components was interesting.

Secondly, it is very usable for both professionals and users to master the development process in a very short time. Secondly, PaaS has good scalability. New modules and features can be added while using it. Finally, the PaaS environment provides a range of standard solutions. Enterprises and developers do not need to start from scratch but only use standard solutions as needed or customize them according to existing solutions. It effectively saves costs and increases productivity.

B. Future further implementation of this PaaS application and other areas within the organization where PaaS implementations could be done.

The current system is only part of the system for a single clinic. As far as individual clinics are concerned, more modules and features can be added to the system. For example, adding a scheduling module, especially for doctors. It will allow patients to be scheduled for appointments based on the doctor's schedule and the average length of the consultation. Also, add printing functionality so doctors and admins can print prescriptions or invoices.

On a larger scale, when more clinics are in the system, the patient can choose the clinic and doctor that is suitable or feasible for the appointment. Staff can work in different clinics. Staff with permissions can review information from other clinics, e.g. a doctor in Clinic A can review information from a patient's diagnosis in Clinic B when diagnosing the patient.

At the group level, the HR department can first deploy the staff scheduling and attendance record module and combine it with the payroll module to automatically calculate salaries. The data statistics department uses the data analysis module to analyze the clinic, doctor consultation and diagnosis time, develop a reasonable appointment time and ensure that the patient's waiting time is reasonable. The customer service department deploys the customer survey module to conduct customer satisfaction surveys and can communicate directly with customers online via email and live chat.

All of the above are necessary features for a group of clinics and individual clinics. These features can be an effective PaaS system that improves efficiency and reduces costs across departments and staff. It is the purpose of using the PaaS system.

It is worth noting that when we use a PaaS system, relevant information, including corporate information and customer information (privacy), is held by the PaaS platform. Both the enterprise and the platform hold data control. In practice, we need to pay attention to choosing a reliable platform, signing relevant agreements by the law, and effectively encrypting and backing up data.