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Computer Based Technologies
Cosmetics Store Management System

Class: INS206501

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LIST OF ABBREVIATION

Abbreviation	Meaning
IDE	Integrated development environment
MVC	Model-view-controller
CMD	Command Line Interface

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I. INTRODUCTION

Information technology is developing quickly nowadays and has become vital to the economic and social framework of many nations worldwide. In today's trend, data management is becoming an increasingly important activity to keep up with developments in data application capabilities.

Instead of needing to manually manage cosmetics in an ineffective and time-consuming manner, develop solutions from honest demands. For instance, there is no safety and everyone can access the system, mistakes can happen when editing records, and there is no way to search for and look at saved records. In order to solve each problem that happens today and convert all of the manual software to a computer system, we created a report on this topic "**Cosmetics Store Management System**". By providing an extensive list of tools to enhance the standard of comic administration, the suggested solution makes cosmetic management easier and faster than using conventional approaches. It also contributes to time, money, and energy savings.

1.1. Project requirement

Glamour, a cosmetics store, currently faces significant challenges due to the manual management of product, customer, and order information on paper. This approach is time-consuming, inefficient, and prone to errors. Additionally, the lack of security measures makes the records accessible to anyone, which poses a risk to data integrity. To address these issues, the development of a "Cosmetics Store Management System" is proposed.

The system aims to transform manual processes into a computerized system that tracks all information about cosmetics and their complete details efficiently. It will provide robust search capabilities for cosmetic records based on various criteria such as product type, brand, and cost. The system is designed to handle large volumes of data effectively and efficiently, ensuring smooth operations. This capability is crucial for managing extensive inventories, customer data, and order histories without compromising performance. Furthermore, the system will include features for generating

product charts and optimizing product selection to enhance the customer shopping experience. Ultimately, the goal is to provide better service by streamlining operations and reducing the potential for errors, thereby saving time, money, and energy. By integrating these functionalities, the system will significantly improve the operational efficiency and service quality of Glamour, making cosmetic management easier and faster than using conventional approaches.

1.2. Languages & Tools

To develop the Cosmetics Store Management System, we utilize a combination of powerful languages and tools, each serving a specific purpose in the development process. We begin with Visual Studio Code, an integrated development environment (IDE) that provides a robust code editor, debugging tools, and seamless version control integration. This environment allows us to efficiently write, debug, and maintain the system's codebase, ensuring high-quality software development.

Next, we incorporate Docker, a platform that enables us to develop, ship, and run applications in containers. Docker ensures that our system can be deployed consistently across different environments, simplifying the management of dependencies and enhancing the reliability of our deployment process. This containerization also aids in scaling the system as needed, providing flexibility and robustness. The backbone of our system is developed using Ruby on Rails, a web application framework that follows the model-view-controller (MVC) pattern. Ruby on Rails facilitates rapid development with a strong emphasis on convention over configuration and code simplicity. This framework allows us to build the system efficiently, maintaining a clean and organized code structure. For executing various development, deployment, and maintenance tasks, we rely on the Command Line Interface (CMD). The command line provides a powerful and efficient way to perform operations, manage version control, and automate repetitive tasks, thereby speeding up the development process.

Lastly, we use GitHub as our platform for version control and collaborative software development. GitHub allows us to manage our system's source code

repositories, track issues, and facilitate teamwork through features like pull requests and code reviews. This collaboration tool ensures that our development process is transparent, organized, and conducive to teamwork, enabling us to deliver a high-quality product. By integrating these languages and tools, we streamline the development process, ensuring that the Cosmetics Store Management System is robust, scalable, and capable of meeting Glamour's operational needs effectively.

1.3. Project plan

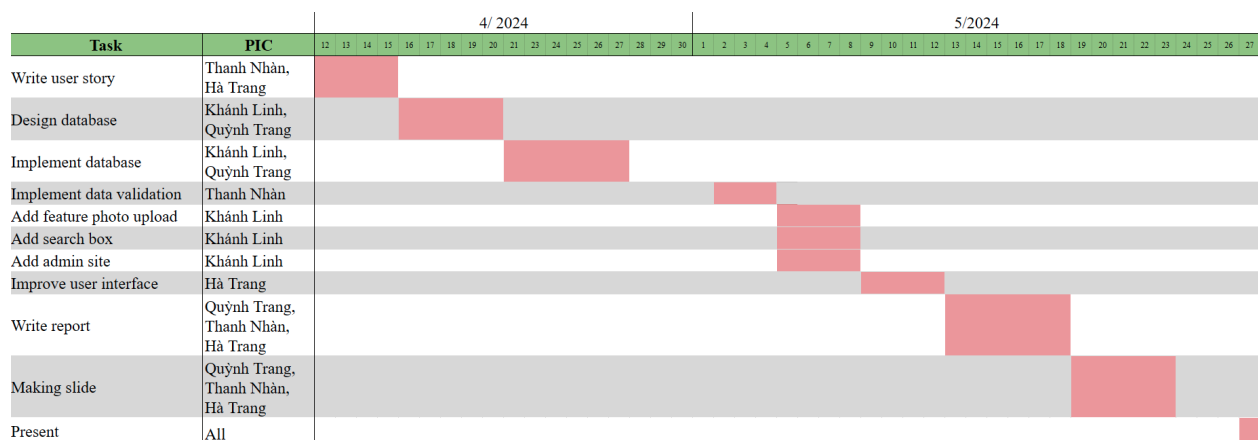


Figure 1. Project plan

To keep track of tasks and ensure they are shared equally among team members, we use Google Sheets. The project is divided into 10 key tasks, with each task assigned to 1-2 people. Exceptions to this allocation are the tasks of writing the report, creating the slides, and preparing the presentation, which involves more collaborative efforts from the entire team. This approach ensures clear responsibility and accountability while promoting teamwork for critical deliverables.

II. USER STORIES

User story	Acceptance criteria
As a cashier, I want to store customer information So that I can quickly access their details for future order.	<ul style="list-style-type: none">- The system should allow cashiers to input and save customer information, including name and phone number(unique for each customer).- The system should allow cashiers to update or delete customer information when needed.
As a cashier, I want to create an order for a customer So that the customer can purchase their desired products.	<ul style="list-style-type: none">- The system should allow cashiers to search for and select products, and customers to add to the order.- When an order is created successfully, it cannot be updated or deleted.
As an inventory manager, I want to manage the inventory So that I can keep track of stock levels and ensure products are available for customers.	<ul style="list-style-type: none">- The system should allow employees to add, edit, and delete products from the inventory.- The system should automatically update stock levels when an order is created or canceled.
As the store manager, I want to generate sales reports	<ul style="list-style-type: none">- The system shall provide options to filter sales data by various parameters such as product category, date range, and sales region.

So that I can analyze sales performance and provide management with accurate data.	<ul style="list-style-type: none"> - The system shall allow sorting of the sales data by different fields such as product name, revenue, and units sold.
<p>As a store manager,</p> <p>I want the order management system to have an intuitive user interface</p> <p>So that employees can quickly learn and perform tasks efficiently.</p>	<ul style="list-style-type: none"> - Common tasks such as creating orders and updating customer information should be easily accessible from the main dashboard.
<p>As a store manager,</p> <p>I want the order management system to handle a high volume of simultaneous transactions efficiently</p> <p>So that customers experience minimal delays during peak usage periods.</p>	<ul style="list-style-type: none"> - The average response time for common user actions (e.g., placing an order, searching for a customer) should be less than 500 milliseconds.

Table 1. User stories

III. DATABASE DESIGN

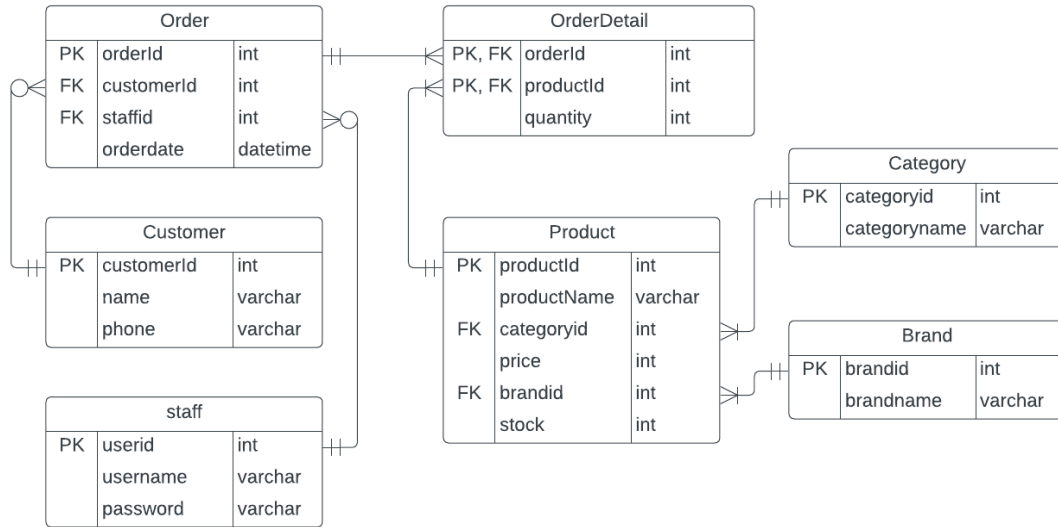


Figure 2. Entity Relationship Diagram

The **Product** table contains information about each product. Given that many products can be classified into a category or a brand, but each product belongs to only one category and one brand, the relationships between **Product** and **Category** and between **Product** and **Brand** are many-to-one.

An **Order** is created by only one staff member and is made by only one customer, although a customer can make multiple purchases, and a staff member can create multiple orders. Thus, the relationships between **Order** and **Customer** and between **Order** and **Staff** are many-to-one.

Each time a customer makes a purchase, they can buy many different products, indicating that the relationship between **Order** and **OrderDetail** is one-to-many. This structure allows for detailed tracking of each product within an order, maintaining comprehensive order management and inventory control.

IV. IMPLEMENTATION

4.1 Data validation

Table	Validation
Brand	<ul style="list-style-type: none">- Brand must has name- Name of brand must be unique
Category	<ul style="list-style-type: none">- Category must has name- Name of category must be unique
Staff	<ul style="list-style-type: none">- Each staff account must has name and password- Username of each staff must be unique
Customer	<ul style="list-style-type: none">- Customer must has customer name and phone number- Phone number of customer must be unique- Phone number of customer must contain 10 digits
Product	<ul style="list-style-type: none">- Product must has name- Stock and price of product must be a number and greater than or equal to 0
OrderDetail	<ul style="list-style-type: none">- Quantity of each product in an order must be greater than 0 and cannot exceed its stock number- Stock will be updated when there's an order created

Table 2. Data validation

4.2 System workflow

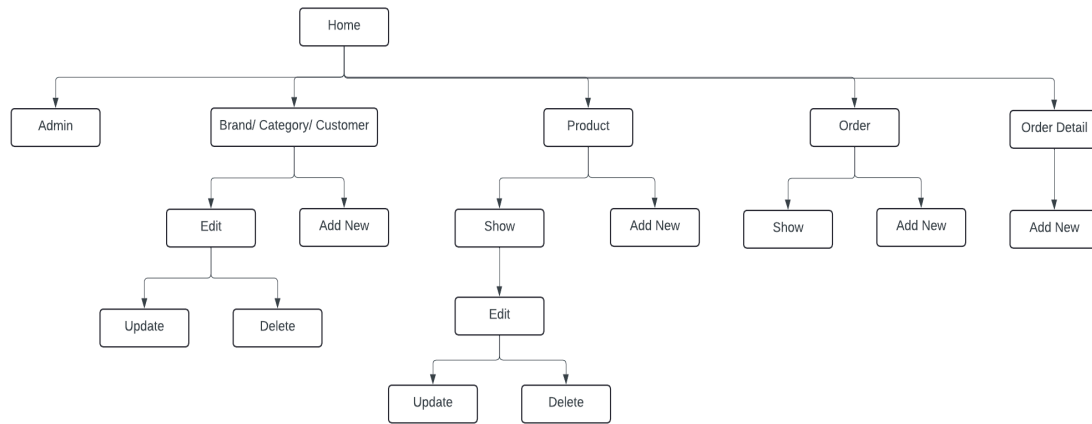


Figure 3. System workflow

Upon user access, the system will navigate directly to the homepage, which features links to seven distinct pages, besides admin site, each page represents a table in our database. The Brand, Category, and Customer pages share an identical structure, and along with the Product page, they support functionalities for adding, updating, and deleting entries. As per the defined user stories, users can create new orders and order details but are unable to edit them once they have been successfully created.

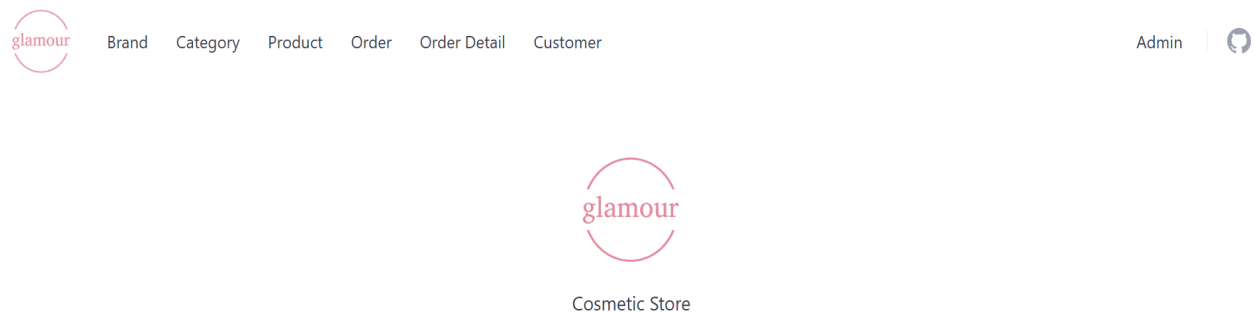
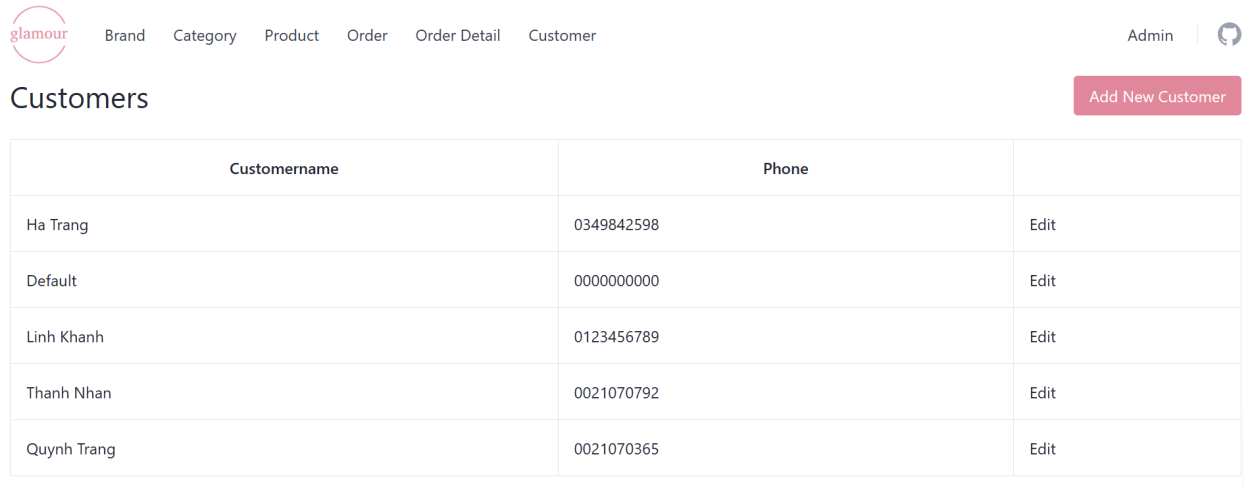


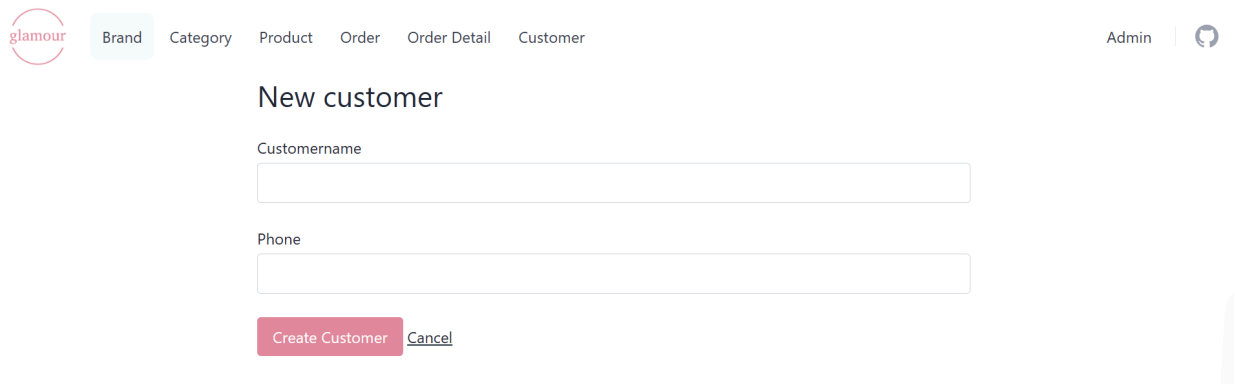
Figure 4. Home page



glamour			Brand	Category	Product	Order	Order Detail	Customer	Admin	
Customers										Add New Customer
Customername			Phone							
Ha Trang			0349842598			Edit				
Default			0000000000			Edit				
Linh Khanh			0123456789			Edit				
Thanh Nhan			0021070792			Edit				
Quynh Trang			0021070365			Edit				

Figure 5. Index page of Customer page

When users click on each link in the navigation bar, the system will navigate them to the respective index page, displaying information about all records in that model.



glamour
Brand
Category
Product
Order
Order Detail
Customer
Admin

New customer

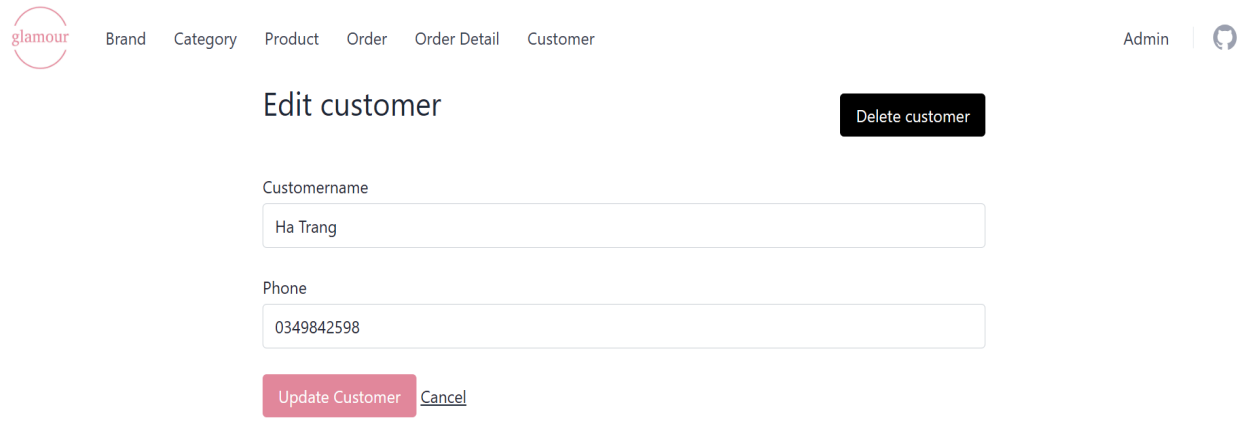
Customername

Phone

Create Customer Cancel

Figure 6. Add new Customer page

By clicking the "Add New" button, users will be directed to a page containing a form where they can enter the required information to create a new record. If users decide not to proceed with creating a new record, they can click the "Cancel" button to return to the index page.



glamour Brand Category Product Order Order Detail Customer Admin

Edit customer

Delete customer

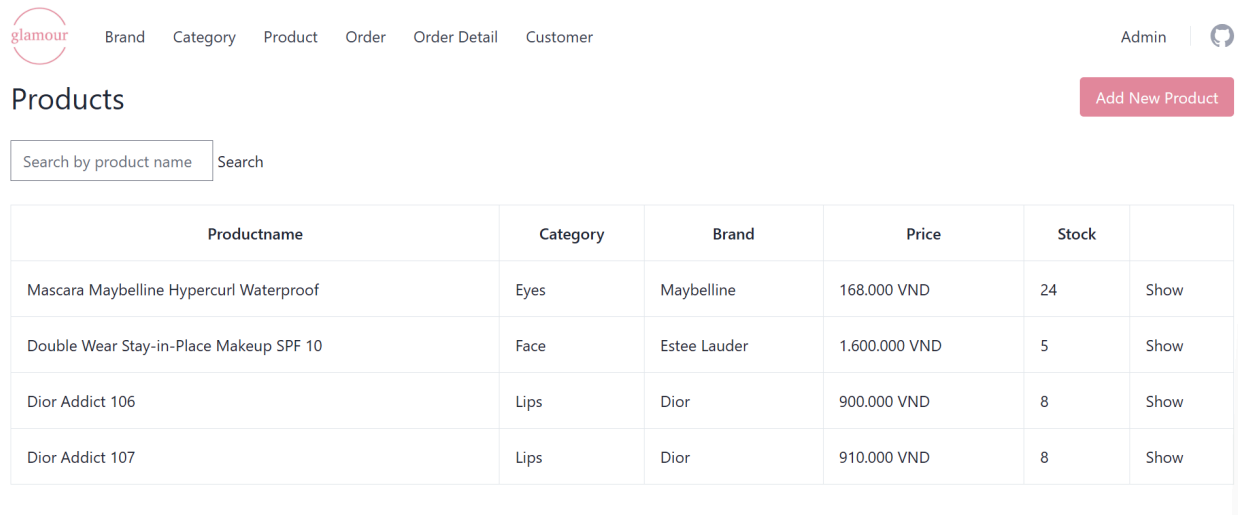
Customername
Ha Trang

Phone
0349842598

Update Customer Cancel

Figure 7. Edit Customer page

On the index page, if users click the "Edit" button on a specific item row, the system will navigate them to a page containing a form similar to the "Add New" page, but with the purpose of updating the information for that item. If users wish to delete a record, they can do so by clicking the "Delete" button.



glamour Brand Category Product Order Order Detail Customer Admin

Products


Add New Product

Search by product name Search


Productname	Category	Brand	Price	Stock	
Mascara Maybelline Hypercurl Waterproof	Eyes	Maybelline	168.000 VND	24	Show
Double Wear Stay-in-Place Makeup SPF 10	Face	Estee Lauder	1.600.000 VND	5	Show
Dior Addict 106	Lips	Dior	900.000 VND	8	Show
Dior Addict 107	Lips	Dior	910.000 VND	8	Show

Figure 8. Index page of Product page

The product page has a special feature is the search box that allows user search for product by product name.



[Brand](#)
[Category](#)
[Product](#)
[Order](#)
[Order Detail](#)
[Customer](#)

[Admin](#)


Order

Order Date:
2024-05-22 11:43:00 UTC

Customer:
Ha Trang


Staff:
hatrang783

Order Details:


Product	Unit price	Quantity	Total price
Dior Addict 107	910.000 VND	1	910.000 VND
Double Wear Stay-in-Place Makeup SPF 10	1.600.000 VND	1	1.600.000 VND

[All Orders](#)

Figure 9. Show Order page



[Brand](#)
[Category](#)
[Product](#)
[Order](#)
[Order Detail](#)
[Customer](#)

[Admin](#)


Product

Productname: Mascara Maybelline Hypercurl Waterproof

Price: 168.000 VND

Stock: 24

Category: Eyes

Brand: Maybelline

[All Products](#)
[Edit](#)




Figure 10. Show Product page

On pages with a "Show" feature, such as the Product and Order pages, clicking the "Show" button will navigate users to a detailed view page. This page displays additional information about the selected record, such as the product image on the Product page or all the products included in an order on the Order page.

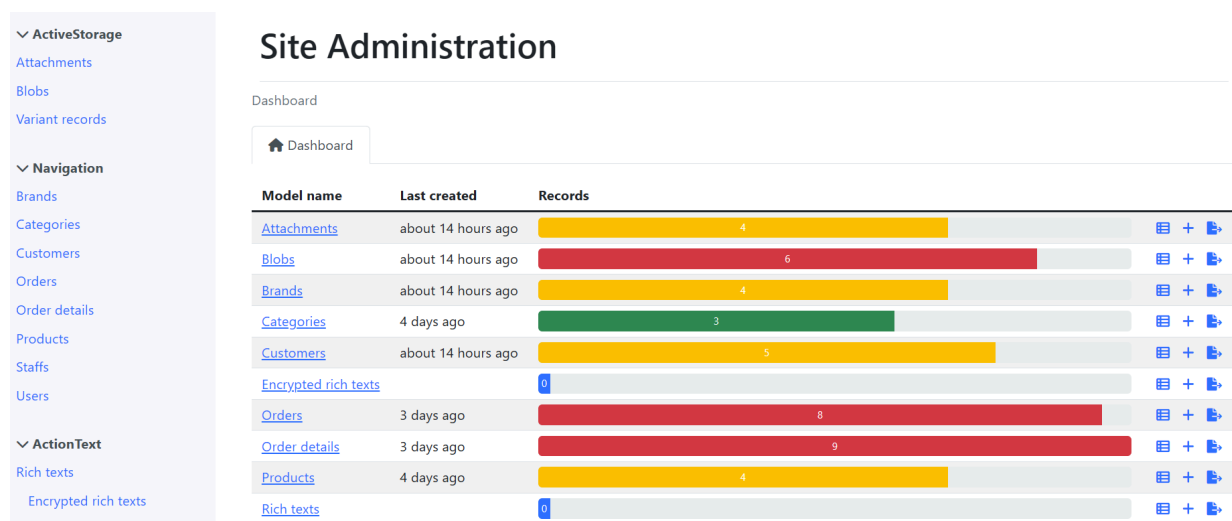


Figure 11. Admin page

When users click on Admin on the navigation bar, the system will move users to the admin site. The admin site provides a comprehensive interface for administrators to manage all aspects of the system. It offers robust tools for overseeing user accounts, managing content, configuring settings, and monitoring system performance. With features such as detailed record views, advanced search capabilities, and activity logs, the admin site ensures efficient and secure administration of the platform

V. DISCUSSION

5.1. Improvements

In addition to the basic features practiced in class, we have enhanced our system with several additional functionalities:

- Photo Upload: We support uploading images for various cosmetic products, including those for lips, masks, eyes, face, and cheeks.
- Automatic Stock Deduction: Stock levels are automatically updated and deducted when a new order is placed.
- Product Search by Name: The search feature allows users to find products by brand name.
- User Interface Improvements: We have designed an intuitive and visually appealing interface tailored for a cosmetic store.
- Product Price Formatting: Prices are formatted for better readability.
- Order Page Details: The order page now displays detailed information within each order.

5.2. Limitations

The construction process for the Glamor Store project was relatively brief, resulting in several notable limitations. One significant area for improvement is the inability to create Order Details that are linked to the Order creation process. This functionality is essential for comprehensive order management and tracking, and its absence affects the overall user experience. We also have not yet developed an advanced dashboard featuring graphical representations of data. Another limitation is the current deployment status of the application. We have not been able to deploy the application to the cloud, which restricts accessibility and scalability. Furthermore, the application lacks an authentication system, which is critical for ensuring secure access and protecting sensitive user and transaction data. Addressing these limitations will be a priority in the next phases of the project to enhance functionality, security, and user satisfaction.

VI. CONCLUSION

Glamour has developed a Cosmetics Store Management System to improve its operational efficiency. The system transitions from manual to digital platforms, addressing challenges like time inefficiency, data inaccuracy, and security. The user-friendly interface facilitates seamless management of products, brands, customers, and orders. In addition to meeting the core requirements, we have integrated several features such as uploading photos, updating stock levels with new orders, and searching for products. We also implemented user authentication for authorized personnel. Looking ahead, our future development plans include implementing Order Details for granular tracking of individual orders, developing an advanced dashboard with graphical representations of key metrics, and deploying the application to the cloud for improved accessibility and scalability. Overall, this system reduces manual effort, minimizes errors, and enhances service quality, laying a strong foundation for future growth and scalability. It not only meets current operational needs but also provides a scalable platform for future enhancements, allowing Glamour to innovate and improve its service offerings.