

Report on

GadgetScape

(PC Accessories Store Management System)

Prepared for

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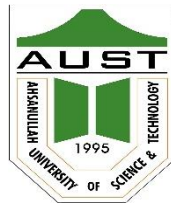
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Date: 6th September, 2022



Department of Computer Science and Engineering

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Summary of the Project:

These days, having a computer at home as well as in the business is an absolute need. Both in terms of domestic output and international trade, Bangladesh's information technology (IT) and electronic industries are among the country's most dynamic sectors. The majority of Bangladesh's computer hardware companies are also involved in the importation of machine parts and intermediate items. Things like motherboards, CPUs, memory, hard disks, ram, and so on are all examples. They sell the machine systems in the regional market (under a brand name). However, they are also confronted with some significant challenges. We intend to develop software in order to assist them with their issues.

"GadgetScape" makes it much simpler for the proprietor, managers, and other workers of a computer store to operate their business management system and provide greater customer access and support. Additionally, "GadgetScape" enhances the quality of service that can be provided to customers. This is accomplished by presenting a range of alternative options for consideration.

The purpose of this PC accessory management system is to facilitate the execution of client and product management services in the most transparent and efficient manner possible, given their inherent complexity.

In our system, Admin will be able to register their manager and workers who work for their computer store, and Admin will be able to log in to the system and monitor all activities. He/she and can also supervise employee transactions. In the managerial section, Manager has the ability to add, delete, and modify product details. Manager will mostly interact with dealers. Salesman can add new user information for their customers and update their information based on their most recent purchase. Additionally, they are able to search by user ID, mobile number, and payment ID. Finally, Admin may oversee every aspect of the computer store.

Project Goals:

Developing this project , we intended to implement the below goals :

1. Making hard tasks easier to complete by providing an intuitive user interface and functional capabilities. Even users with a limited understanding of information technology will have no trouble navigating and using this software.
2. Cost-effective since after installation, this system won't need further hardware or software.
3. In this configuration, gaining access to the internet is not a problem. This is a system that operates offline.
4. Increased efficiency and productivity.

Used Technologies for the Project:

1. NetBeans IDE.
2. Java FX.
3. Scene Builder.
4. Jfoenix-8.0.10
5. Fontawesomefx-8.9
6. Microsoft SQL Server Management Studio.

Feasibility Analysis:

In Software Engineering, a Feasibility Study is an evaluation of the practicability of a given project or system. The following feasibilities relate to this project:

1. Technical
2. Economical
3. Operational

Technical Feasibility:

Our team consist of four members. This project can be finished with the effort of four persons. We all have the required skills and hardware to complete the project. We will need NetBeans IDE for back end development, Scene builder for front end development and Microsoft SQL Server 2008 for database management. Both software's are available and we will not need to use any customized software. So it is possible to develop our project with the current technical resources.

Economic Feasibility:

We will have fourteen weeks to finish the project. This is sufficient for us to complete the project. We will not need to purchase any additional hardware because we already have it. NetBeans IDE is a free piece of software. Microsoft SQL Server 2008 Express is also available for free. As a result, we won't need to purchase any additional software. As a result, the project will be profitable in the long run.

Operational Feasibility:

To build the project, we will use Java as the programming language. Scene Builder is used to designing the user interface. The entire software is based on the Windows operating system. This program is only compatible with the Windows operating system. However, because the majority of PCs run the Windows operating system, this project will work on

the majority of PCs. The system will be mostly operated by our project manager and salesman. Admin can keep track of all activities, such as administrative tasks.

Requirement Analysis:

Requirements analysis, often known as requirements engineering, is the process of identifying user expectations for a new or altered product. These qualities, termed needs, must be quantitative, relevant, and comprehensive. Typically, such requirements are referred to as functional specifications in software engineering.

Analysis of requirements comprises the tasks involved. Determining the criteria or conditions to be met for a new or modified product or project, taking into account the potentially conflicting needs of the various stakeholders; assessing, documenting, validating, and managing software or systems.

Requirements analysis is one of the most important parts of a software or systems project. The requirements should be written down, actionable, measurable, testable, traceable, related to identified customer needs or opportunities, and detailed enough for system design. Generally, for this analysis the, tasks need to perform include

- Communicating with customers and end-users in order to determine their needs. Occasionally, this is also known as requirements collecting.
- Evaluating whether the stated requirements are unclear, insufficient, ambiguous, or inconsistent, and then correcting these shortcomings.
- Documentation of requirements may take different forms, including natural-language documents, use cases, user stories, and process specifications.
- Team members reflect on what happened throughout the iteration and identify actions for future improvement.

Requirements analysis is teamwork that requires competence in hardware, software, and human factors engineering as well as people skills in order to identify customer needs and evaluate system feasibility. For this purpose, we have gathered information and data from various sources to obtain a complete and accurate picture of a certain project. This methodical process includes surveys and interviews with existing system users and managerial personnel. We used questionnaires and interview patterns and asked two basic types of questions.

- Project related
- Feedback and suggestions

After gathering information, data and suggestions we can see that the requirements for our project are:

- Computer accessory proprietors desire efficient, quick, and user-friendly access to the entire administration system.
- They desire robust capabilities for securing data and monitoring the business portfolio, as well as secure inventories and accounting.
- A system that is useful for mid-tier and lower-tier PC accessory retailers.
- They desire affordable software to use and maintain.

Data Flow Diagram (DFD):

A Data Flow Diagram (DFD) is a convenient visual representation of how data moves within a system. A tidy and straightforward DFD can graphically display the necessary system requirements. It may be manual, automatic, or a hybrid of the two. It demonstrates how data enters and exits the system, how information is modified, and where it is stored. The purpose of a DFD is to represent the scope and bounds of a system as a whole. It can be used as a communication tool between a system analyst and any individual involved in the order that serves as the beginning point for the redesign of a system.

DFDs are used to:

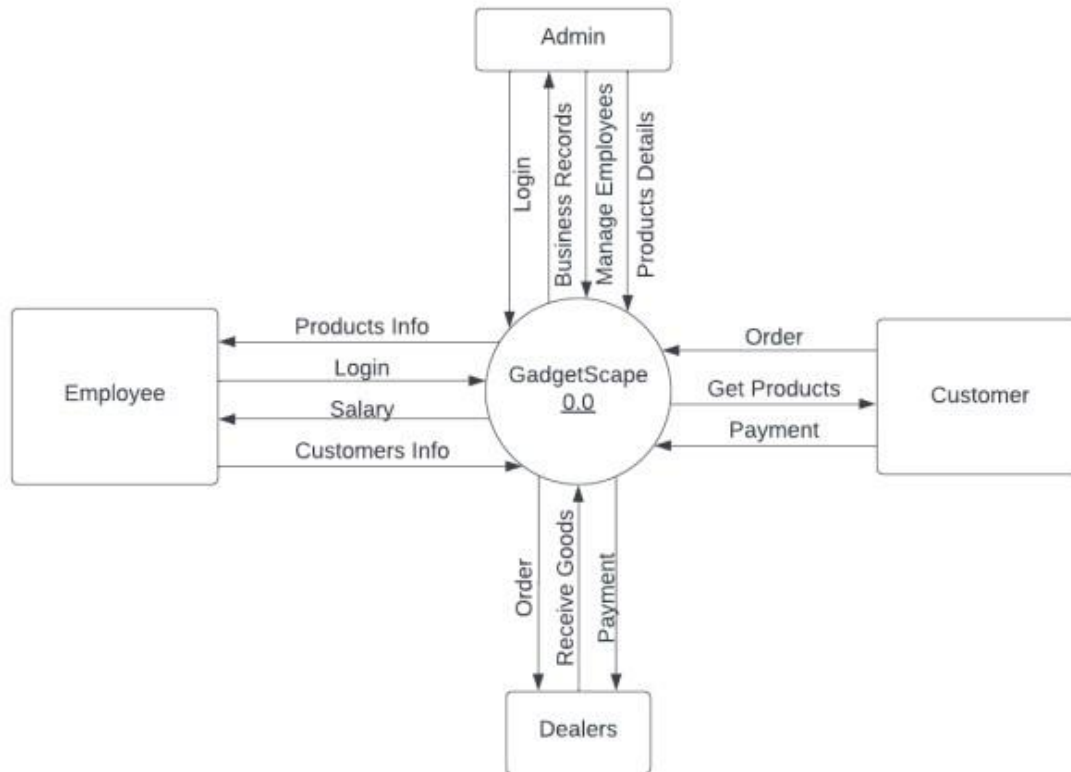
- Discuss with the user a diagrammatic interpretation of the system's process and clarify what is currently being performed and clarify what is being performed.
- Determine what the new system should be able to do and what information is necessary for each process.
- Verify that the finalized system adheres to its original design.
- facilitates communication and presentation between technical and non-technical personnel.

There are three level of DFD

- Context level Diagram
- Level 0 Diagram
- Level 1 Diagram

The construction of Context Level DFD:

The Context Level Diagram shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities. Context Level Diagram is a specialized version of the Data-Flow Diagram. Each DFD may depict a number of processes, each with data flowing into and out of it. If more detail is required within a specific process, the process is decomposed into a number of smaller processes in a lower-level DFD. In this manner, the Content Diagram or Context-Level DFD is labeled a "Level-0 DFD," while the next level of decomposition is labeled a "Level-1 DFD," and so on.



The construction of Level 0 DFD:

A level 0 DFD describes each of the primary sub-processes that constitute the entire system.

Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments

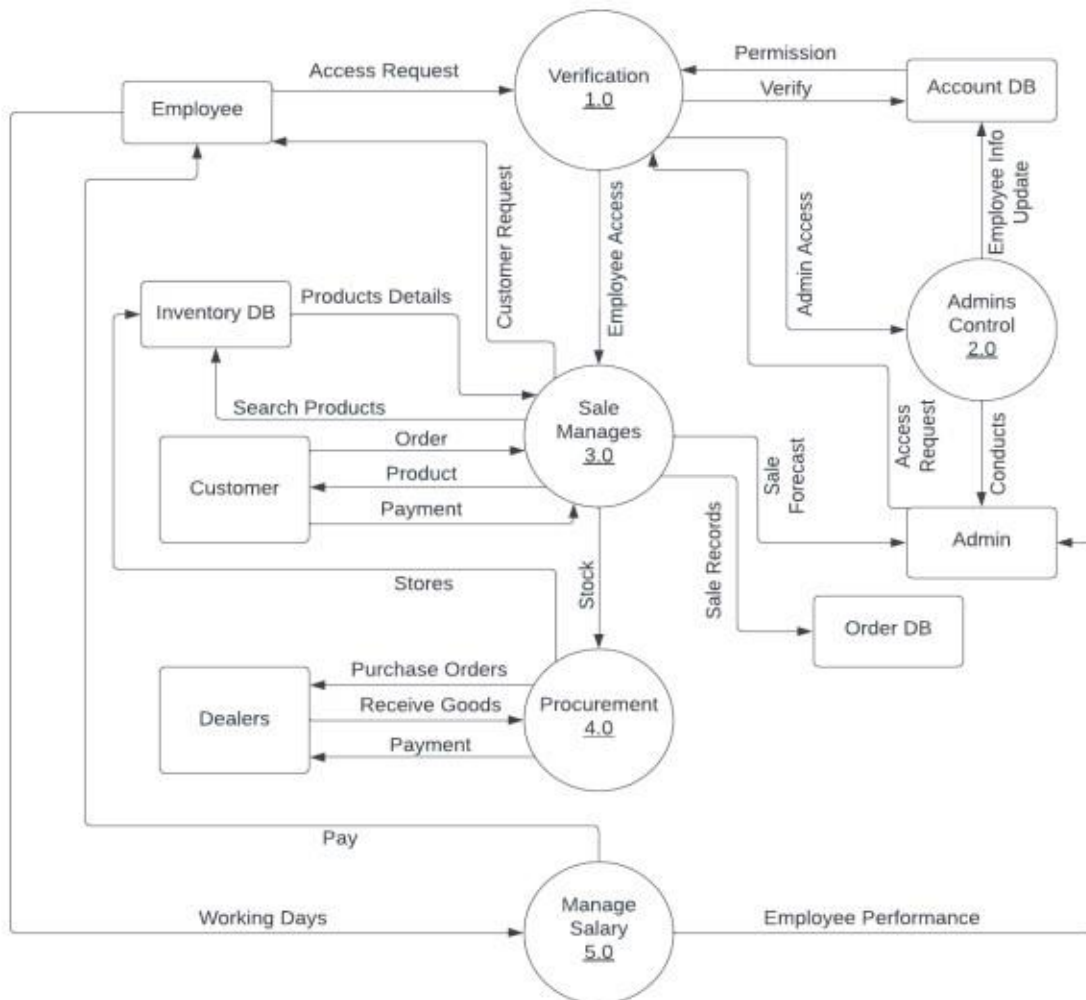
Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments



The construction of Level 1-n DFD: Level 1-n DFD goes deeper into the level 0 diagram.

Verification:

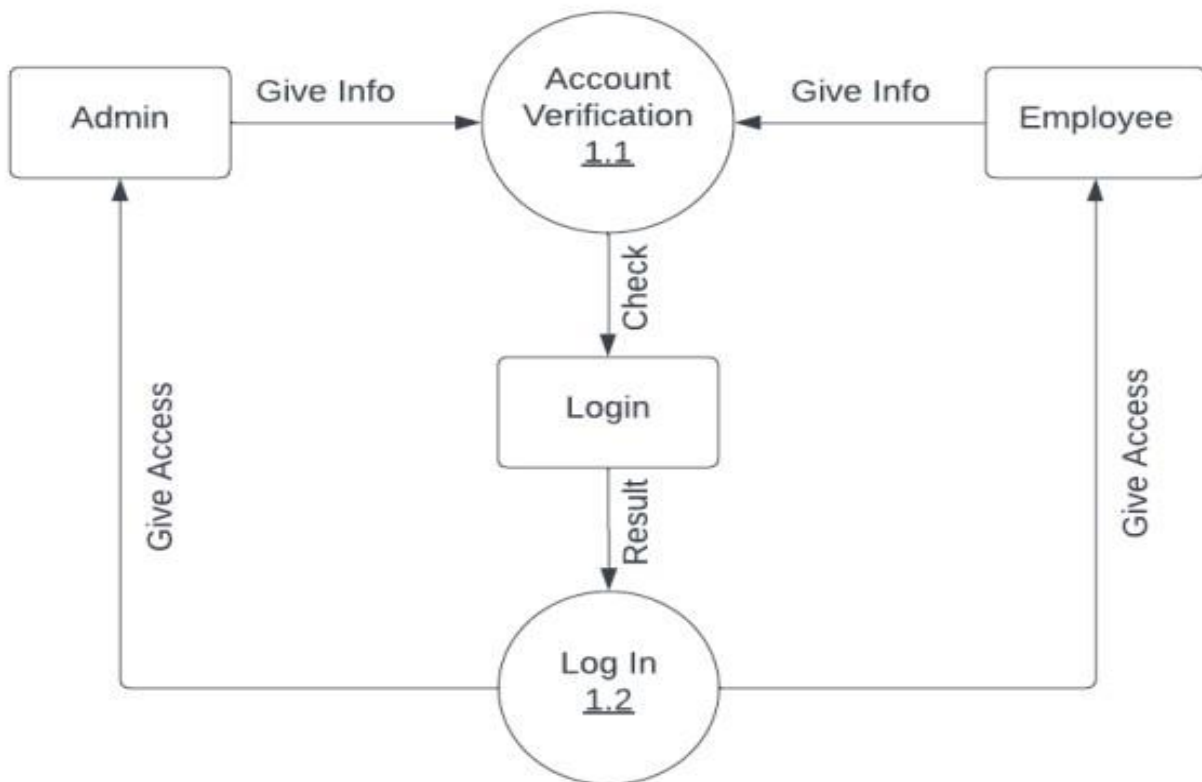
Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments



Admin Controls:

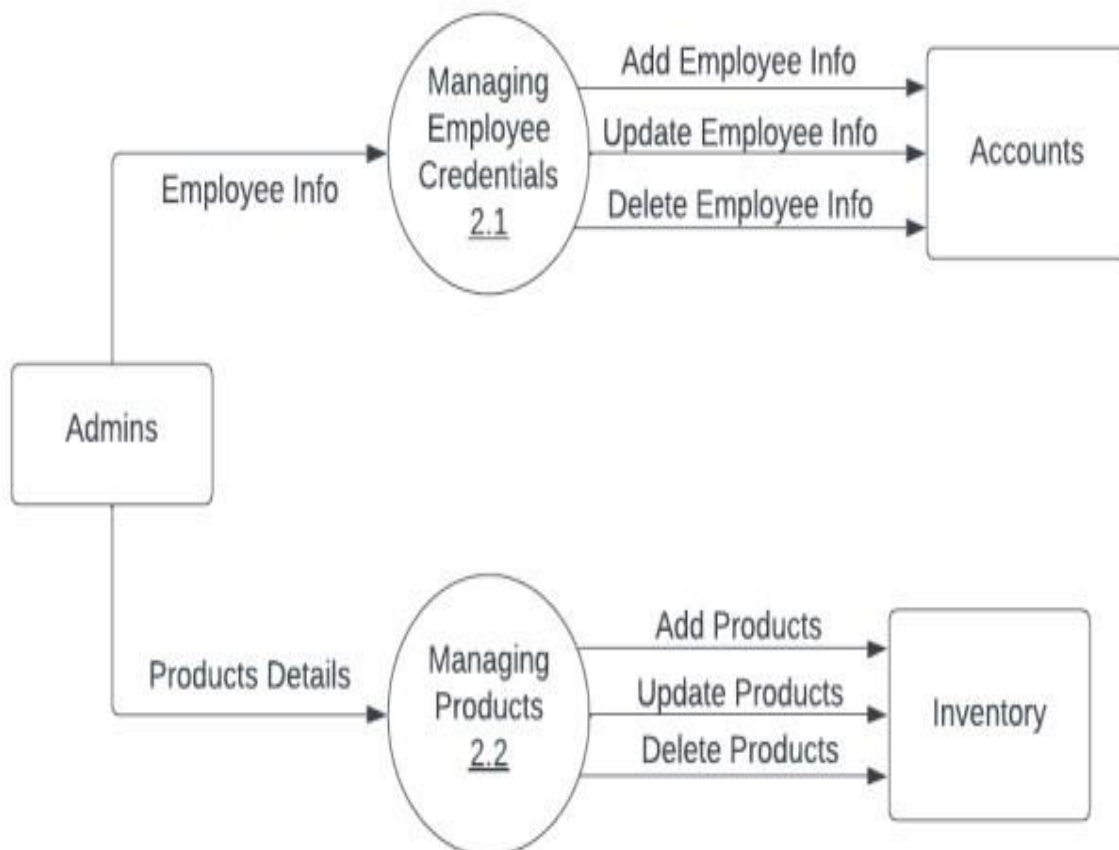
Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments



Sales Manage:

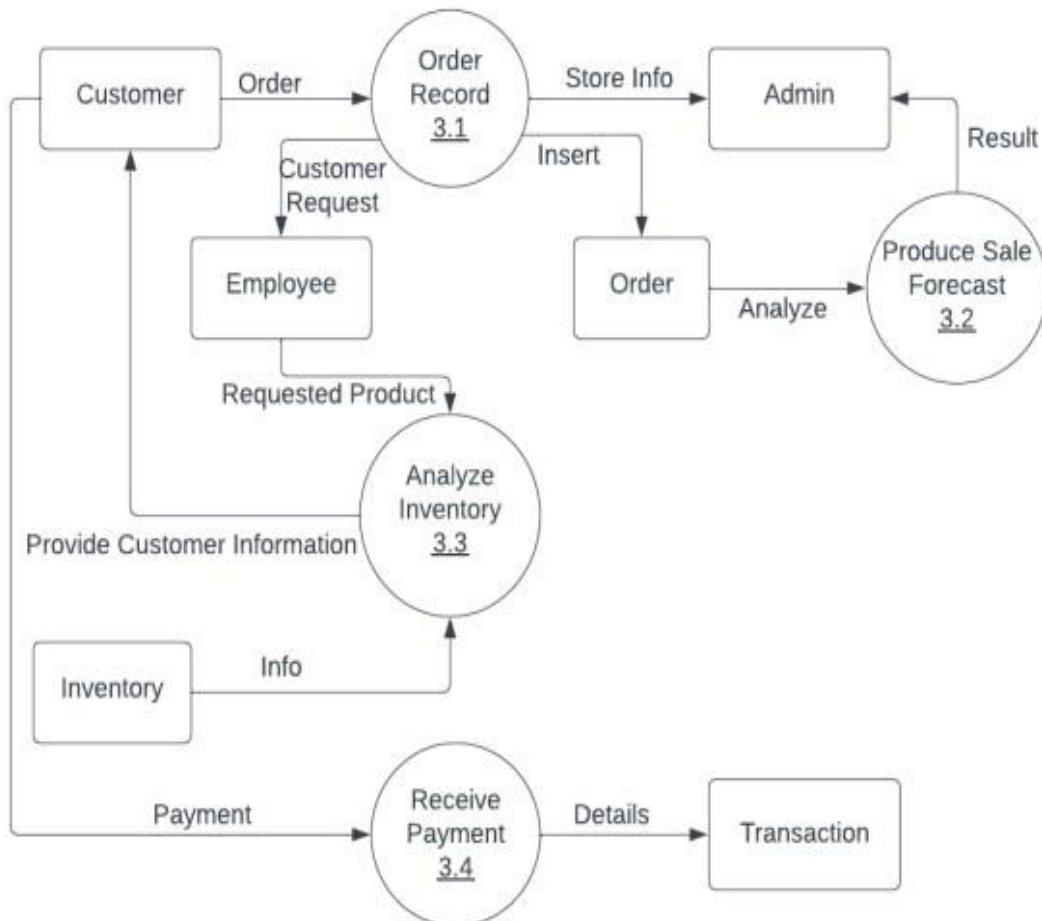
Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments



Procurement:

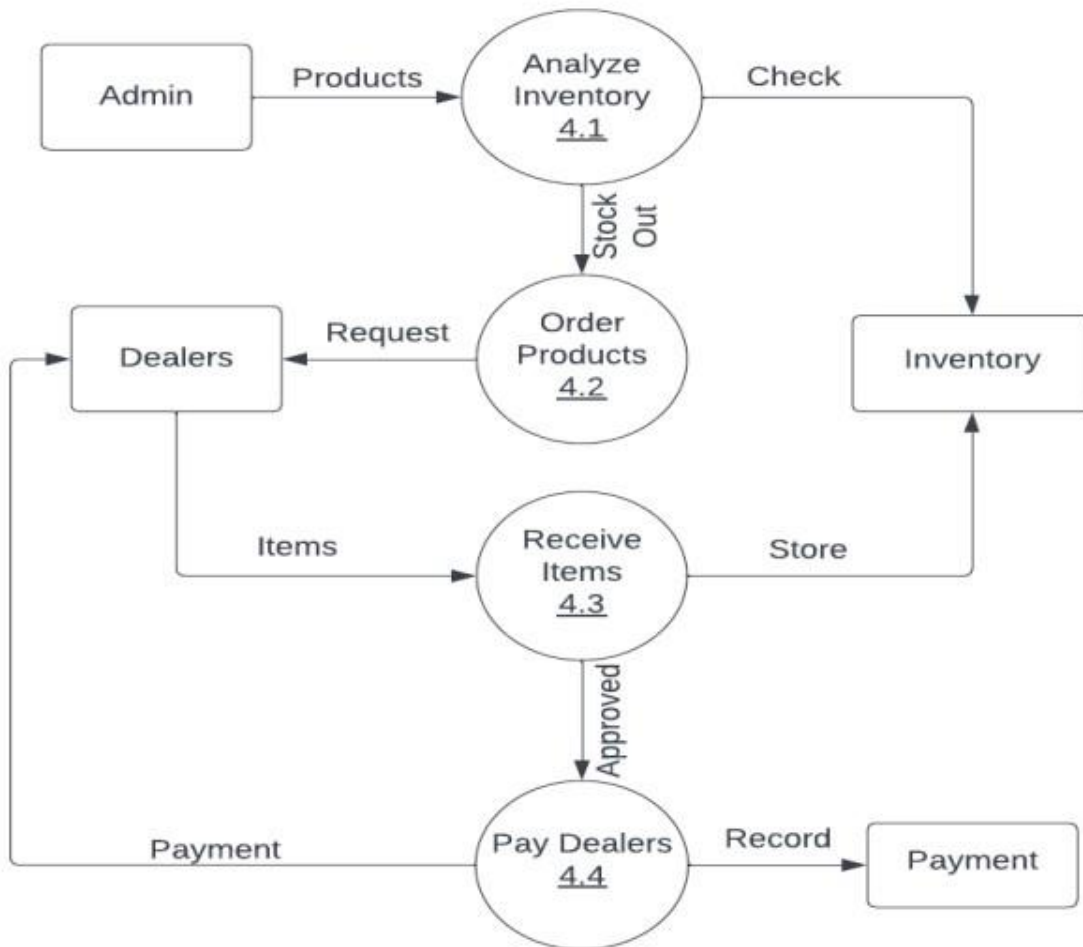
Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments



Manage Salary:

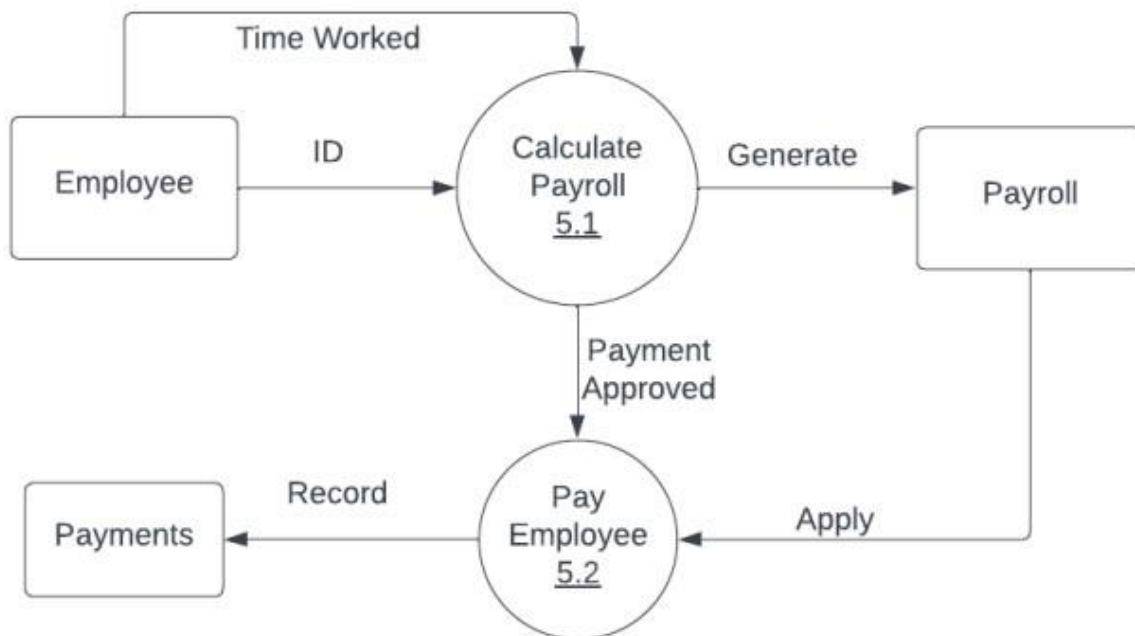
Login Request
Verify User

Check Inventory
Purchase Products
Make Payments

Admin Access
Employee Information Update
Products Information Update

Pay Employee

Customer Order
Check Product Details
Sell Products
Collect Payments



Use Case Diagram:

Use case Diagram is a way of representing a system. It provides a graphical representation of the possible user interactions. Use case diagram has actors and many use cases.

Actors:

An entity that interacts with the system is the actor. The best example of an actor is a user. An actor in use case modeling specifies a role played by a user or any other system that interacts with the subject. The actor has a responsibility toward the system (inputs), and Actor has expectations from the system (outputs). An actor must be associated with at least one use case.

There are two kinds of actors

- Primary actor
- Secondary actor

Our project actors are

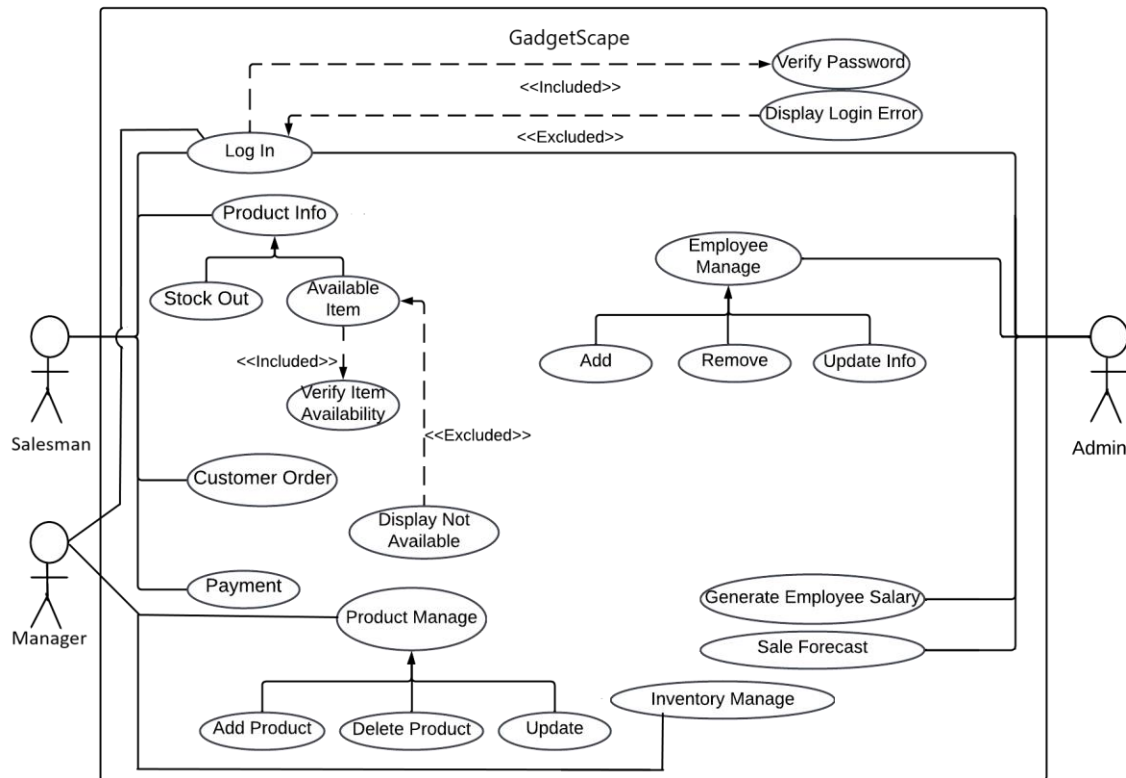
1. Employee
2. Admin

Use cases:

A use case diagram is a graphical representation of the possible interactions between a user and a system. Use case diagrams are utilized to collect the internal and external needs of a system. These requirements are primarily designed demands. Consequently, when a system is studied to determine its functionality, use cases and actors are developed. A use case diagram displays the system's various use cases and user classifications and is typically supplemented by other diagrams. Circles or ellipses are used to indicate use scenarios. Stick figures are frequently used to illustrate the actors. The use cases in our project are

- Login
- Product info
- Customer Order
- Payment
- Employee Manage
- Product Manage
- Generate Employee Salary
- Sale Forecast
- Inventory Manage

Use Case Diagram:



Detailed descriptions of different scenarios:

Use Case: Log in

Primary Actor: Salesman, Manager

Secondary Actor: Admin

Scenario: Salesman, Manager and Admin have to log in to use the system.

Pre-Condition: Employees and admins must have an account to access the system.

Exception: If logging in is not successful, the system will display an error message.

Use Case: Product info

Primary Actor: Salesman

Scenario: Salesman can access the information of any products.

Pre-Condition: Log in

Exception: If the product is not available in inventory then the system will display a message which will indicate that the item is not available.

Use Case: Customer Order

Primary Actor: Salesman

Scenario: Salesman will take the customer's order with all the information about the customer and the products that the customer is buying.

Pre-Condition: Log in

Exception: Not applicable

Use Case: Payment

Primary Actor: Salesman

Scenario: Salesman will see every customer order here and make the payment and change the payment status and delivery status.

Pre-Condition: Log in and customer order

Exception: Not applicable

Use Case: Employee Manage

Secondary Actor: Admin

Scenario: Admin can add or remove employees. He can also update the information of current employees.

Pre-Condition: Log in

Exception: Not applicable

Use Case: Product Manage

Primary Actor: Manager

Scenario: Manager can add new products or remove any old products from the inventory. He can also update the information on products like price, brand name, and other properties.

Pre-Condition: Log in

Exception: Not applicable

Use Case: Generate Employee Salary

Secondary Actor: Admin

Scenario: Admin can see the employee's working status and based on that he can calculate the salary for the employee. He can see the payment status.

Pre-Condition: Log in

Exception: Not applicable

Use Case: Sale Forecast

Secondary Actor: Admin

Scenario: Admin can get the idea of which product is selling well and which is not.

Pre-Condition: Log in

Exception: Not applicable

Use Case: Inventory Manage

Primary Actor: Manager

Scenario: Manager can manage the status of inventory.

Pre-Condition: Log in

Exception: Not applicable

ERD (Entity Relationship Diagram):

Entity Relationship (ER) Diagrams are flowcharts that depict the relationships between "entities" such as people, things, and concepts within a system.

In terms of logic and business rules (in a logical data model) and the specific technology to be applied, ER diagrams are used to model and create relational databases (in a physical data model.) An ER diagram is frequently the first stage in software engineering when identifying the requirements for an information systems project. Additionally, it is utilized to model a specific database or databases. A relational database has an analogous relational table, which can be expressed in that format if necessary. In addition, an Entity Relationship Diagram (ERD) depicts data structures. It displays the entities (tables) and relationships between tables in a database.

In our project "GadgetScape" we have made a detailed ERD(Entity Relationship Diagram) according to our system requirements. There are eight entities and the relationships between them are shown in the ERD. Each entity has some attributes. Among all attributes some of them are multivalued. The entity sets and attributes with their datatype details are shown below. The multivalued attributes and the participation of the attributes are also shown in detail.

Entity Sets:

An entity is any singular, identifiable, and separate object. It refers to individuals, organizations, and systems bits of data or even distinct system components that are considered significant in and of themselves. Entity Set is a collection or group of entities that share the exact same set of attributes. All entities can be distinctly identified in an entity set. This is because each entity has a unique set of values for a specific set of attributes. As a result, the database is a collection of entity sets and their relationship sets.

1. Customer.
2. Products.
3. Dealers.
4. Admin.
5. Employee.
6. Salesman.
7. Manager.
8. Salary.

Attributes Specified With Data Type:

Attributes mean a property that describes an entity. Each attribute of the entity has a unique data type that reflects the characteristics of that field. In the database, each entity contains some attributes that hold the data's details.

Entity 1: Customer

Attributes	Datatype
Cus_ID (Primary Key)	int
Cus_Name	varchar
Phone (Unique Key)	varchar
Points	int

Entity 2: Products

Attributes	Datatype
Product_ID (Primary Key)	int
Product_Name	varchar
Price	float
Quantity	int
Product_Status	varchar
Image	varchar
Details	varchar
Category	varchar

Entity 3: Dealers

Attributes	Datatype
Dealer_ID (Primary Key)	int
Company_Name	varchar
Mobile (Unique Key)	varchar
Address	varchar
Email	varchar

Entity 4: Admin

Attributes	Datatype
Admin_ID (Primary Key)	int
AdminName	varchar
Email	varchar
Phone (Unique Key)	varchar
Password	varchar

Entity 5: Employee

Attributes	Datatype
Emp_ID (Primary Key)	int
EmpName	varchar
Email	varchar
Phone	varchar
Password	varchar
NID (Unique Key)	varchar
Address	varchar
Roles	varchar

Entity 6: Salesman

Attributes	Datatype
SM_ID (Primary Key)	int
Rate	float
WorkingHours	float
Emp_ID (Foreign Key)	int

Entity 7: Manager

Attributes	Datatype
Manager_ID (Primary Key)	int
Rate	float
Period	float
Emp_ID (Foreign Key)	int

Entity 8: Salary

Attributes	Datatype
Salary_ID (Primary Key)	int
Salary_Status	varchar
Date	date
Amount	int
Emp_ID (Foreign Key)	int

Detailed ER Diagram:

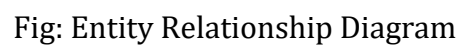
Multivalued Attributes: An entity's multivalued attributes are those that have more than one value connected to the entity's key.

1. Products: Product_ID, Quantity.
2. Employee: Phone.
3. Admin: Phone.

Total Participation: Total Participation denotes that all parties to the relationship are actively involved.

1. Products.
2. Employee.
3. Salary.

1. Customer.
2. Dealers.
3. Admin.



Opportunity of Development:

We have a plan to add more product category and dealers in our management system. We also want to generate a pay slip so that we can provide it to the customers. We also have a plan to make this system available for online.

Contribution:

The Contribution of each group member over the academic semester is given below:

Md Saber Ahmed (190104104)	25%
Rifat Bin Karim (190104105)	25%
Fahmida Nowshin Nikita (190104107)	20%
Hadayet Ullah Razu (190104121)	30%

Software Testing:

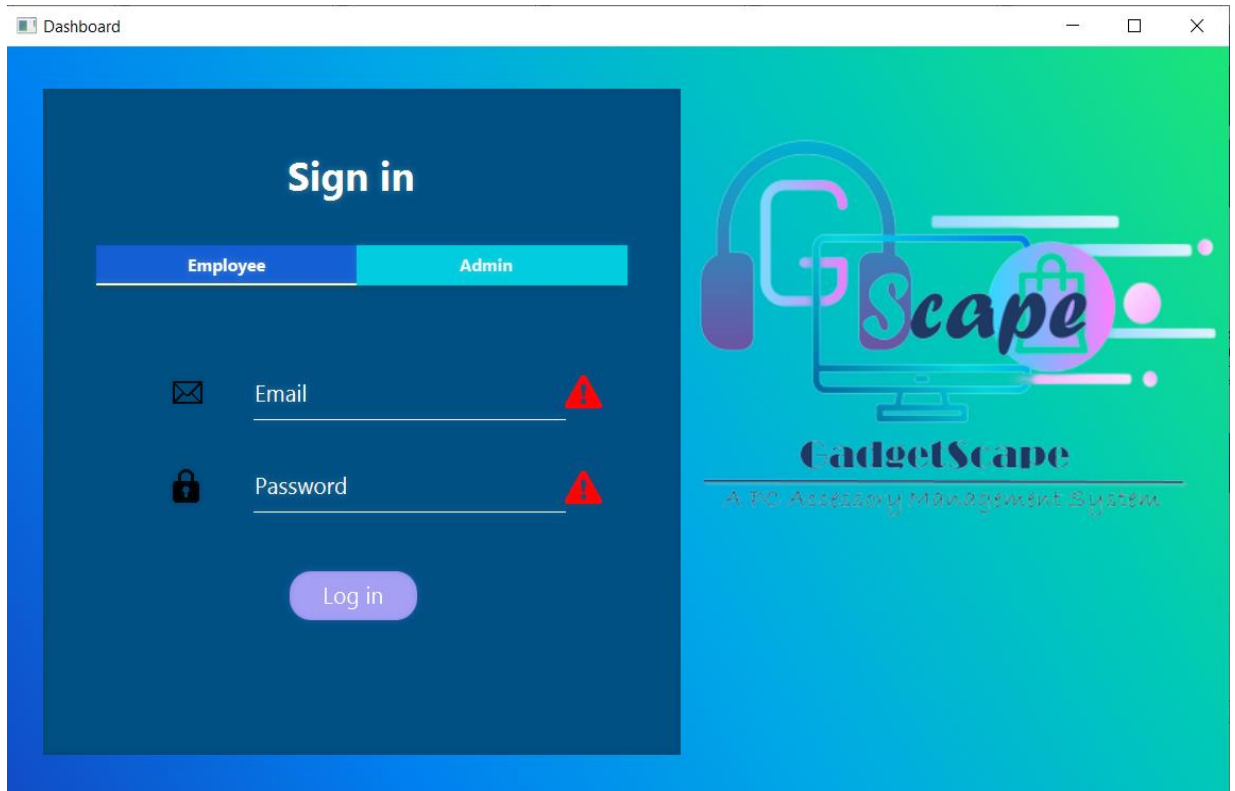
Software testing is the process of executing a software system to see if it conforms to its requirements and runs in its intended environment.

Gorilla Testing:

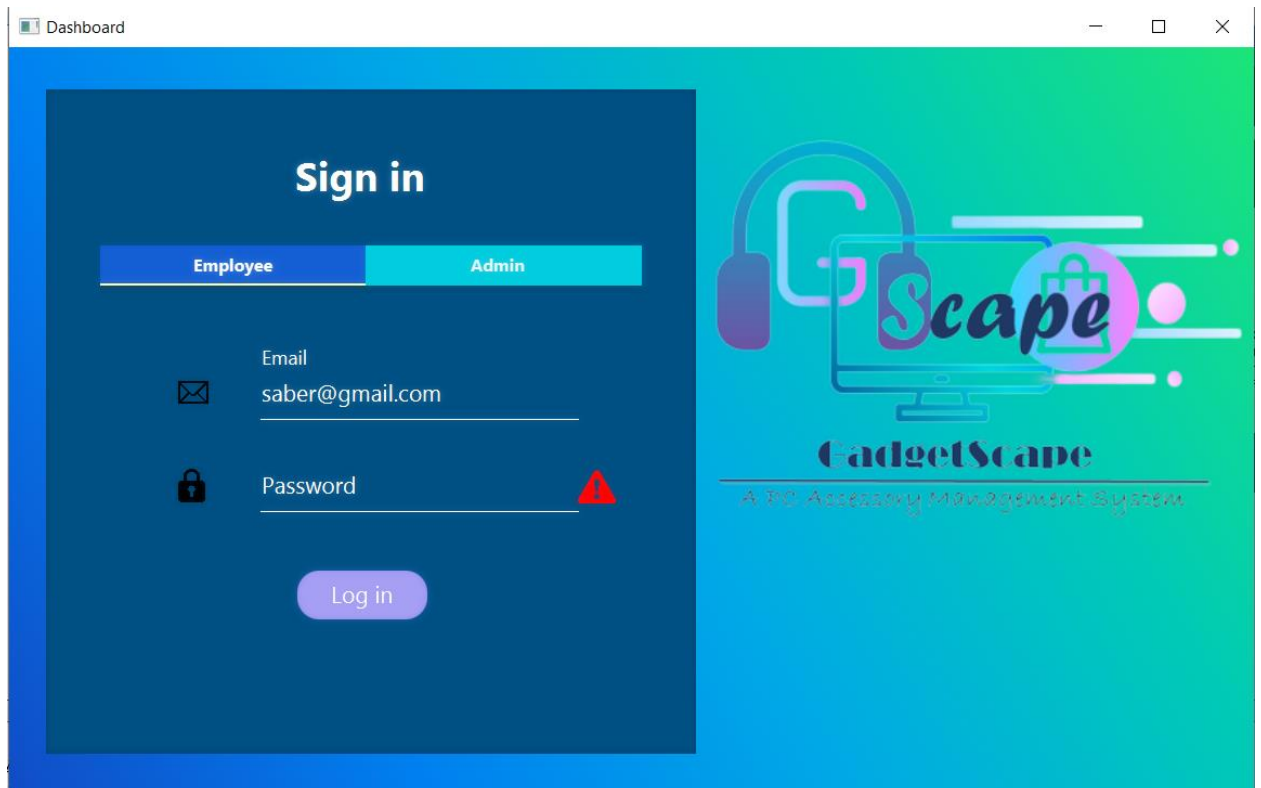
Gorilla Testing is a type of testing that is occasionally performed by both a tester and a developer. In Gorilla Testing, a module or its feature is rigorously and extensively tested. The purpose of this testing is to evaluate the application's robustness.

LogIn Page:

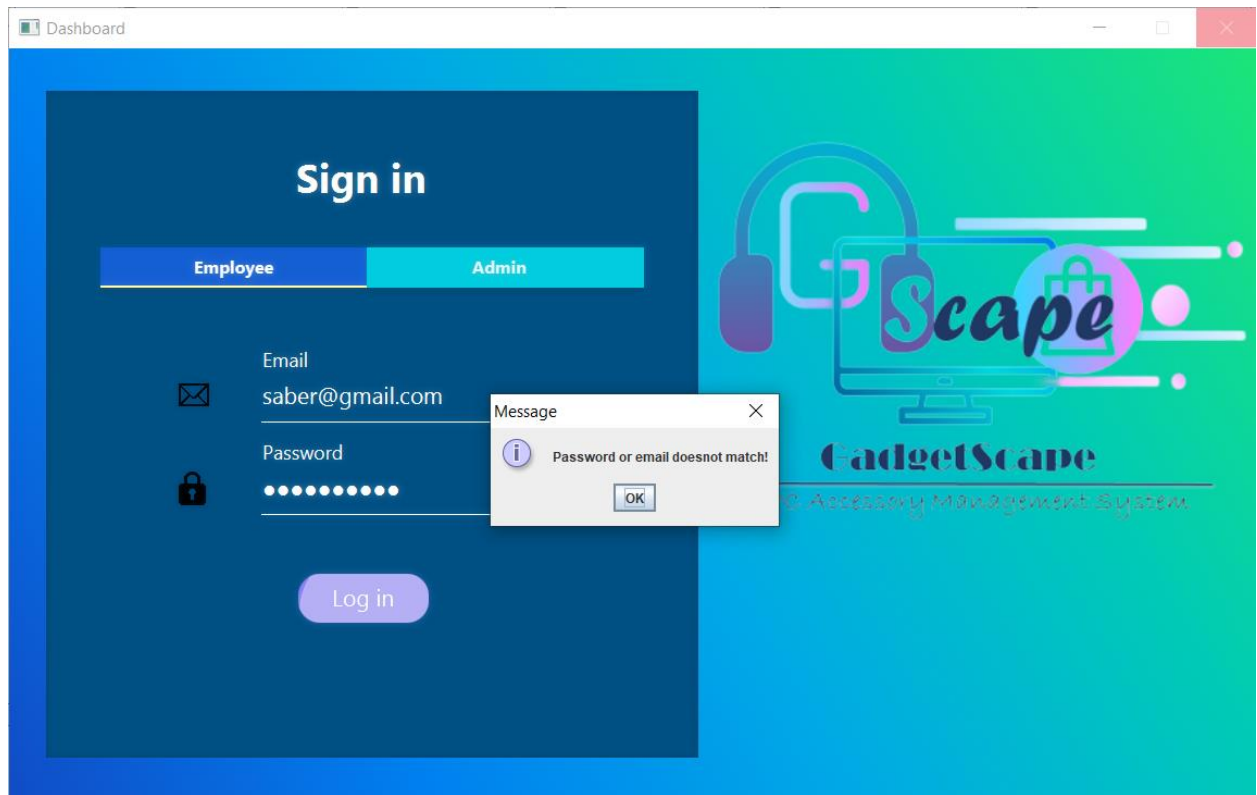
1. When the login button is pressed without entering any values, there will be a warning sign at those fields where there are no values.



2. When one field have values and other one is empty, the warning sign will appear only on the empty field.



3. If the password and the email doesn't match, then there will be an error pop up message.



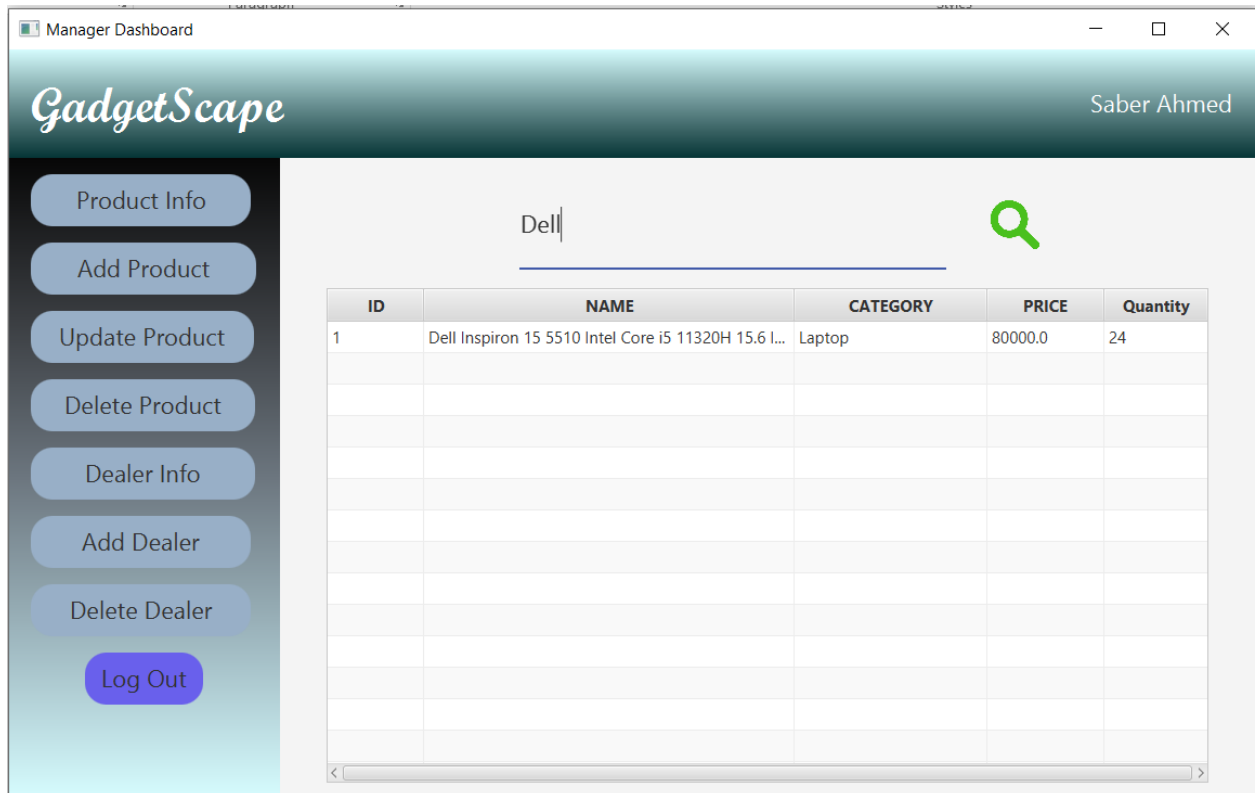
Manager dashboard:

1. At first there will be all the product information in the opening page.

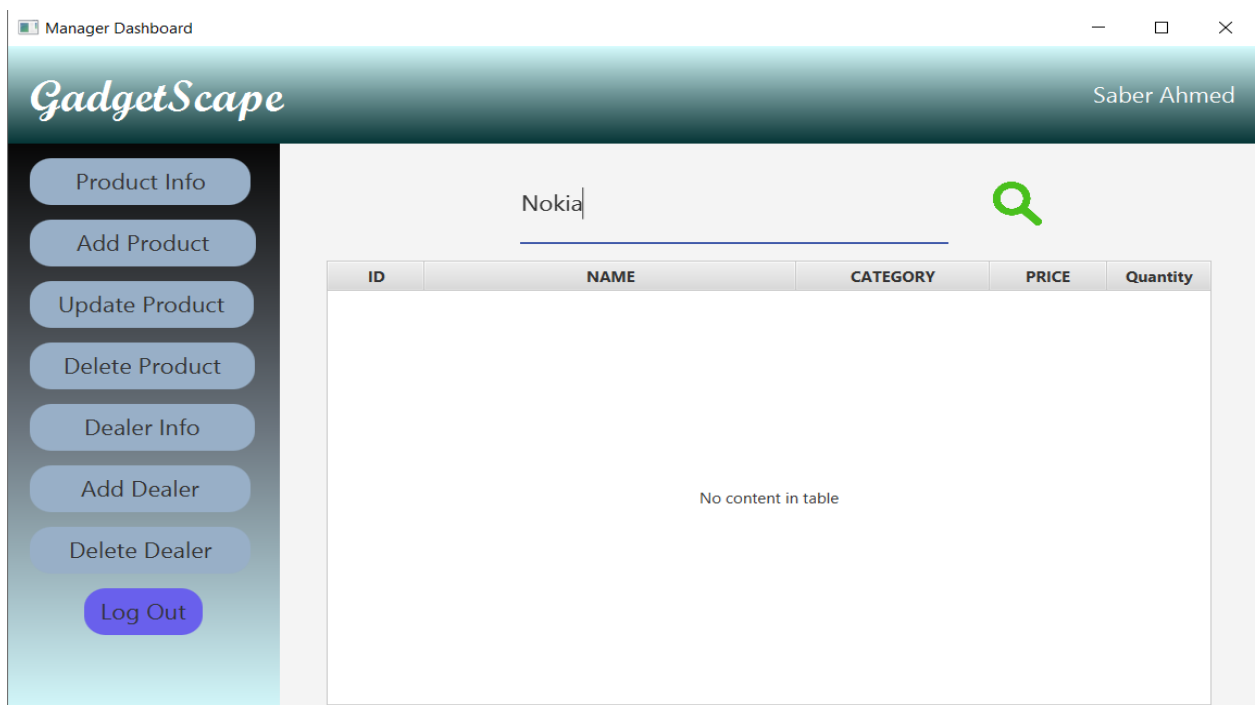
The screenshot shows the 'Manager Dashboard' of the GadgetScape system. The dashboard has a dark blue header with the 'GadgetScape' logo and the user name 'Saber Ahmed'. On the left side, there is a sidebar with buttons for 'Product Info', 'Add Product', 'Update Product', 'Delete Product', 'Dealer Info', 'Add Dealer', 'Delete Dealer', and 'Log Out'. The main area displays a table of product information with columns: ID, NAME, CATEGORY, PRICE, and Quantity. A search icon is visible above the table.

ID	NAME	CATEGORY	PRICE	Quantity
1	Dell Inspiron 15 5510 Intel Core i5 11320H 15.6 I...	Laptop	80000.0	24
2	Razer Book 13 Core i7 11th Gen 512GB SSD 13.4...	Laptop	19000.0	20
3	Razer Blade 15 Advanced Model Core i7 11th Ge...	Laptop	299000.0	20
4	Viewsonic VA1903H 18.5" LED Monitor (HDMI, V...	Monitor	10005.0	21
5	PHILIPS 18.5" 193V5LSB2 LED MONITOR	Monitor	10000.0	25
6	PHILIPS 18.5" 193V5LSB2 LED MONITOR	Monitor	10000.0	20
7	LG 19M38A 18.5 Inch Monitor	Monitor	10000.0	20
8	Acer EB192Q 18.5 Inch HD Monitor	Monitor	10000.0	20
9	LG 22MP400-B 22-inch Full HD Monitor	Monitor	13700.0	20
10	MSI Optix G241V E2 24" FHD FreeSync IPS Espor...	Monitor	18500.0	20
11	ASUS VZ24EHE IPS FHD 23.8 inch Ultra Slim Mo...	Monitor	22500.0	20
12	AOC G2490VX 23.8" FHD 144Hz Gaming Monitor	Monitor	21800.0	20
13	AOC G2590PX 24.5" Full HD 144HZ Freesync Ga...	Monitor	26000.0	20
14	Logitech MK200 Wired Mouse & Keyboard Com...	Keyboard	1299.0	20

2. If a product is searched in the search bar by a keyword, only information about that product is shown.



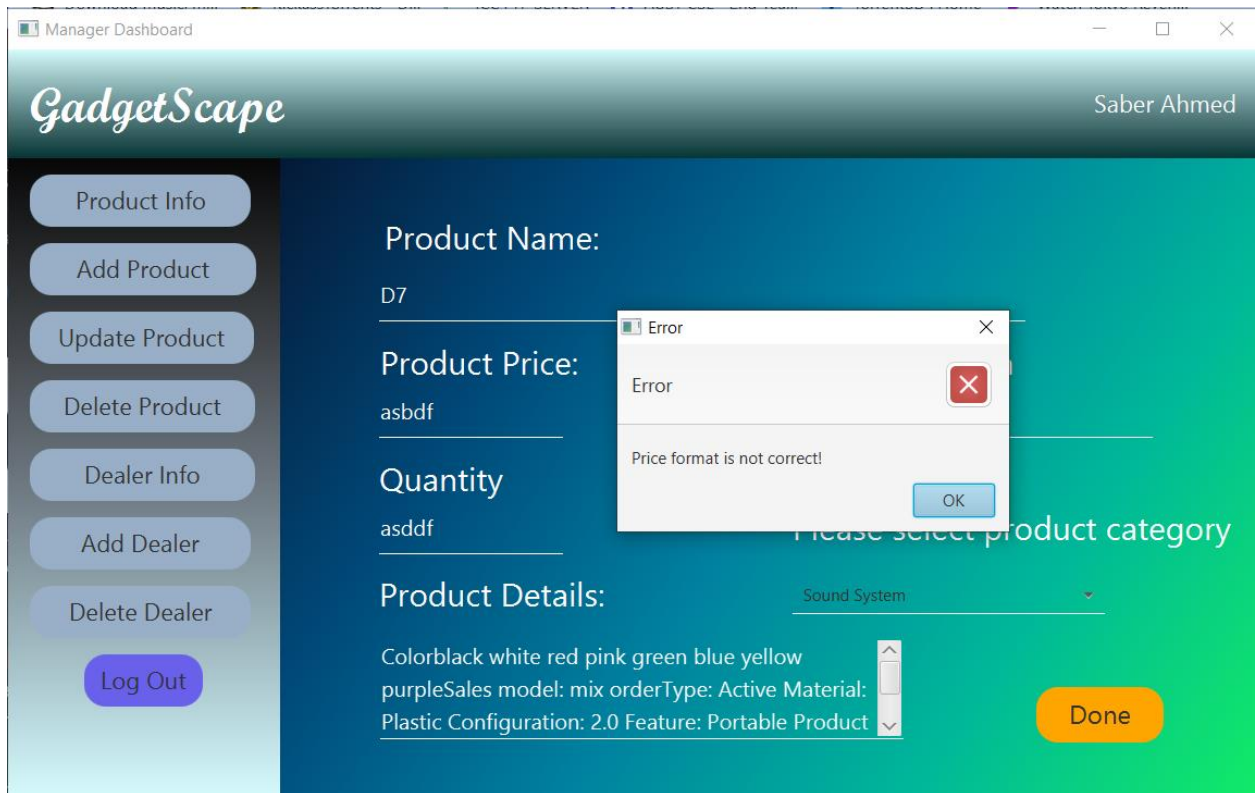
3. If the keyword does not match, there will be no data in the table.



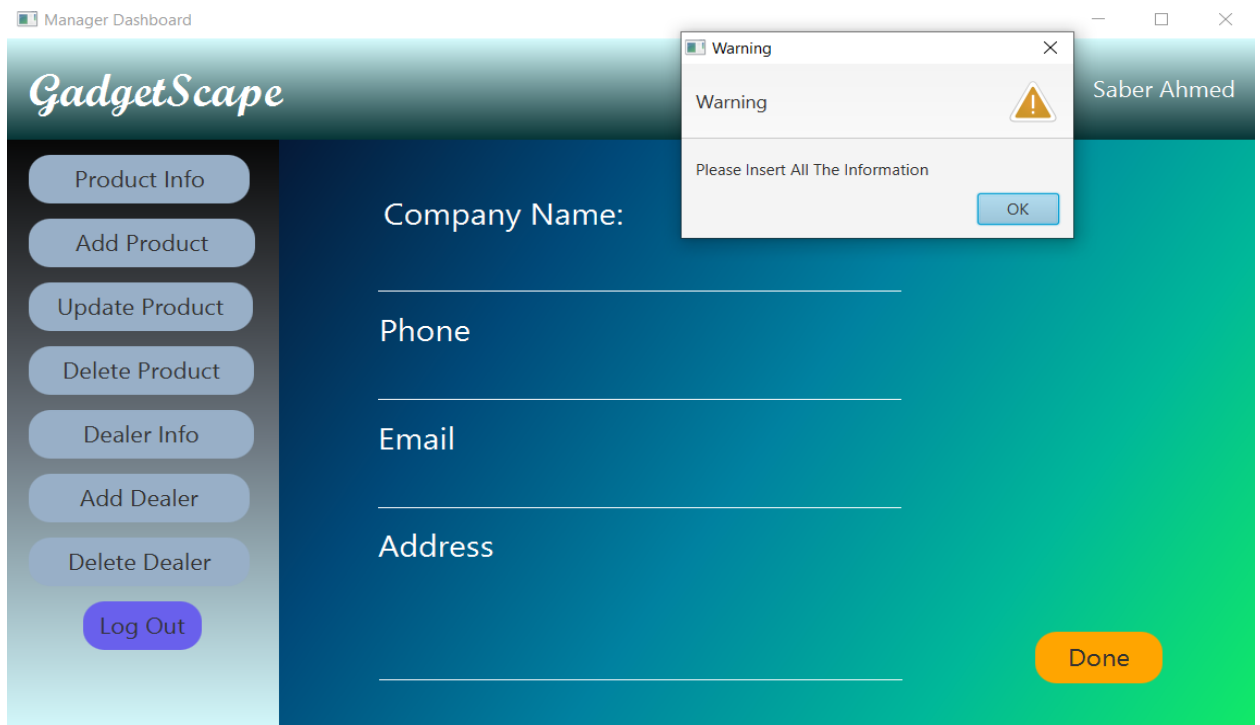
Add Product page:

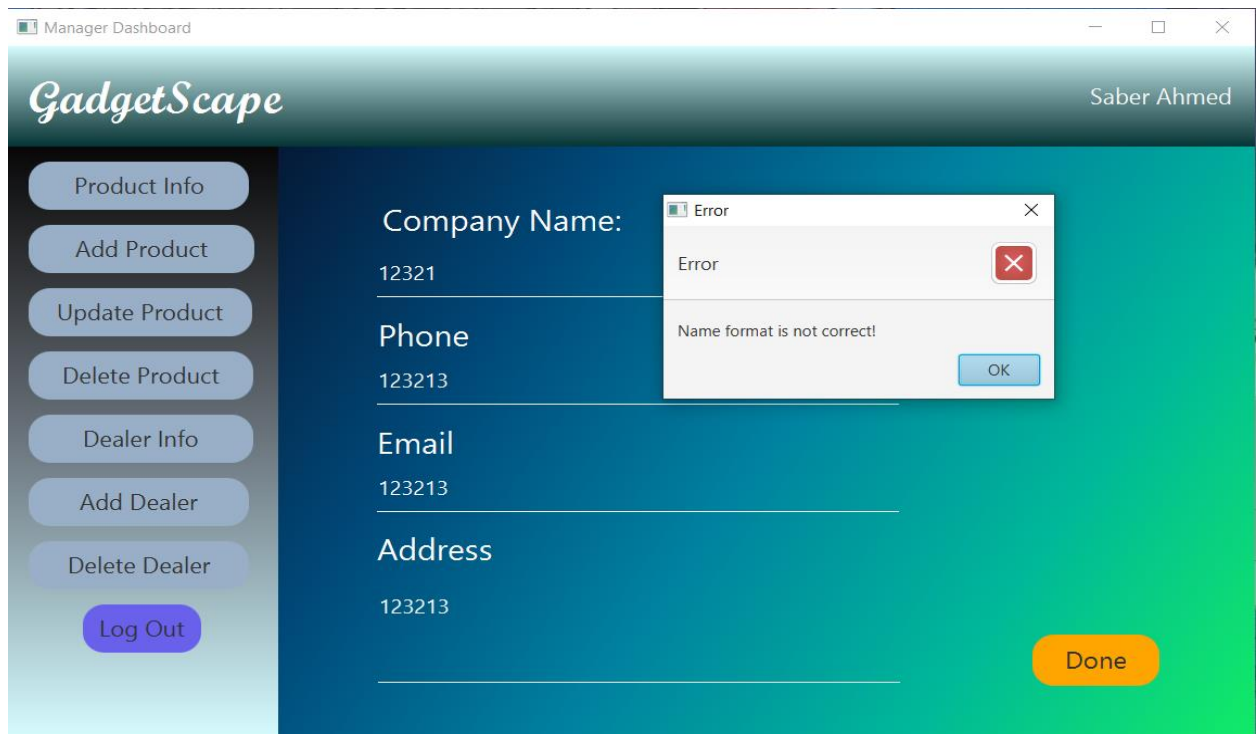
1. Add product page will be shown error when we insert nothing. Only valid information will be accepted.

The screenshot displays the 'GadgetScape' Manager Dashboard. The top header includes the logo 'GadgetScape' on the left and the user name 'Saber Ahmed' on the right. A sidebar on the left contains several buttons: 'Product Info', 'Add Product', 'Update Product', 'Delete Product', 'Dealer Info', 'Add Dealer', 'Delete Dealer', and 'Log Out'. The main content area is titled 'Add Product' and contains the following fields: 'Product Name:', 'Product Price:', 'Image Location', 'Quantity', 'Product Details:', and 'Please select product category'. A 'Done' button is located at the bottom right of the form. A warning dialog box is open in the center, titled 'Warning', with a yellow warning icon and the message 'Please Insert All The Information'. The dialog box has an 'OK' button.



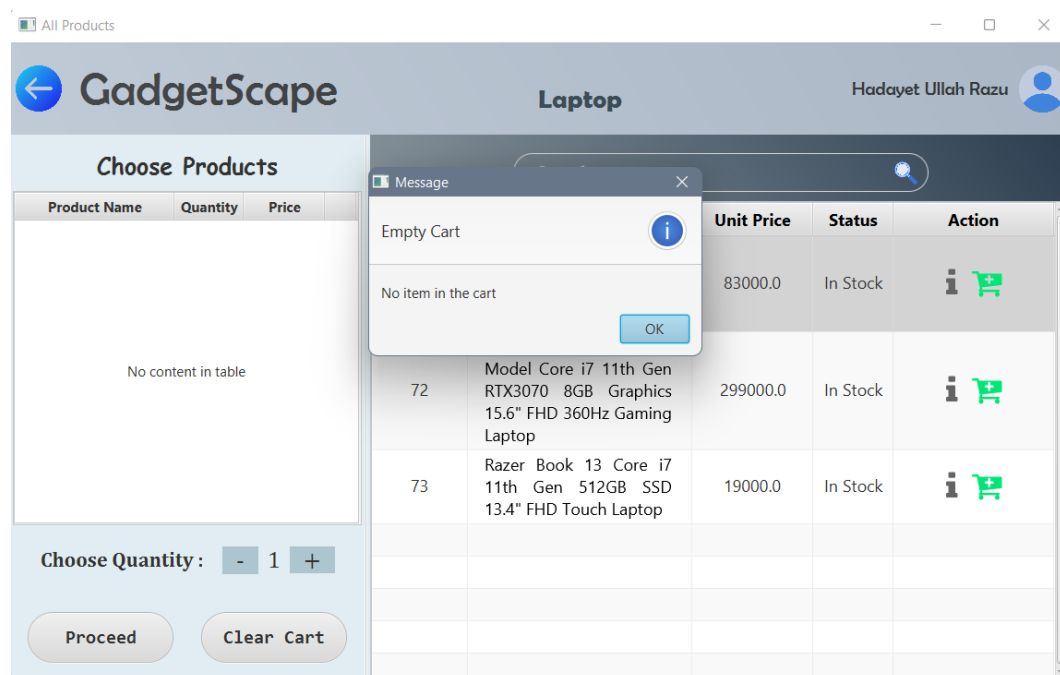
2. Add dealer page will be shown error when we insert nothing. Only valid information will be accepted.



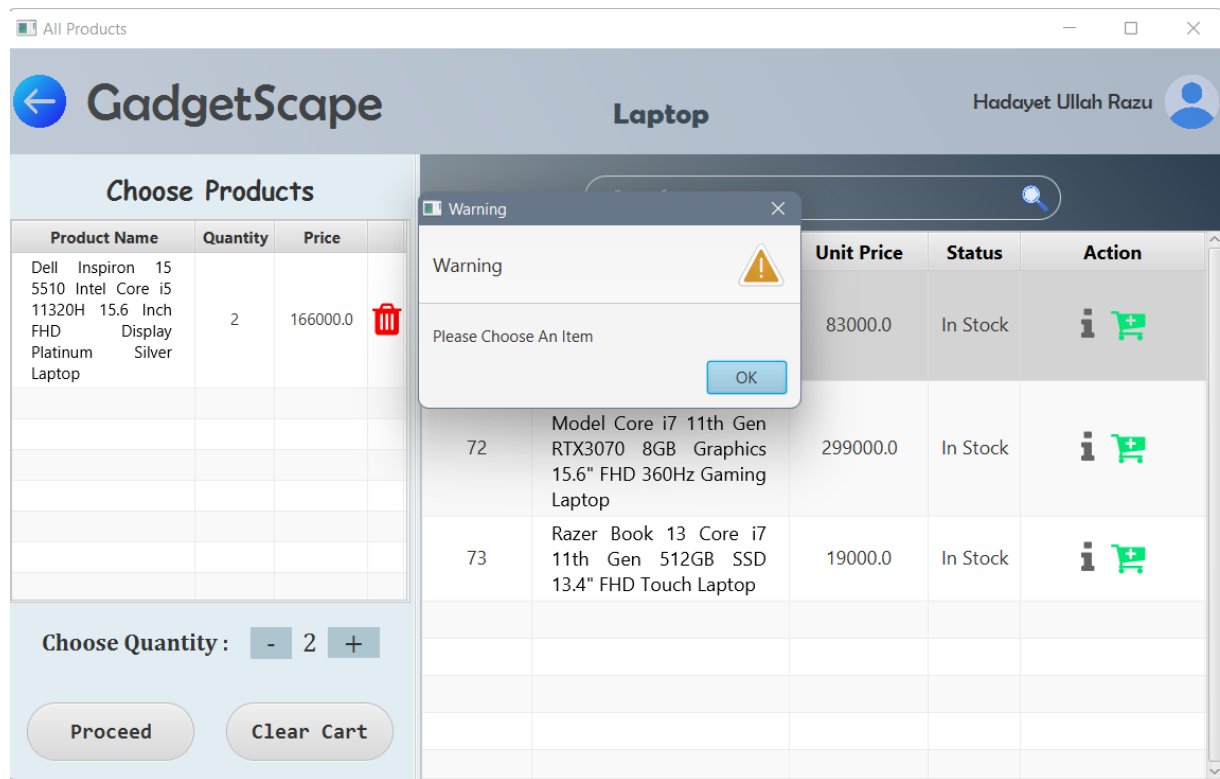


Salesman Dashboard:

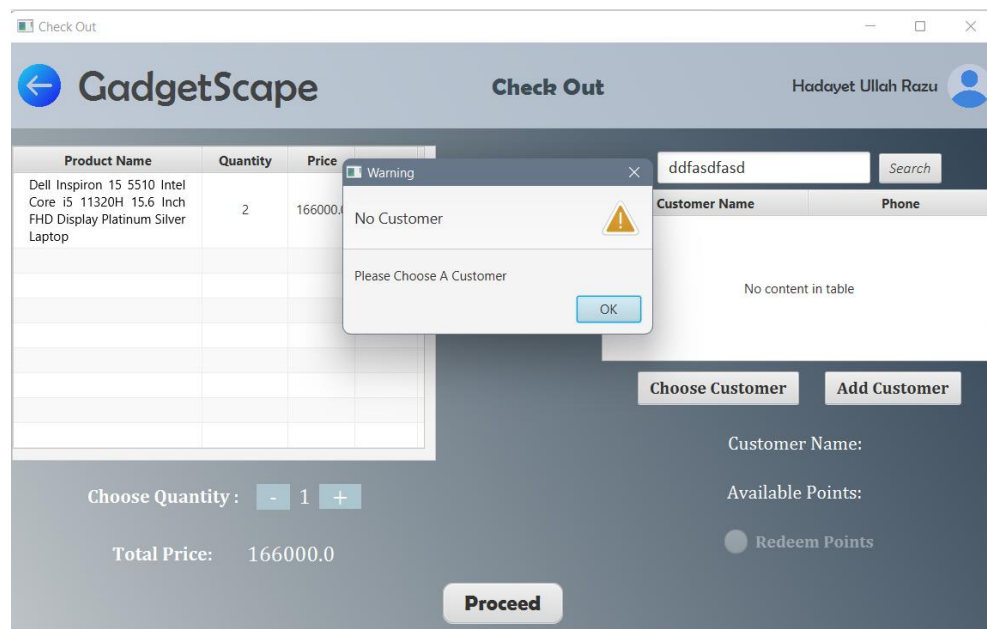
1. If salesman does not add any item in the cart, then he/she can't get action from 'Proceed' button. an error will display



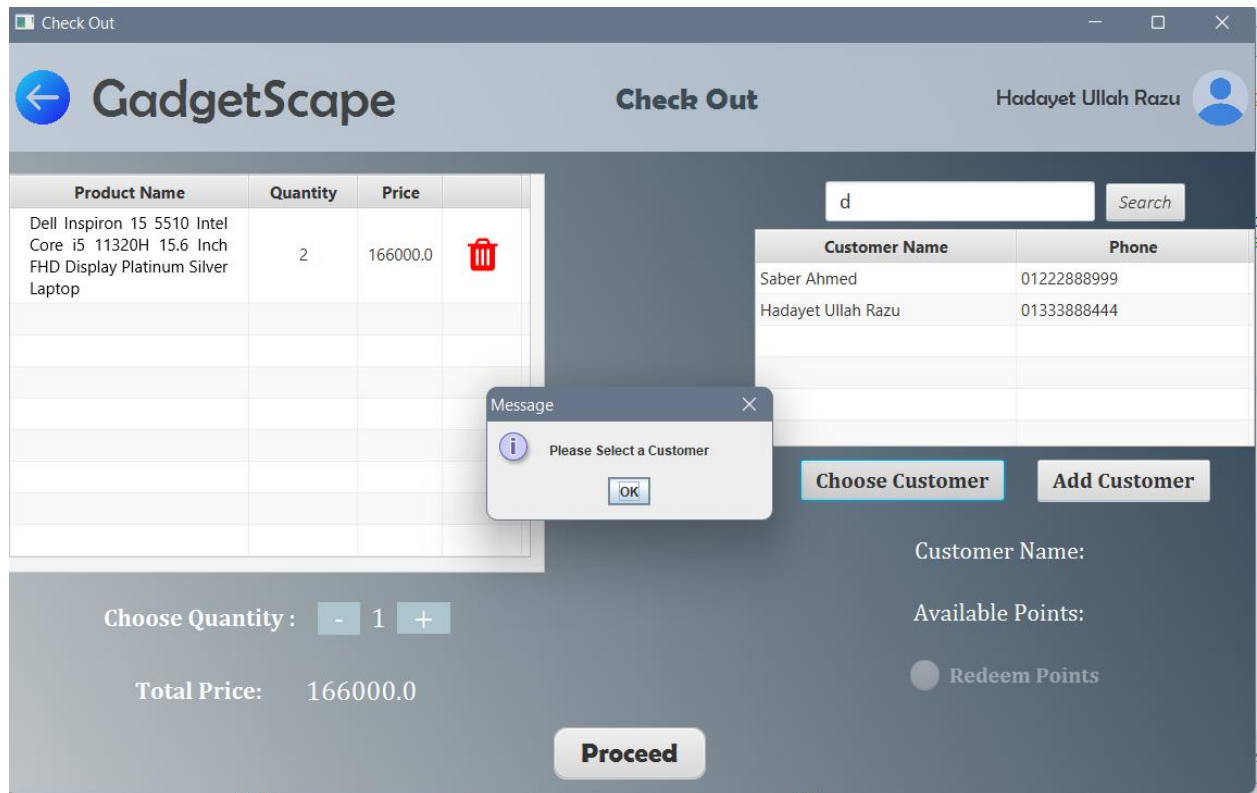
2. If salesman want to increment or decrement product quantity, he/she have to choose selected item. Otherwise, a warning will display.



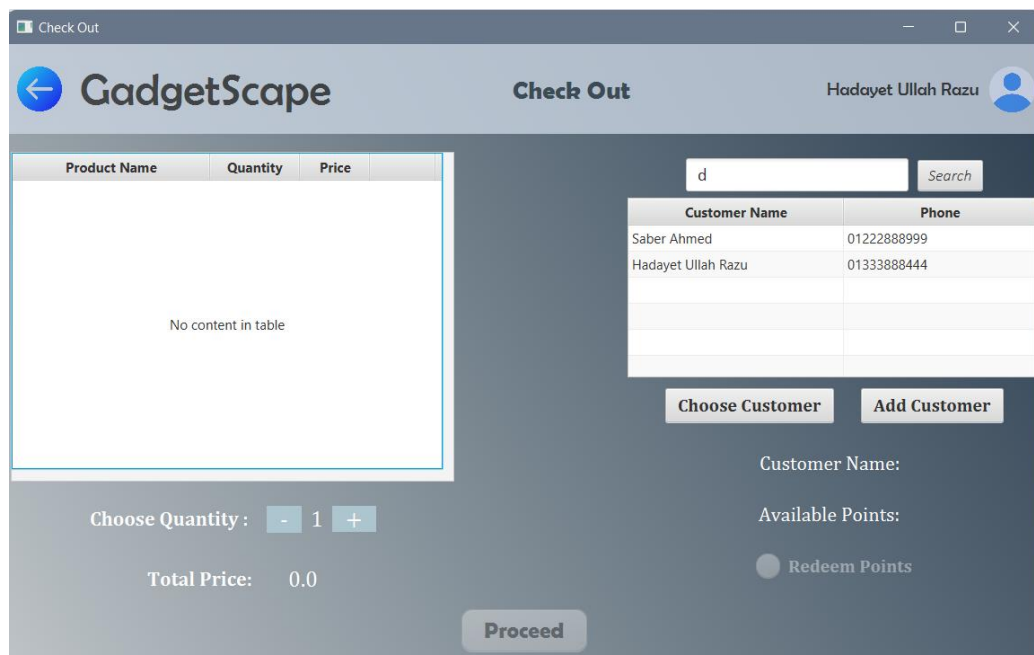
3. If salesman want to submit the purchase data without choosing proper customer, then he/she will get a warning message.



4. If salesman click the 'Choose Customer' button without select the customer name in the table, a message will show.

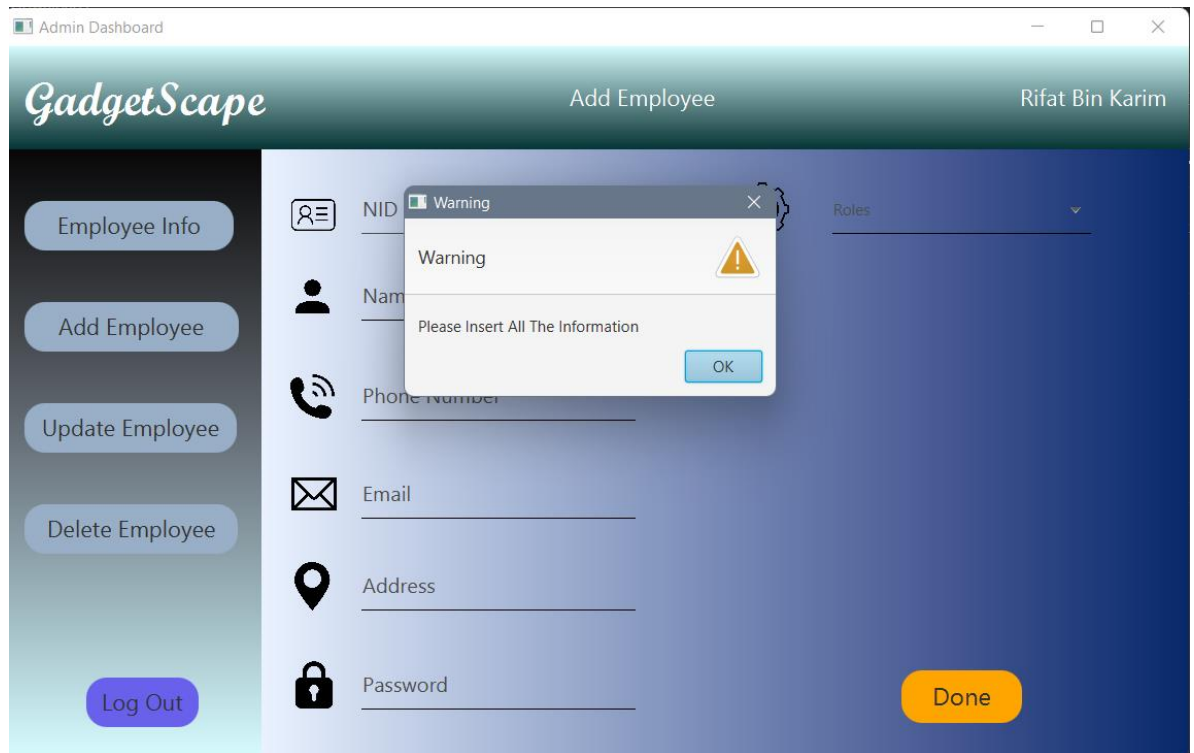


5. If there are no item in the cart, then the 'Proceed' button will disable.

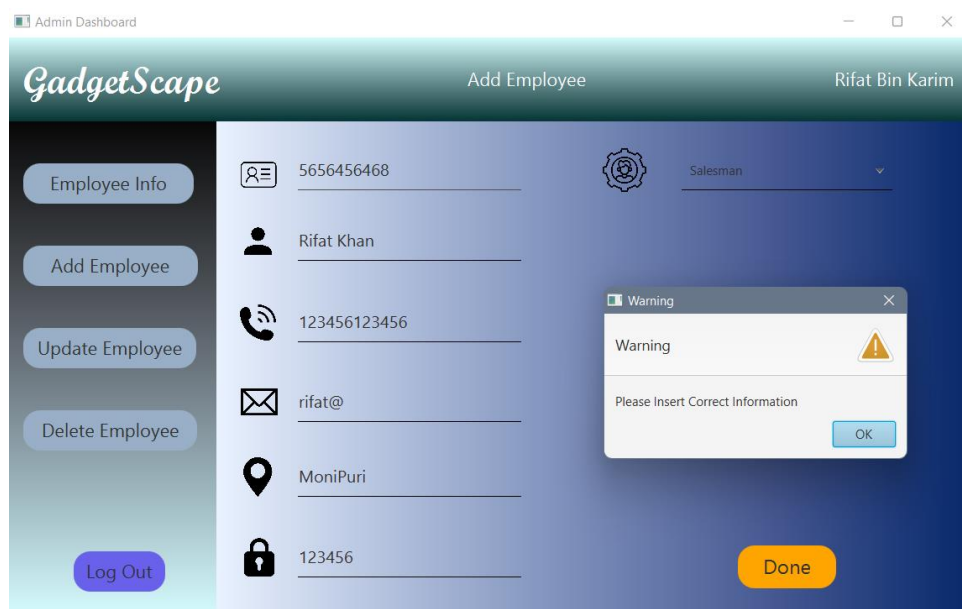


Admin Dashboard:

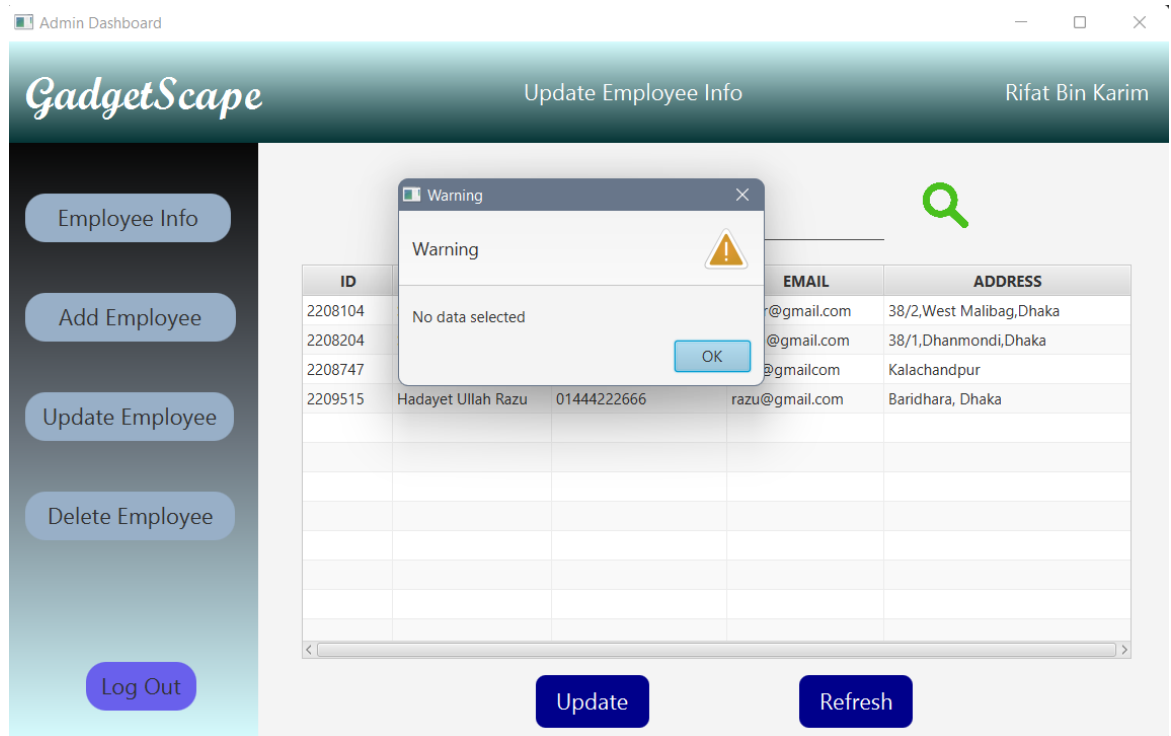
1. If admin want to add employee in the system leaving the input field blank, an warning message will display.



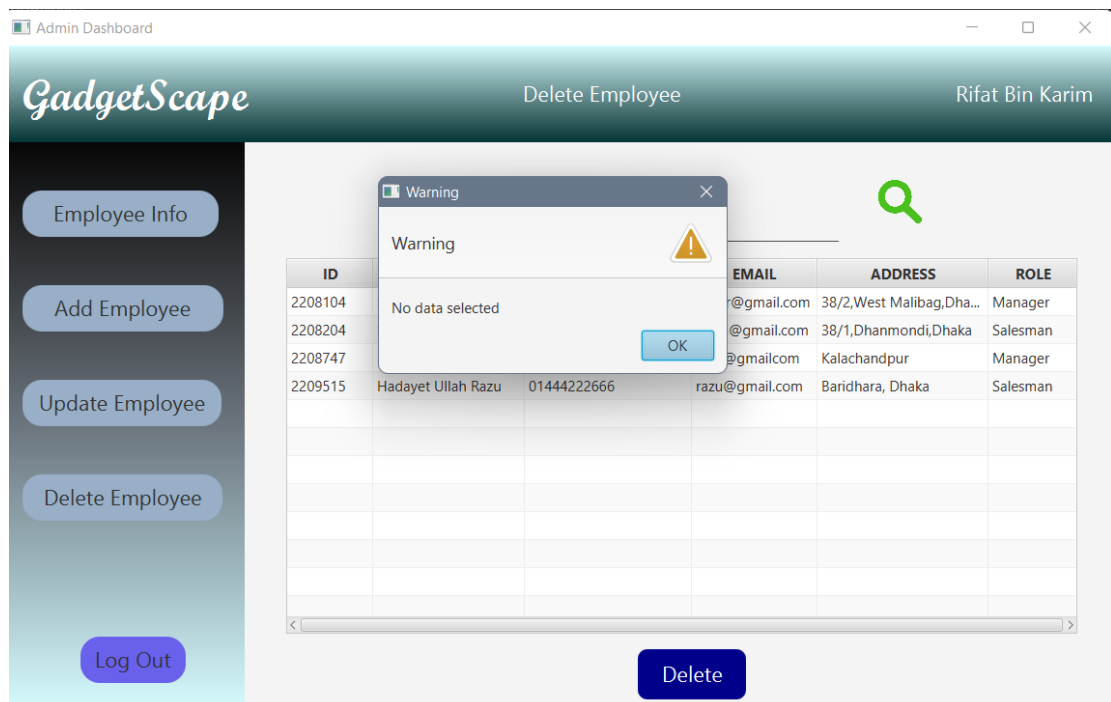
2. If admin insert phone number which length is more than 11 and insert incorrect format of email, then an warning message will show.



3. If admin want to update information of an employee without selecting specific employee from table, then an message will occurred.



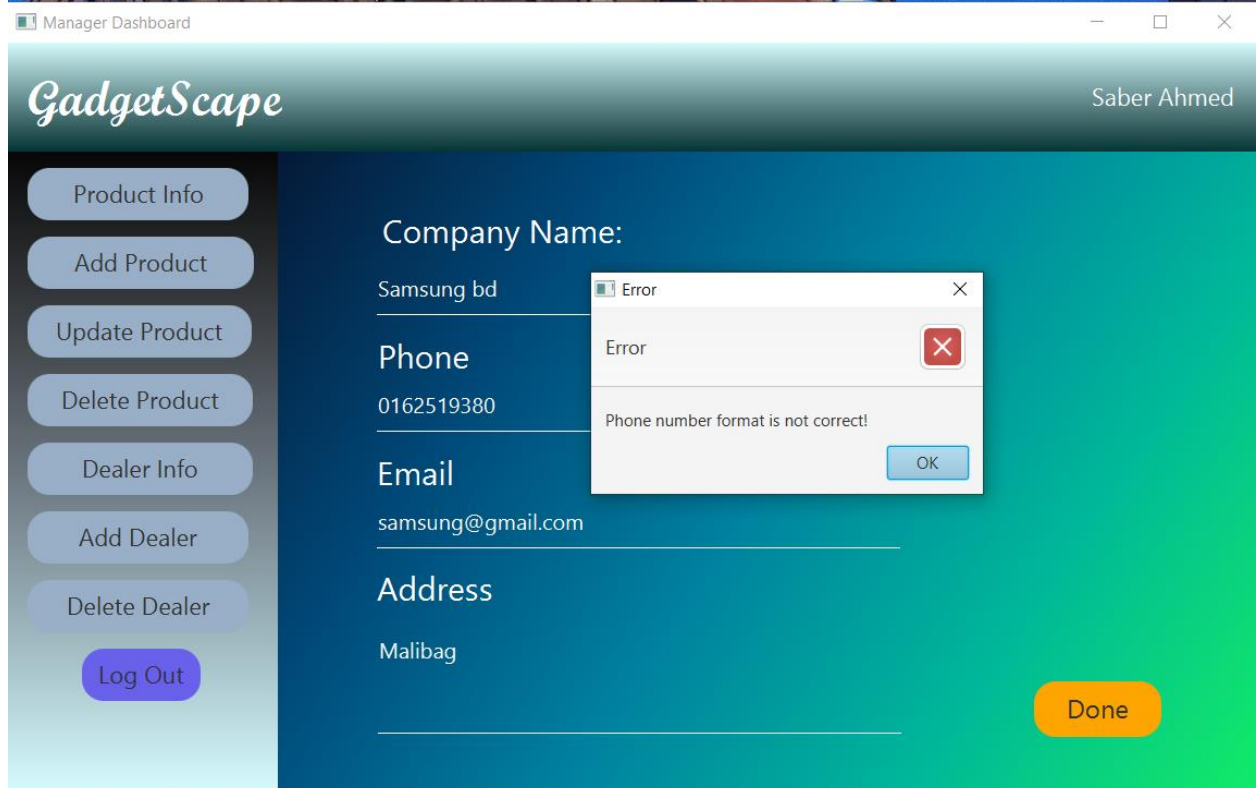
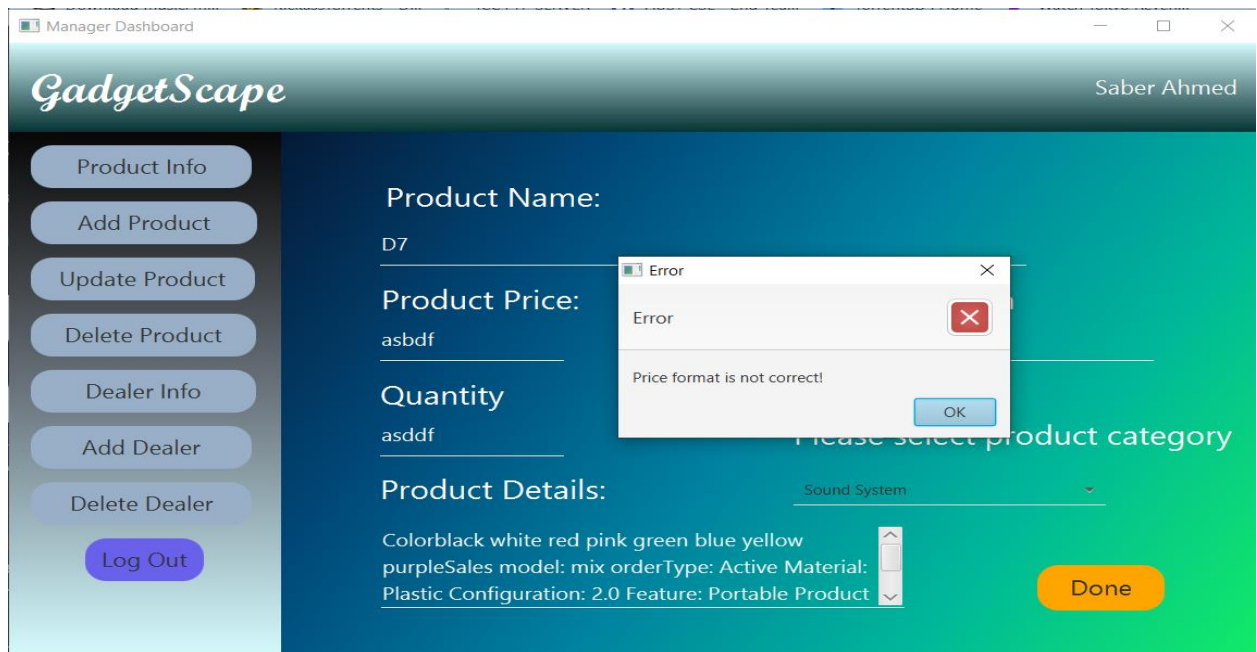
4. If admin want to delete an employee without selecting specific employee from table, then a warning message will display.



Monkey testing:

The purpose of Monkey Testing is to determine whether or not an application or system crashes by supplying random input values or data.

1. If any random values are inserted there will be error message in add product and dealers page.



Conclusion:

Several PC accessory stores in our area use expensive, inconvenient paper-pen methods. Commercial transactions are frequently lost. Some stores have difficult-to-use software. We want computer accessory owners to grow. The discount system will increase business. Workers will be more focused because this program keeps track of who serves the most customers. To properly build our project, we conducted an information gathering session that included interviews and surveys. It aided us in determining what information and procedures were required to carry out the project. We created our system's USE Case Diagram with the assistance of information gathering. We also created a Data Flow Diagram, which provided us with an overview of the overall project's working flow. Following that, we used a database to store the information about our system. As a result, we had to create an Entity Relationship Diagram for our system entities. We encountered some difficulties as we began to develop the project, but we persevered in order to build the system properly and effectively. If the system attracts the target customer, we hope that our system will do well in the industry.

References:

The references we have used and collected data related to our project are :

1. For UI Design: <https://www.youtube.com/>
2. For SQL: <https://www.w3schools.com/sql/default.asp>
3. For color gradient: <https://mycolor.space/>
4. Error solving: <https://stackoverflow.com/>

Appendix:

1. Google form survey response spreadsheet:

<https://docs.google.com/spreadsheets/d/1zQ0GUivFiweEFxenodV2OrZJhf3FbUcTo7-P2-AVgTg/edit?usp=sharing>

2. Supporting Documents:



To Whomever it May Concern

This is to acknowledge that a group of CSE students from Ahsanullah University of Science and Technology came to visit me and talk about their project. They conducted a formal interview session with me on the below mentioned date and time:

Date: 24 June 2022

Time: 11:30 AM


Interviewers:

1. Saber Ahmed
2. Rifat Bin Karim
3. Fahmida Nowshin Nikita
4. Hedayet Ullah Raju

I wish them good luck for the success of their project.

Please feel free to contact me regarding further clarity of the interview session.

Best Regards,



05/07/22

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