RESTAURANT MANAGEMENT SYSTEM Z21452-SOFTWARE PRODUCT DESIGN AND DEVELOPMENT LABORATORY

MINI PROJECT REPORT

Submitted by

GOKUL KANNAN . G 21DX05

Under the guidance of

Ms. P.Thilakaveni

In partial fulfilment of the requirement of the program

DIPLOMA IN COMPUTER ENGINEERING



April - 2023

DEPARTMENT OF COMPUTER ENGINEERING PSG POLYTECHNIC COLLEGE

(Autonomous and an ISO 9001 certified Institution)

COIMBATORE – 641 004

ABSTRACT

A Restaurant Management System is a type of software designed to assist with the day-to-day tasks associated with running a restaurant. It is a web-based application that provides service facilities to both the restaurant and the customer. The system allows the admin to create menus with corresponding price lists, and customers can view the menu and make online orders. The purpose of this system is to improve customer satisfaction and streamline restaurant operations. The system is designed to manage the restaurant business, and it helps restaurant administrators to manage the restaurant without any problem. The system is computerized, which makes it more systematic, productive, and easily accessible. The system is designed to encompass all back-end operations, including inventory management, employee scheduling, and accounting. The system is specifically designed for restaurants, bars, food trucks, and others in the foodservice industry. The system is essential for small businesses as it helps them to manage their operations efficiently and effectively.

INTRODUCTION

A Restaurant Management System is a type of software designed specifically to help users manage their food service establishment. It encompasses a broad range of tasks and responsibilities, from overseeing company finances and facilitating business growth to overseeing marketing, managing the workforce, and ensuring customer satisfaction. The system is computerized, which makes it more systematic, productive, and easily accessible. It is a web-based application that provides service facilities to both the restaurant and the customer. The system is designed to manage the restaurant business, and it helps restaurant administrators to manage the restaurant without any problem. The system is specifically designed for restaurants, bars, food trucks, and others in the foodservice industry. Unlike a POS system, RMS encompasses all back-end needs, such as inventory and staff management. The system is essential for small businesses as it helps them to manage their operations efficiently and effectively. In this article, we will explore the key aspects of restaurant management systems, their common functionalities, and the different components that make up the technology. We will also provide a guide to choosing the right restaurant management system for your business.

SOFTWARE REQUIREMENTS

StarUML is a modeling and diagramming tool used for creating UML (Unified Modeling Language) diagrams. It is a popular software development tool used by software architects, designers, developers, and analysts.

StarUML offers various types of diagrams such as Class Diagrams, Use Case Diagrams, Sequence Diagrams, Activity Diagrams, and State Diagrams. It also supports the ability to generate code from the UML models that have been created.

Some key features of StarUML include:

- 1. Easy-to-use interface: StarUML has a user-friendly interface, making it easy to create and modify UML diagrams.
- 2. Multiple language support: StarUML supports multiple programming languages, including Java, C++, and Python.
- 3. Code generation: StarUML can generate code from the UML diagrams, which can save developers a lot of time.
- 4. Extensibility: StarUML can be extended with third-party plugins and scripts.
- 5. Collaboration: StarUML allows users to collaborate on diagrams in real-time, making it a great tool for team projects.
- 6. Overall, StarUML is a powerful tool for software development that can help developers streamline their work and create high-quality UML diagrams.

Software Requirement Specification

1.1 Purpose

The goal of this system is to create software that will allow all of the restaurant's foods to be available and updated in a fraction of a second.

1.2 Scope

To provide people with well-prepared, high-class food to eat and takeaway.

1.3 Definition

RFOS stands for restaurant food

ordering system. SRS: Software

Requirements Specification DBMS:

Database Management System

LAN: Local

Area Network

IP: Internet

Protocol

TCP: Transmission

Control Protocol UDP

(User Datagram

Protocol)

1.4 References

www.google.com

www.wikipedia.com

www.knowmyknowl

edge.com

2. Overall description

2.1 Product Perspective

The software described in this SRS is the software for a complete RMOS system. The system merges various hardware and software elements and further interfaces with external systems. Thus, while the software covers the majority of the system's functionality, it relies on several external interfaces for persistence and unhandled tasks, as well as physically interfacing with humans.

2.2 Product Functions

Item

This class represents an item of food or beverage from the restaurant's menu. It exists as a part of either a single order or a single meal, but not both at the same time (an order gets decomposed into its constituent items, which are then added to a meal). An item that is part of an order may contain a dietary requirement. An item contains the menu item's name, price, description, status, and an image or model to depict the item on a surface computer or display.

Dietary Requirement

This class represents a customer's dietary requirement (e.g., vegetarian, celiac). It exists as part of either a single order or a single item, but not both at the same time. A dietary requirement contains both the name and a description of the particular requirement it represents.

Order

This class represents a collection of items and dietary requirements. It is part

of a single meal and maintains information about whether it has been placed or approved. An order can be in either the "placed," "canceled," or "approved" state. An order will typically be deleted shortly after it has been approved and its items added to the customer's meal, tying the items in the order to an account.

Meal

This class represents a collection of all items ordered by a single customer. It

is part of a single account and maintains the seat number related to the meal. The total price of a meal is also maintained.

Account

This class represents the associated meals and payments for a table of customers. It consists of one or more meals and one or more payments.

An account is related to one table and is associated with one tablet.

Alert

This class represents a message sent to a tablet to alert the waiter or supervisor of an event related to one of the tables they have been assigned. It maintains a category (e.g., "item rejected" or "item ready") and a description. An alert belongs to exactly one tablet.

Payment

This class represents a payment to be made to the restaurant. It may contain any number of meals and tip denominations and be related to exactly one account. A payment maintains its total value and the seat number of the paying customer.

Payment by bank card

This class represents an extension of the Payment class for customer payments that are to be paid using a bank card.

Cash Payment

This class represents an extension of the Payment class for customer payments that are to be paid using cash.

Tip Denomination

This class represents a tip denomination to be given to a waiter. A tip denomination belongs to a single payment and contains information about the denomination value.

2.3 User Characteristics

Unskilled user

The users of the surface computers are walk-in customers and should therefore be assumed to have no relevant prior skills or education other than basic abilities to operate an automated system, no more complex than a parking metre or vending machine.

User with limited expertise

The users of the tablets and displays are waiters and chefs,

respectively, and they should be able to use the system and further be able to train others with minimal training themselves. They must be able to explain all elements of the user interfaces except the server. Supervisors also fall into the same category, though they will have to learn other sections of the system (refunds, etc.); these should not be of notably greater complexity than the standard functions. This class of user would be expected to have a junior high school certificate or equivalent education.

highly skilled user

The initial installation and configuration of hardware and the constituent MOS system components (especially the server) are guaranteed to require someone with notable computer experience, including extensive experience with networks and operating systems, to complete them. The software should not be needlessly complex, but it is still not expected to be entirely "plug and play." This class of user is expected to have a high school diploma or equivalent, as well as extensive computer experience.

2.4 Constraints

The RMOS should be written in an object-oriented language with strong GUI links and a simple, accessible network API. The primary candidate toolchains are Java/Swing, C++/Qt, and Python/Qt. The system must provide a capacity for parallel operation, and the system design should not introduce scalability issues concerning the number of surface computers, tablets, or displays connected at any one time. The end system should also allow for seamless recovery, without data loss, from individual device failures.

2.5 Assumptions and Dependencies

The SRS assumes that none of the constituent system components will be implemented as embedded applications. The implication is that the target hardware will support standalone programme or application deployment without the need for customised embedded firmware to be written. It is further assumed that tablet PCs with sufficient processing capability and battery life will be utilized.

3. External Interface Requirements

3.1.1 User Interface Requirements

Surface computer UI

The Surface Computer UI is the interface used by restaurant

customers. This interface uses the surface computer paradigm: users interact with the system by dragging "objects" around on the flatscreen touch-sensitive display. For the MOS, users can manipulate objects such as items of food, dietary requirements, tips, and menus on the surface of their table. Such objects can be moved into static objects, such as meals and payments, to perform various functions. In addition to this object manipulation paradigm, a limited system menu is necessary. Users will summon their restaurant menu, which is combined with a system/command menu, using an easy touch gesture (a double-tap on the touch surface), and dismiss it with a similar gesture or by tapping a close button GUI element.

The GUI will take up a small percentage of the tablet's screen, so the UI will be clear and uncluttered.

Tablet UI

The Tablet UI is designed to run on a small, wireless-enabled touch-screen tablet PC to be used by waiters to accommodate customer needs. This UI will be designed for use with a stylus input on the touch screen. Because the number of operations the UI needs to support is relatively limited, there will be no nested menu structure. The UI shall provide simple graphical interfaces, similar to a map, to allow the user to select tables or customers as the target of operations.

Display UI

The display UI provides kitchen staff with simple functionality related to ordered items. The UI will display the list of items in large, easy-to-read text, sorted by time of submission, with additional information (such as dietary requirements and the destination table) displayed in tabular format. Input is provided by the fingertips, as opposed to a stylus.

3.1.2 Hardware Interface Requirements

There are three external hardware devices used by the RMOS, each related to a user interface. These devices are surface computers, wireless tablets, and touch displays. All three devices must be physically robust and immune to liquid damage and stains. The devices (with the possible exception of displays) must also have good industrial design aesthetics, as they are to be used in place of normal restaurant tables and notepads and will be in direct contact with customers. The devices behave as "terminals" in the sense that they never have a full system image, do not store data, and are not used for the core logic of the system. However, they should be fully capable computers that can use textual data from the server along with local UI/interpretation code to display UI elements and take input. All order and transaction records should be stored on the server, not on these computers.

3.1.3 Software Interface Requirements

The RMOS will interface with a database management system (DBMS) that stores the information necessary for the RMOS to operate. The DBMS must be able to provide, on request and with low latency, data concerning the restaurant's menu, employees (and their passwords), and available dietary requirements. Additionally, it should take and archive the data provided to it by the RMS. This data will include records of all orders and transactions (system states and state changes) executed by the RMS. The DBMS must store all data such that it can be used for accounting as well as accountability.

3.1.4 Communication Interface Requirements

The RMOS will interface with a local area network (LAN) to maintain communication with all its devices. It should use a reliable-type IP protocol, such as TCP/IP or reliable-UDP/IP, for maximum compatibility and stability. All devices it will interface with should contain standard Ethernet-compatible, software-accessible LAN cards to maintain communication between the server and the surface computers, tablets, displays, and the external payment system. Wireless devices should also use Ethernet-compatible cards that use the IEEE 802.11b/g standard and have support for WPA2-PSK encryption. The use of IEEE 802.11n transmission standard hardware is also acceptable if all other local hardware is conformant to the same standard.

4. Functional requirements

- 1. A server shall host the RMOS and provide system data processing and storage capability.
- 2. A surface computer shall provide a customer with all customer system functionality.
- 3. A tablet shall provide a waiter or supervisor with all waiter or supervisor system functionality (according to access control).
- 4. A display must provide all chef system functionality to the chef.
- 5. All system functionality shall be accessible through touch-sensitive surface computers, tablets, and displays via simple touch gestures.
- 6. A tablet shall be capable of interfacing with a register to facilitate the accurate processing of a payment.

5. Non-functional Requirements

- 1. The system shall log every state and state change of every surface computer, tablet, and display to provide recovery from system failure.
- 2. The system shall be capable of restoring itself to its previous state in the event of failure (e.g., a system crash or power loss).
- 3. The system shall be able to display a menu at all times to facilitate manual order-taking should the need arise.
- 4. The system shall utilize periodic 30-second keep-alive messages between tablets and the server to monitor the tablet's operational status.
- 5. The system shall flag tablets that fail to send timely keep-alive messages as non-operational and disassociate the assigned waiter from the tablet.

1.Use Case Diagram

A UML use case diagram is the primary form of system/software requirements for a new software program underdeveloped. Use cases specify the expected behavior (what), and not the exact method of making it happen (how). Use cases once specified can be denoted both textual and visual representation (i.e. use case diagram). A key concept of use case modeling is that it helps us design a system from the end user's perspective

A use case diagram is usually simple. It does not show the detail of the use cases:

- It only summarizes some of the relationships between use cases, actors, and systems.
- It does not show the order in which steps are performed to achieve the goals
 of each use case.

Purpose of Use Case Diagram

Use case diagrams are typically developed in the early stage of development and people often apply use case modeling for the following purposes:

- · Specify the context of a system
- Capture the requirements of a system
- Validate a systems architecture
- Drive implementation and generate test cases
- Developed by analysts together with domain experts

Actor

- Someone interacts with use case (system function).
- Named by noun.
- Actor plays a role in the business
- Similar to the concept of user, but a user can play different roles
- For example:
 - A prof. can be instructor and also researcher
 - plays 2 roles with two systems
- Actor triggers use case(s).
- Actor has a responsibility toward the system (inputs), and Actor has expectations from the system (outputs).



Use Case

- System function (process automated or manual)
- Named by verb + Noun (or Noun Phrase).
- i.e. Do something
- Each Actor must be linked to a use case, while some use cases may not be linked to actors.

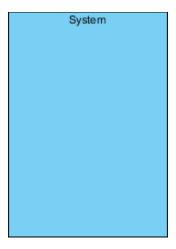


Communication Link

- The participation of an actor in a use case is shown by connecting an actor to a use case by a solid link.
- Actors may be connected to use cases by associations, indicating that the actor and the use case communicate with one another using messages.

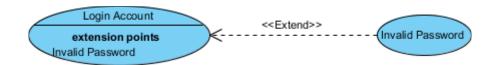
Boundary of system

- The system boundary is potentially the entire system as defined in the requirements document.
- For large and complex systems, each module may be the system boundary.
- For example, for an ERP system for an organization, each of the modules such as personnel, payroll, accounting, etc.
- can form a system boundary for use cases specific to each of these business functions.
- The entire system can span all of these modules depicting the overall system boundary



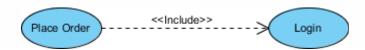
Extends

- Indicates that an "Invalid Password" use case may include (subject to specified in the extension) the behavior specified by base use case "Login Account".
- Depict with a directed arrow having a dotted line. The tip of arrowhead points
 to the base use case and the child use case is connected at the base of the
 arrow.
- The stereotype "<<extends>>" identifies as an extend relationship



Include

- When a use case is depicted as using the functionality of another use case, the relationship between the use cases is named as include or uses relationship.
- A use case includes the functionality described in another use case as a part of its business process flow.



Generalization

- A generalization relationship is a parent-child relationship between use cases.
- The child use case is an enhancement of the parent use case.

Generalization is shown as a directed arrow with a triangle arrowhead.

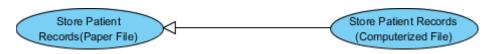
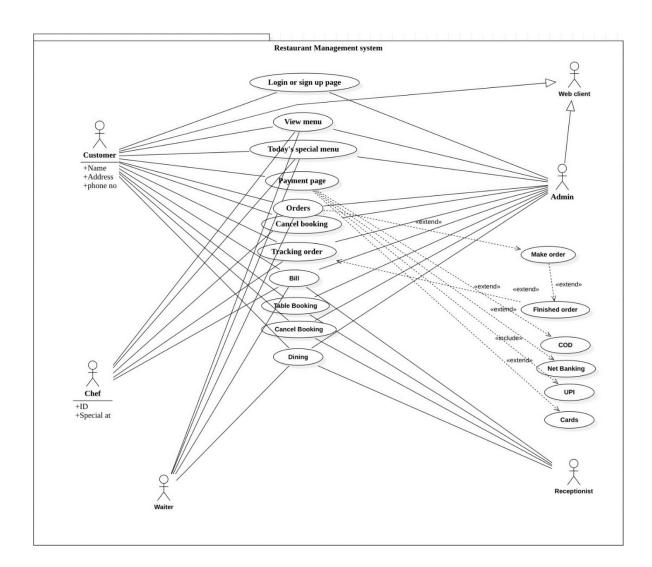


DIAGRAM:



2. Activity Diagram:

Activity diagram is another important behavioral diagram in <u>UML</u> diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flow chart that modeling the flow from one activity to another activity.

Activity

Is used to represent a set of actions



Action

A task to be performed



Control Flow

Shows the sequence of execution



Object Flow

Show the flow of an object from one activity (or action) to another activity (or action).



Initial Node

Portrays the beginning of a set of actions or activities



Activity Final Node

Stop all control flows and object flows in an activity (or action)



Object Node

Represent an object that is connected to a set of Object Flows



Decision Node

Represent a test condition to ensure that the control flow or object flow only goes down one path



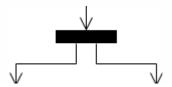
Merge Node

Bring back together different decision paths that were created using a decisionnode.



Fork Node

Split behavior into a set of parallel or concurrent flows of activities (or actions)



Join Node

Bring back together a set of parallel or concurrent flows of activities (or actions).

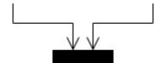
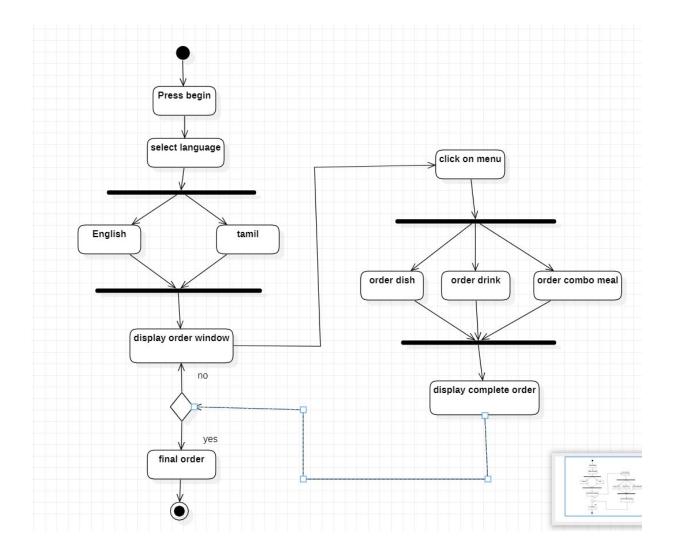


DIAGRAM:



3. Class Diagram

In software engineering, a class diagram in the Unified Modelling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

Purpose of Class Diagrams

- 1. Shows static structure of classifiers in a system
- 2. Diagram provides a basic notation for other structure diagrams prescribed by UML
- 3. Helpful for developers and other team members too

4. Business Analysts can use class diagrams to model systems from a business perspective

A UML class diagram is made up of:

- A set of classes and
- A set of relationships between classes

Purpose of Class Diagrams

- 1. Shows static structure of classifiers in a system
- 2. Diagram provides a basic notation for other structure diagrams prescribed by UML
- 3. Helpful for developers and other team members too
- 4. Business Analysts can use class diagrams to model systems from a business perspective

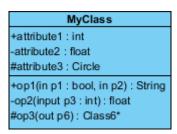
A UML class diagram is made up of:

- · A set of classes and
- A set of relationships between classes

What is a Class

A description of a group of objects all with similar roles in the system, which consists of:

- Structural features (attributes) define what objects of the class "know"
 - Represent the state of an object of the class
 - Are descriptions of the structural or static features of a class
- Behavioural features (operations) define what objects of the class "can do"
 - Define the way in which objects may interact
 - Operations are descriptions of behavioural or dynamic features of a class

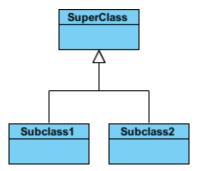


Class Relationships

A class may be involved in one or more relationships with other classes. A relationship can be one of the following types: (Refer to the figure on the right for the graphical representation of relationships).

Inheritance (or Generalization):

- Represents an "is-a" relationship.
- An abstract class name is shown in italics.
- SubClass1 and SubClass2 are specializations of Super Class.
- A solid line with a hollow arrowhead that point from the child to the parent class



Simple Association:

- A structural link between two peer classes.
- There is an association between Class1 and Class2
- A solid line connecting two classes

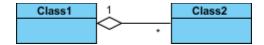


Aggregation:

A special type of association. It represents a "part of" relationship.

- · Class2 is part of Class1.
- Many instances (denoted by the *) of Class2 can be associated with Class1.
- Objects of Class1 and Class2 have separate lifetimes.

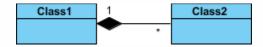
 A solid line with an unfilled diamond at the association end connected to the class of composite



Composition:

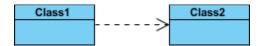
A special type of aggregation where parts are destroyed when the whole is destroyed.

- Objects of Class2 live and die with Class1.
- · Class2 cannot stand by itself.
- A solid line with a filled diamond at the association connected to the class of composite

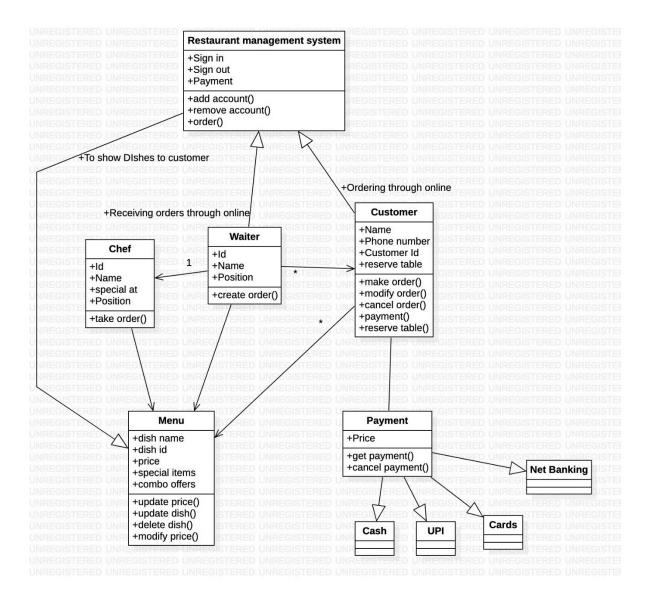


Dependency:

- Exists between two classes if the changes to the definition of one may cause changes to the other (but not the other way around).
- Class1 depends on Class2
- A dashed line with an open arrow



CLASS DIAGRAM:



4. Sequence Diagram

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when.

Sequence Diagrams captures:

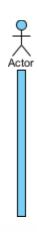
- the interaction that takes place in a collaboration that either realizes a use case or an operation (instance diagrams or generic diagrams)
- high-level interactions between user of the system and the system, between the system and other systems, or between subsystems (sometimes known as system sequence diagrams)

Sequence Diagrams captures:

- the interaction that takes place in a collaboration that either realizes a use case or an operation (instance diagrams or generic diagrams)
- high-level interactions between user of the system and the system, between the system and other systems, or between subsystems (sometimes known as system sequence diagrams)

Actor

- a type of role played by an entity that interacts with the subject (e.g., by exchanging signals and data)
- external to the subject (i.e., in the sense that an instance of an actor is not a part of the instance of its corresponding subject).
- represent roles played by human users, external hardware, or other subjects.



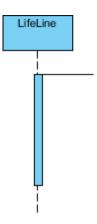
Lifeline

• A lifeline represents an individual participant in the Interaction.



Activations

- A thin rectangle on a lifeline) represents the period during which an element is performing an operation.
- The top and the bottom of the of the rectangle are aligned with the initiation and the completion time respectively



Return Message

- A message defines a particular communication between Lifelines of an Interaction.
- Return message is a kind of message that represents the pass of information back to the caller of a corresponded former message.



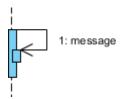
Self Message

- A message defines a particular communication between Lifelines of an Interaction.
- Self message is a kind of message that represents the invocation of message of the same lifeline.



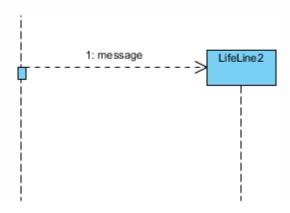
Recursive Message

 A message defines a particular communication between Lifelines of an Interaction. Recursive message is a kind of message that represents the invocation of message of the same lifeline. It's target points to an activation on top of the activation where the message was invoked from.



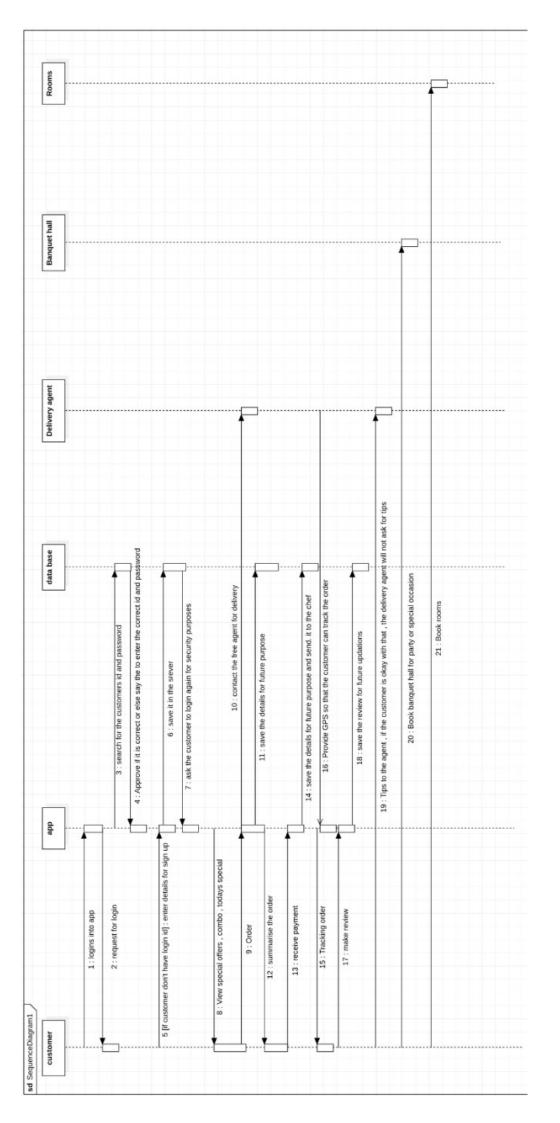
Create Message

- A message defines a particular communication between Lifelines of an Interaction.
- Create message is a kind of message that represents the instantiation of (target) lifeline.



Destroy Message

- A message defines a particular communication between Lifelines of an Interaction.
- Destroy message is a kind of message that represents the request of destroying the lifecycle of target lifeline.



5. State chart Diagram

A state machine diagram (also known as statechart, state transition diagram or state diagram) is a kind of behavior diagram; like an activity diagram and a sequence diagram, it presents a dynamic view of a system. Unlike an activity diagram and a sequence diagram, a state machine diagram focuses attention on how a structure within a system (object, or block instance) changes state in response to event occurrences over time. State machine diagrams typically are used to describe state-dependent behavior for an object. An object responds differently to the same event depending on what state it is in. State machine diagrams are usually applied to objects but can be applied to any element that has behavior to other entities such as actors, use cases, methods, subsystems systems, etc.

State

A state is a constraint or a situation in the life cycle of an object, in which a constraint holds, the object executes an activity or waits for an event.

Initial and Final States

 The initial state of a state machine diagram, known as an initial pseudostate, is indicated with a solid circle. A transition from this state will show the first real state

The final state of a state machine diagram is shown as concentric circles. An open-loop state machine represents an object that may terminate before the system terminates, while a closed-loop state machine diagram does not have a final state; if it is the case, then the object lives until the entire system terminates.

Events

An event signature is described as Event-name (comma-separated-parameter-list). Events appear in the internal transition compartment of a state or on a transition between states.

Transition

Transition lines depict the movement from one state to another. Each transition line is labeled with the **event** that causes the transition.

 Viewing a system as a set of states and transitions between states is very useful for describing complex behaviors

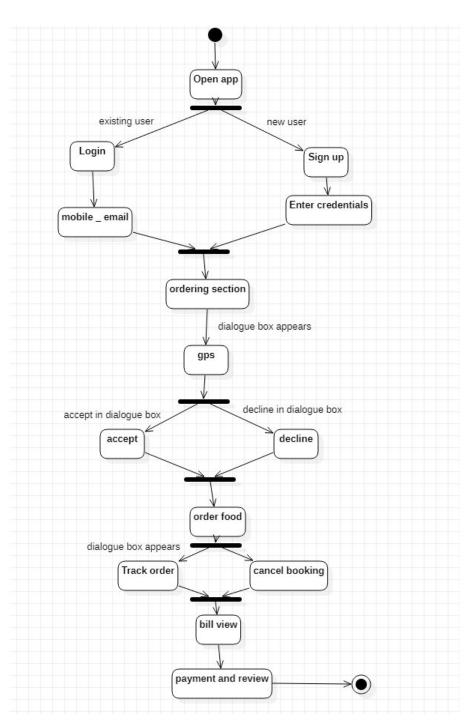
- Understanding state transitions is part of system analysis and design
- A Transition is a movement from one state to another state

Entry and Exit Actions

Entry and Exit actions specified in the state. It must be true for every entry/exit occurrence. If not, then you must use actions on the individual transition arcs

Entry Action executed on entry into a state with the notation: Entry/action
 Exit Action executed on exit from a state with the notation: Exit/action

DIAGRAM:



6. Deployment Diagram

A UML deployment diagram is a diagram that shows the configuration of run time processing nodes and the components that live on them. Deployment diagrams is a kind of structure diagram used in modeling the physical aspects of an object-oriented system. They are often be used to model the static deployment view of a system (topology of the hardware).

Purpose of Deployment Diagrams

- They show the structure of the run-time system
- They capture the hardware that will be used to implement the system and the links between different items of hardware.
- They model physical hardware elements and the communication paths between them
- They can be used to plan the architecture of a system.
- They are also useful for Document the deployment of software components or nodes

A deployment diagram is just a special kind of class diagram, which focuses on a system's nodes. Graphically, a deployment diagram is a collection of vertices and arcs. Deployment diagrams commonly contain:

Nodes

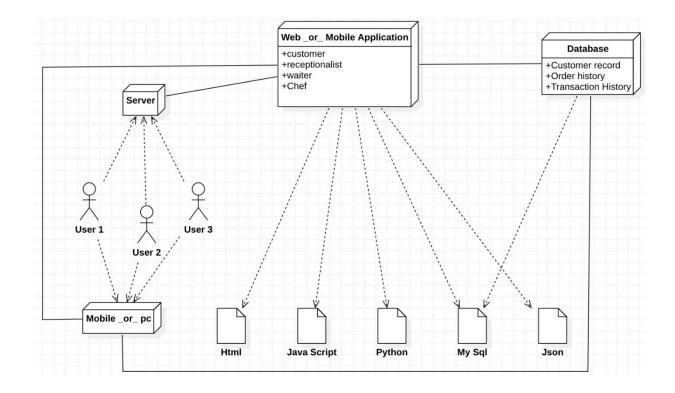
- 3-D box represents a node, either software or hardware
- HW node can be signified with <<stereotype>>
- Connections between nodes are represented with a line, with optional <<stereotype>>
- Nodes can reside within a node

Other Notations

- Dependency
- Association relationships.

May also contain notes and constraints

DIAGRAM:



PROJECT DESCRIPTION

A Restaurant Management System (RMS) is a type of software designed specifically to help users manage their food service establishment. It is an essential tool for any new restaurant, as it helps keep the restaurant running by tracking employees, inventory, and sales. The system is computerized, which makes it more systematic, productive, and easily accessible. It is a web-based application that provides service facilities to both the restaurant and the customer. The system is designed to manage the restaurant business, and it helps restaurant administrators to manage the restaurant without any problem. The system is specifically designed for restaurants, bars, food trucks, and others in the foodservice industry. Unlike a POS system, RMS encompasses all back-end needs, such as inventory and staff management. The system is essential for small businesses as it helps them to manage their operations efficiently and effectively. The system is designed to improve customer satisfaction

and streamline restaurant operations. It is intended to assist with the tasks associated with the day-to-day management of a restaurant or similar business. In this article, we will explore the key aspects of restaurant management systems, their common functionalities, and the different components that make up the technology. We will also provide a guide to choosing the right restaurant management system for your business.

CONCLUSION

In conclusion, a Restaurant Management System (RMS) is a type of software designed specifically to help users manage their food service establishment. It is an essential tool for any restaurant, as it helps keep the restaurant running by tracking employees, inventory, and sales. The system is computerized, which makes it more systematic, productive, and easily accessible. It is a web-based application that provides service facilities to both the restaurant and the customer. The system is designed to manage the restaurant business, and it helps restaurant administrators to manage the restaurant without any problem. The system is specifically designed for restaurants, bars, food trucks, and others in the foodservice industry. Unlike a POS system, RMS encompasses all back-end needs, such as inventory and staff management. The system is essential for small businesses as it helps them to manage their operations efficiently and effectively. The system is designed to improve customer satisfaction and streamline restaurant operations. It is intended to

assist with the tasks associated with the day-to-day management of a restaurant or similar business. By using restaurant management software, restaurant owners can increase productivity and boost bottom-line profitability.