CENG3004: Software Engineering

The Restaurant Menu and Ordering System Management

Software Requirements Specification Document

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1 Overview

Our project will be a software package that facilitates the ordering in traditional restaurants. Nowadays, orders are carried out by taking notes on the papers by waiters in many restaurants today and they are also transmitted to the kitchen side with papers. In addition to causing some confusion, this situation makes things difficult, causes too much paper to be consumed and even slows down the order action. Communication disorders between people such as waiter-customer, waiter-cook, waiter-waiter, etc. causes deterioration in the traditional ordering system. With this project, we aim to minimize these problems and offer a customer-friendly system.

Our customers are institutions that include the food and beverage industry, such as restaurants, cafes and hotels. Our project aims to increase customer satisfaction in these institutions and to regulate the order system. Thanks to this software, the customer (in the restaurant) can view the menu, place an order, view order status, call the waiter and pay the bill through the tablets placed on her/his table. In addition to these, customers can read the comments made by other customers about the products (food and beverage), leave comments if they wish, and view the most popular products of the restaurant.

Waiters can set up the table, manage the table remotely, confirm the order, and remotely control table functions to assist customers with tablets. In addition, staff working in the kitchen can view the approved orders from the kitchen. During preparation, they are able to let the waiter know the status of each order, and can send notifications when products are completed, through the touch-display.

The system contains full accountability and logging systems, and supports supervisor actions to account for exceptional circumstances, such as an order being refunded or walked out on. Customers are presented with an attractive and easy-to-use surface computer GUI.

Waiters are able to perform all actions that the table system normally handles via their tablet PCs, so in the event of a customer being unable to operate the surface computer, the waiter can handle orders traditionally while using retaining the accountability and logging functions of the system, and retaining the same channel of communication with food staff.

As can be understood from its functions, this software provides people with both convenience and time. We are doing this project because we aim to reduce the use of paper and provide people with an enjoyable meal that they can manage completely with our software on tablets.

2 Requirements

2.1 Functional Requirements

Requirement Identifier	Source (e.g. Interview with XX on DD/MM/ YYYY)	Priority (High/ Medium/ Low)	Description
FR-1		High	The interface has to show the menu when it is touched twice.
FR-2		High	The system must provide a customer with all customer system functionality.
FR-3		High	The system must provide a waiter with all waiter system functionality.
FR-4		High	The system must provide a manager with all waiter system functionality.
FR-5		High	The system must provide a chef with all waiter system functionality.
FR-6		Medium	The interface has to contain pictures of products.
FR-7		High	The system must be based on software as a service model (SaaS model); restaurants do not need to install in-house servers.
FR-8		High	The system must show all available and unavailable products to the customer.
FR-9		High	Unavailable products must be displayed but their operations must be disabled.
FR-10		High	When the system is in a deactivated situation, the customer should not be able to do any function.
FR-11		High	The customer shall be able to add the products he/she wants to order by clicking “Add Product”.
FR-12		High	The customer shall be able to view the products he/she wants to order in the “View Added Product” section.

FR-13		High	The customer shall be able to confirm his/her order by clicking “Confirm Order”.
FR-14		Medium	The customer shall be able to view order status.
FR-15		Low	The customer shall be able to read comments about products.
FR-16		Medium	The customer shall be able to search a product by selecting the “Search Product” option from the menu.
FR-17		High	The customer shall be able to arrange the quantity of the products or remove the products while giving or editing her/his order.
FR-18		High	System must classify the products according to category and add these products on a particular chef’s queue in the kitchen screen.
FR-19		Medium	The customer shall be able to cancel an order if their order is pending and not yet placed.
FR-20		Medium	The customer shall be able to call the waiter by selecting the “Call Waiter” option from the menu.
FR-21		High	The customer shall be able to select one of the online credit card, cryptocurrency, credit card or cash payment options after tapping the “Pay Bill” button.
FR-22		Medium	The customer shall be able to comment and rate a product that he/she has purchased before.
FR-23		Medium	The chef shall be able to mark the customer's meal as “Being prepared” through a display to inform the customer.
FR-24		Medium	The chef shall be able to mark the customer's meal as “Cooked” through a display to inform the customer.
FR-25		High	The waiter has to login in working hours to use waiter functions.
FR-26		High	The chef has to login in working hours to use chef functions.
FR-27		High	The manager has to login in working hours to use manager functions.
FR-28		High	The waiter shall be able to active and deactivate tables.
FR-29		High	The manager shall be able to Add/Edit/Delete users.
FR-30		High	The manager shall be able to Add/Edit/Delete products.
FR-31		High	The manager shall be able to issue a refund.

2.2 Nonfunctional Requirements

Requirement Identifier	Source (e.g. Interview with XX on DD/MM/ YYYY)	Priority (High/ Medium/ Low)	Description
NR-1		Medium	The system will take no longer than 10-seconds to restart.
NR-2		High	Response time of the system should not exceed 10 ms.
NR-3		High	The system's upper limit is handling 1000 transactions per second.
NR-4		High	The system shall log every state and change of state of every surface computer, tablet and display to every second to provide recovery from system failure.
NR-5		High	The system should be able to back up to its previous state within 10 seconds in case of failure (e.g. system crash or power loss).
NR-6		High	The whole system is secured. Only the manager can access all the data.
NR-7		High	The cryptocurrency payment method, one of the payment methods, can be used when the necessary government regulations are provided.
NR-8		High	The system shall require a staff to log in using a username and password.
NR-9		Medium	The waiter/chef shall only be able to log into one device at any given instance of time.
NR-10		High	The waiter/chef/manager password used for login must have a bit-strength of at least 64 bits.
NR-11		Medium	The waiter/chef/manager password used for login must be changed every three months.
NR-12		Medium	The system must not dismiss an engaged menu unless the customer requests it.
NR-13		High	Access to the system without user login is prohibited.
NR-14		High	The system must be supported on devices such as tablets and surface computers.
NR-15		High	All users have a role and the actions they can do according to their roles are limited.

NR-16		High	The system should work as long as the computer in the restaurant is on.
NR-17		High	Wireless communication throughout the system will be encrypted using SSLv3 at the application layer and WPA2-PSK at the data link layer.
NR-18		High	The WPA2-PSK password used for wireless communication must have a bit strength of at least 80 bits.
NR-19		Medium	The WPA2-PSK password used for wireless communication must be changed every three months.
NR-20		Medium	The server shall be capable of supporting no less than 500 concurrent connections from any combination of surface computers, tablets and displays.
NR-21		High	Information transmission should be securely transmitted to the database without any changes in information to avoid disturbances in orders and billing.

3 Actors and Roles

1. Customer
2. Manager
3. Waiter
4. Chef

Role of Customer: Taking advantage of the service offered by the system and placing order

Role of Manager: Managing the restaurant, controlling and maintaining order

Role of Waiter: Serving the ordered products, helping the customer in all matters, organizing the tables

Role of Chef: Cooking and preparing ordered products

4 Use Cases

Use Case Identifier	UC-1
Use Case Name	Place Order
Participating Actors	Customer, Waiter, Chef
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the “Place Order” option from the menu. 3. The page with the photos and prices of the products that can be ordered opens. 4. The customer looks at the products and she/he clicks on the photo of the product she/he wants to eat to order or read reviews about the product. 5. The customer clicks the “Add Product” button after choosing the products and the amount of the products on the newly opened page. 6. The customer who finishes adding the product selects the "View Product Added" option from the menu. 7. After checking all the products she/he added, the customer clicks on the "Confirm Order" button on the page that opens. 8. The waiter assigned to the table’s account is notified that the order has been placed. 9. The system classifies the products by category and adds these products to a particular chef's queue on the kitchen screen.
Entry condition	The customer has been seated at an activated table.
Exit conditions	The customer cancels the order by selecting the “Cancel Order” option from the menu.
Related non-functional requirements	The system's upper limit is handling 1000 transactions per second. <NR-3> The system must not dismiss an engaged menu unless the customer requests it. <NR-12> Information transmission should be securely transmitted to the database without any changes in information to avoid disturbances in orders and billing. <NR-21>

Use Case Identifier	UC-2
Use Case Name	Call Waiter
Participating Actors	Customer, Waiter
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the “Call Waiter” option from the menu. 3. An alert is sent to the waiter assigned to the table. 4. Depending on availability, the waiter comes to the customer's table.
Entry condition	The customer has been seated at an activated table.
Exit conditions	The customer has stopped calling the waiter.

Related non-functional requirements	The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-3
Use Case Name	Search Product
Participating Actors	Customer
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the “Search Product” option from the menu. 3. The customer enters the word she/he wants to search in the search box on the opened page and clicks the "Search" button. 4. The products containing the word typed by the customer are displayed.
Entry condition	The customer has been seated at an activated table. The customer wants to search for a product.
Exit conditions	The product that the customer is looking for does not exist.
Related non-functional requirements	The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-4
Use Case Name	View Order Status
Participating Actors	Customer
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the “View Order Status” option from the menu. 3. On the screen that opens, the customer follows the preparation stages of her/his own order.
Entry condition	The customer must have placed an order.
Exit conditions	The customer cancels his/her order.
Related non-functional requirements	The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-5
Use Case Name	Edit Order
Participating Actors	Customer
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the “Edit Order” option from the menu. 3. If the product have not yet been prepared, the customer

	can change the quantity of the product ordered, add and remove products from the order.
Entry condition	The products have been ordered by the customer.
Exit conditions	The customer can not edit the order, if the dishes have been prepared.
Related non-functional requirements	The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-6
Use Case Name	Cancel Order
Participating Actors	Customer
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the “Cancel Order” option from the menu. 3. The customer selects the order she/he wants to cancel and clicks the “Cancel Order” button. 4. The customer answers “Yes" to the question “Are you sure about cancelling your order?".
Entry condition	The product has been ordered by the customer.
Exit conditions	The customer answers “No” to the question “Are you sure about cancelling your order?". The customer can not cancel the order, if the product has been prepared.
Related non-functional requirements	The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-7
Use Case Name	Comment and Rate Product
Participating Actors	Customer
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. After the customer has finished her/his meal, she/he clicks on the “Comment and Rate Product” option from the menu. 3. The customer rates the product out of 5 stars. 4. The customer enters her/his comment in the relevant space in the page that opens and clicks on the "Comment" button.
Entry condition	The order of the customer must have been delivered by the waiter.
Exit conditions	The customer stops making reviews and comments.
Related non-functional requirements	The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-8
Use Case Name	Pay Bill
Participating Actors	Customer
Flow of events	1. The customer double-taps the tablet to bring up a menu. 2. The customer selects the "Pay Bill" option from the menu. 3. The customer is offered 4 different options: cash payment, credit card payment, crypto currency payment and online credit card payment. 4. The customer continues the transaction by choosing the desired payment method.
Entry condition	The customer's order must have been delivered. The customer has sufficient money to order.
Exit conditions	The customer ceases to pay.
Related non-functional requirements	Information transmission should be securely transmitted to the database without any changes in information to avoid disturbances in orders and billing. <NR-21> The system must not dismiss an engaged menu unless the customer requests it. <NR-12>

Use Case Identifier	UC-9
Use Case Name	Pay with Credit Card
Participating Actors	Customer
Flow of events	1. The customer selects "Online Credit Card Payment" from the "Payment Methods" section. 2. The customer enters the required credit card information. 3. According to the card she/he uses, she/he is directed to the 3D Security verification step. 4. Customer completes the verification process by entering the code sent to his/her phone and the payment is completed.
Entry condition	The customer should have come to the payment step.
Exit conditions	The customer stops paying and exits the page. The customer does not have enough money to pay the bill.
Related non-functional requirements	Information transmission should be securely transmitted to the database without any changes in information to avoid disturbances in orders and billing. <NR-21>

Use Case Identifier	UC-10
Use Case Name	Pay with Crypto currency

Participating Actors	Customer
Flow of events	1. The customer selects "Crypto-currency Payment" from the "Payment Methods" section. 2. After the customer selects the cryptocurrency payment step, the QR code reader opens. 3. The QR code is read. 4. The transaction is confirmed on the tablet and the payment is completed.
Entry condition	The customer should have come to the payment step.
Exit conditions	The customer stops paying and exits the page. The customer does not have enough money to pay the bill.
Related non-functional requirements	The cryptocurrency payment method, one of the payment methods, can be used when the necessary government regulations are provided.<NR-7> Information transmission should be securely transmitted to the database without any changes in information to avoid disturbances in orders and billing. <NR-21>

Use Case Identifier	UC-11
Use Case Name	Log In
Participating Actors	Waiter, Chef, Manager
Flow of events	1. The employee double-taps the tablet to open the screen. 2. Username and password are entered. 3. If the username and password are in the system, the login is completed.
Entry condition	The employee must be registered in the system. Username and password must be correct.
Exit conditions	The employee has been deleted from the system by the manager. The username / password has been entered incorrectly 5 times.
Related non-functional requirements	The system shall require a staff to log in using a username and password. <NR-8> The waiter/chef shall only be able to log into one device at any given instance of time. <NR-9> Access to the system without user login is prohibited.<NR-13>

Use Case Identifier	UC-12
Use Case Name	Log Out
Participating Actors	Waiter, Chef, Manager
Flow of events	1. The employee double-taps the tablet to open the screen. 2. The employee should press the "Log Out" button at the bottom of the tablet.

	3. The employee answers “Yes” to the question “Are you sure you want to log out?”
Entry condition	The employee must have "Log In" to the system.
Exit conditions	The employee answers “No” to the question “Are you sure you want to log out?”
Related non-functional requirements	

Use Case Identifier	UC-13
Use Case Name	Activate Table
Participating Actors	Waiter
Flow of events	1. The waiter double-taps the tablet to open the screen. 2. The waiter selects the "Activate Table" option from the menu on his user interface. 3. The waiter chooses the table she/he wants to activate according to the table number. 4. The waiter activates the table she/he wants by pressing the "Activate Table" button.
Entry condition	There should be no customers at the table. The table should not be reserved.
Exit conditions	The waiter applies the "Deactivate Table" process. The customer sits at the table or the table is reserved.
Related non-functional requirements	

Use Case Identifier	UC-14
Use Case Name	Deactivate Table
Participating Actors	Waiter
Flow of events	1. The waiter double-taps the tablet to open the screen. 2. The waiter selects the “Deactivate Table” option from the menu on his/her user interface. 3. The waiter chooses the table she/he wants to deactivate according to the table number.
Entry condition	The table must be reserved in advance.
Exit conditions	The waiter applies the "Activate Table" process.
Related non-functional requirements	

Use Case Identifier	UC-15
Use Case Name	Deliver Product
Participating Actors	Waiter, Customer
Flow of events	1. After the order given by the customer is prepared, an alert is sent from the chef on the tablet of the waiter that the order is ready. 2. The ready order is served to the customer. 3. After the waiter delivers the order, the waiter selects the “Deliver Order” option from the menu. 4. The waiter marks the served order as “Delivered”.
Entry condition	The chef states that the order is ready.
Exit conditions	The order cannot be served due to the waiter dropping the order.
Related non-functional requirements	

Use Case Identifier	UC-16
Use Case Name	Process Cash Payment
Participating Actors	Waiter, Customer
Flow of events	1.The customer selects "Cash Payment" from the "Payment Methods" section. 2. An alert is sent to the waiter assigned to the table. 3. The waiter goes to the customer's table and takes the payment.
Entry condition	The customer should have come to the bill payment step.
Exit conditions	The customer ceases to pay. The customer decides to change the payment method. The customer does not have enough cash.
Related non-functional requirements	

Use Case Identifier	UC-17
Use Case Name	Issue Refund
Participating Actors	Manager
Flow of events	1. The waiter double-taps the tablet to open the screen. 2. The manager selects the "Issue Refund" option in her/his system. In the page that opens, there is a list of payments made from today to the past. 3. Manager selects the account to be paid back. 3.1 If the payment is made in cash, a warning will be sent to the waiter and the customer will be refunded in cash. 3.2 If the payment is made by online or credit card, the refund will be made to the credit card.

	3.3 If the payment is made in crypto money, the refund will be made in crypto money.
Entry condition	An error occurred in the payment step. There is a defect in the products delivered.
Exit conditions	It is noticed that there is no error in the payment step.
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6> Information transmission should be securely transmitted to the database without any changes in information to avoid disturbances in orders and billing. <NR-21>

Use Case Identifier	UC-18
Use Case Name	Add User
Participating Actors	Manager
Flow of events	1. The manager clicks on the "Users" button from the admin panel. 2. The manager clicks on the "Add User" button. 3. The manager determines the type of personnel, creates a temporary password and clicks the "Add" button for adding new users. 4. The manager informs the relevant user.
Entry condition	The manager decides to add a new user.
Exit conditions	The manager ceases to add a new user.
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6>

Use Case Identifier	UC-19
Use Case Name	Edit User
Participating Actors	Manager
Flow of events	1. The manager clicks on the “Users” button from the admin panel. 2. The manager clicks on the "Edit User" button. 3. The manager finds the relevant personnel among all users. 4. The manager makes the (necessary) update by clicking the “Edit” button and then saves.
Entry condition	Need to update information about users.
Exit conditions	No need to update information about users.
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6>

Use Case Identifier	UC-20
Use Case Name	Delete User

Participating Actors	Manager
Flow of events	1. The manager clicks on the "Users" button from the admin panel. 2. The manager clicks on the "Delete User" button. 3. The system creates a red "Delete" button next to each user. 4. The manager taps the relevant personnal's "Delete" button. 5. The system warns the manager with a pop-up "Are you sure?" . 6. The manager deletes the user by tapping "Yes".
Entry condition	When the employees quit work.
Exit conditions	The manager answers "No" to the question "Are you sure?".
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6>

Use Case Identifier	UC-21
Use Case Name	Add Product
Participating Actors	Manager
Flow of events	1. The manager taps on the "Products" button from the admin panel. 2. The manager taps on the "Add Product" button. 3. The manager fills the information of the product (product name, product description, product image etc.) in the opened page after tapping "Add Product". 4. The manager clicks the "Add Product" button and saves.
Entry condition	New products need to be added to the menu.
Exit conditions	The new product is already on the menu.
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6>

Use Case Identifier	UC-22
Use Case Name	Edit Product
Participating Actors	Manager
Flow of events	1. The manager taps on the "Products" button from the admin panel. 2. The manager taps on the "Edit Product" button. 3. The manager double-taps the product that needs to be updated. 4. The manager updates the information of the product in the opened page after tapping the product by clicking the "Edit Product" button and saves.
Entry condition	Some products in the menu need to be updated.
Exit conditions	
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6>

Use Case Identifier	UC-23
Use Case Name	Delete Product
Participating Actors	Manager
Flow of events	1. The manager taps on the "Products" button from the admin panel. 2. The manager taps on the "Delete Product" button. 3. The system creates a red "Delete" button next to each product. 4. The manager taps the relevant product's "Delete" button. 5. The system warns the manager with a pop-up "Are you sure?" . 6. The manager can delete products by tapping "Yes".
Entry condition	Having products that need to be deleted.
Exit conditions	The manager answers "No" to the question "Are you sure?".
Related non-functional requirements	The whole system is secured. Only the manager can access all the data.<NR-6>

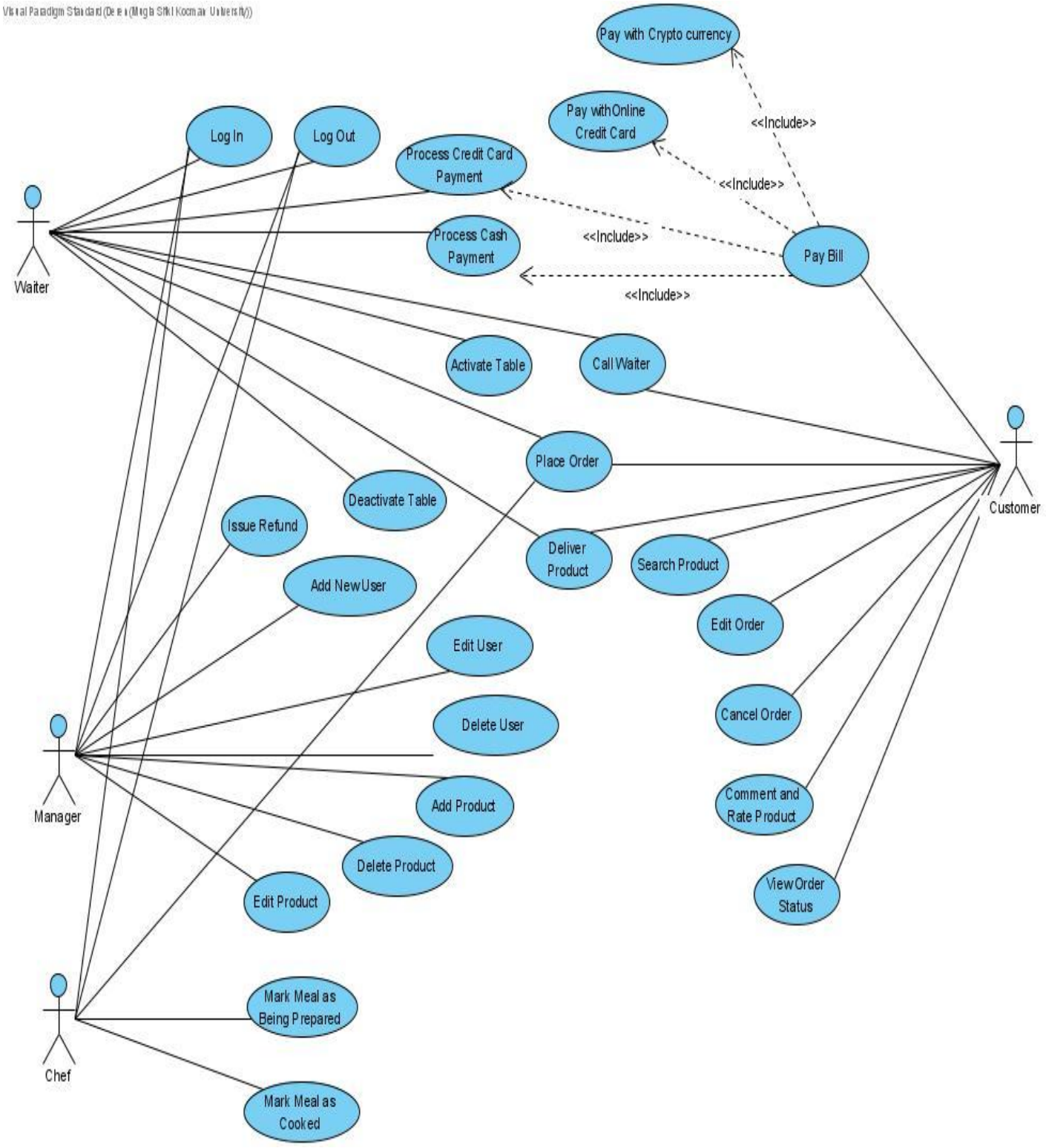
Use Case Identifier	UC-24
Use Case Name	Mark Meal as Being Prepared
Participating Actors	Chef
Flow of events	1. The ordered product appears in the user interface of the chefs. 2. When the relevant chef starts the preparation of the meal. 3. The chef informs the customer by touching the "Being prepared" button.
Entry condition	The customer has placed an order.
Exit conditions	The order has been canceled. There is no product required to prepare the meal.
Related non-functional requirements	

Use Case Identifier	UC-25
Use Case Name	Mark Meal as Cooked
Participating Actors	Chef
Flow of events	1. When the meal in the "Being prepared" position is completed, the relevant chef informs the customer by touching the "Cooked" button. 2. An alert is sent to the waiter that the order is ready.
Entry condition	The order is ready for service.
Exit conditions	
Related non-functional requirements	

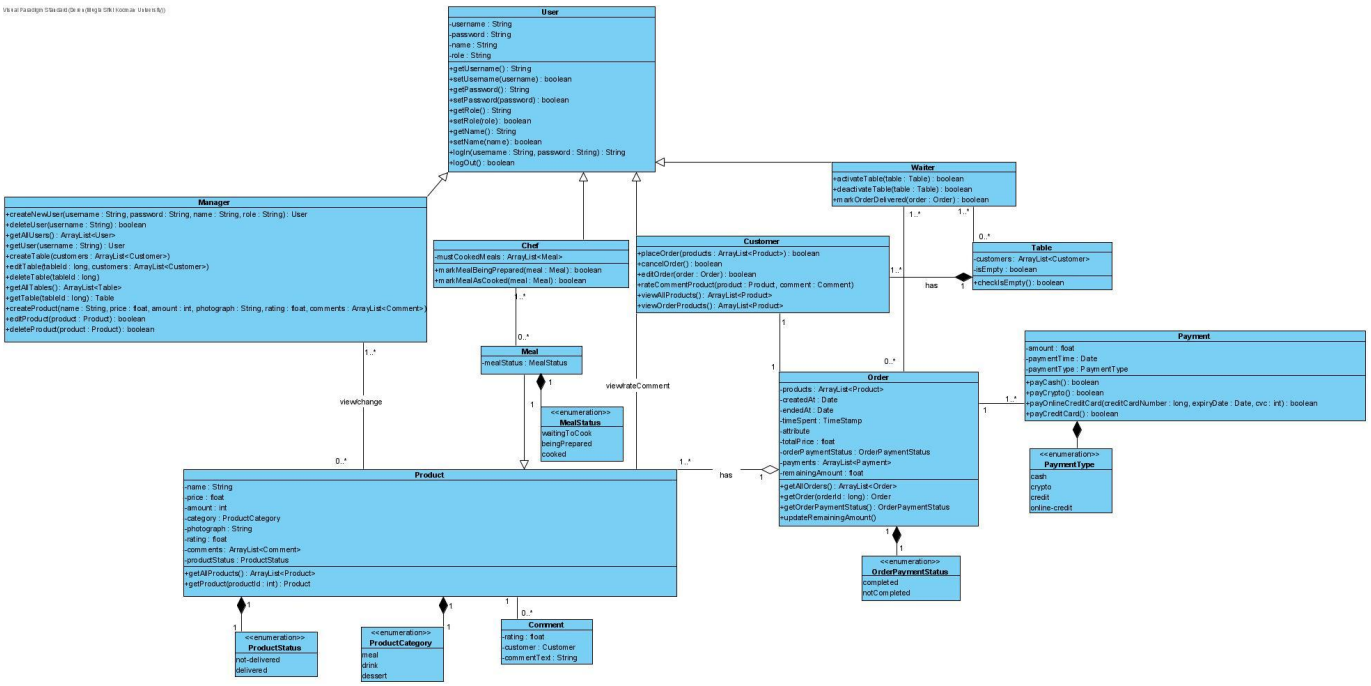
Use Case Identifier	UC-26
Use Case Name	Process Credit Card Payment
Participating Actors	Waiter, Customer
Flow of events	1.The customer selects "Credit Card Payment" from the "Payment Methods" section. 2. An alert is sent to the waiter assigned to the table. 3. The waiter goes to the customer's table with a POS device and takes the payment.
Entry condition	The customer should have come to the bill payment step.
Exit conditions	The customer ceases to pay. The customer decides to change the payment method. There is not enough money on the customer's credit card.
Related non-functional requirements	

5 System models

5.1 Use Case Diagrams (at least three use cases per team member)

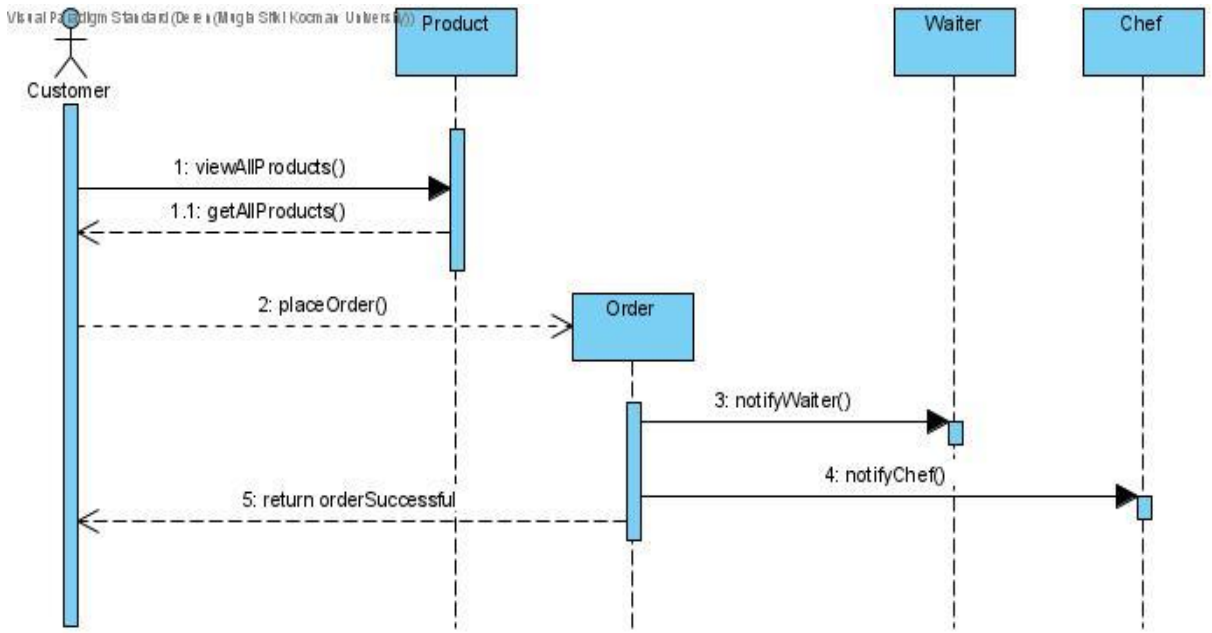


5.2 Class Diagrams (at least four classes per team member)

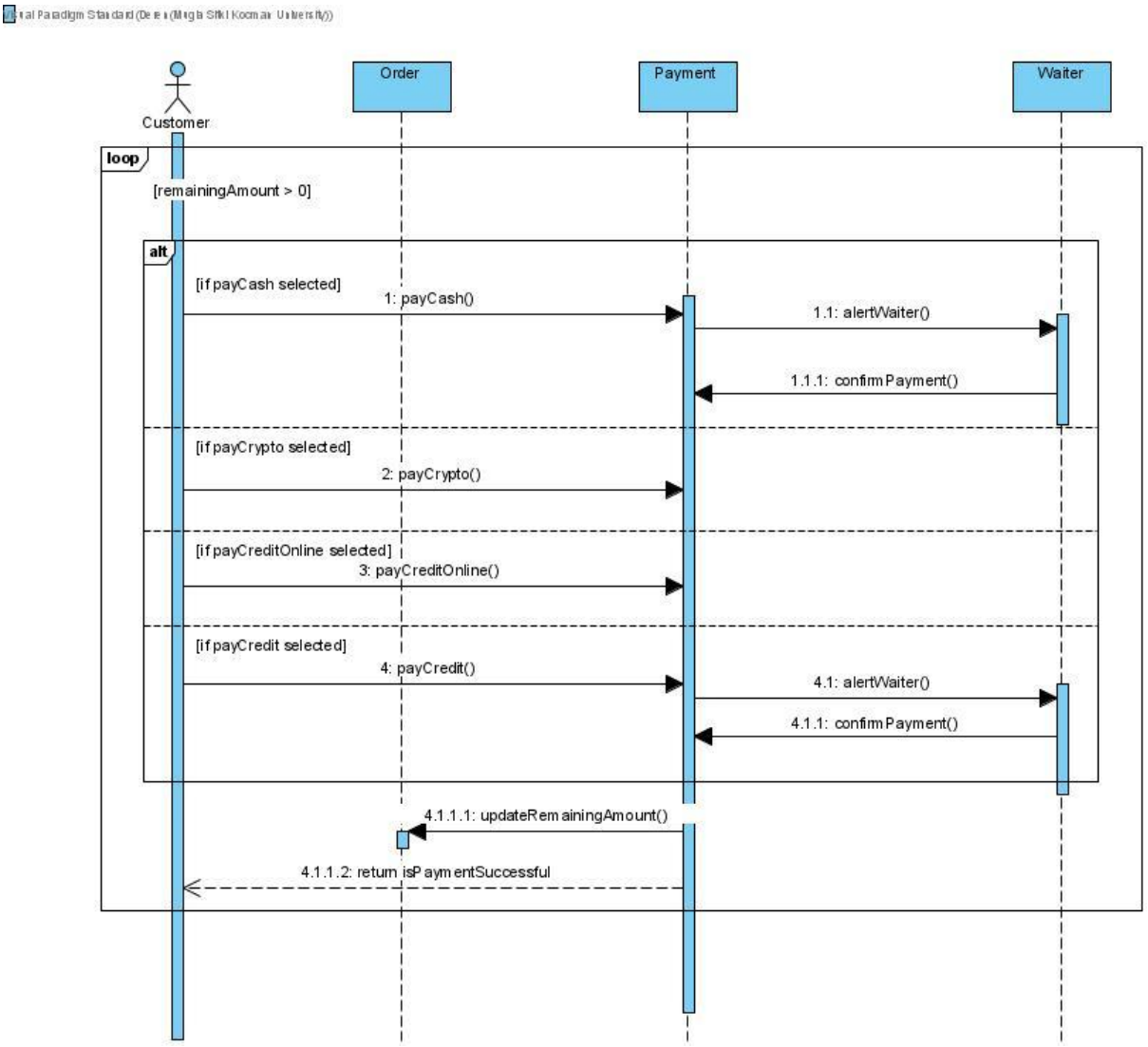


5.3 Sequence Diagrams (at least one per team member)

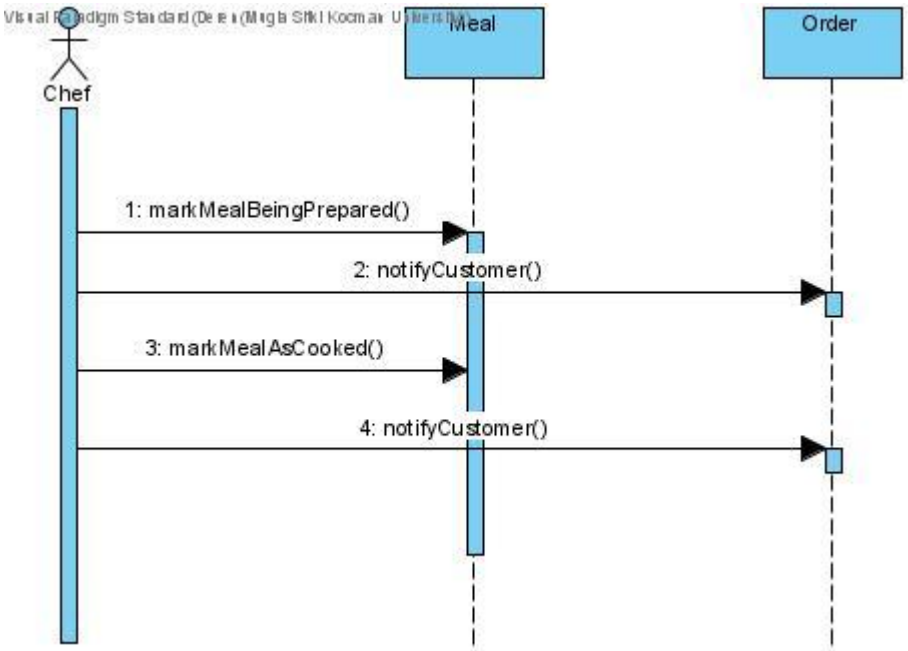
❖ Place Order Sequence Diagram



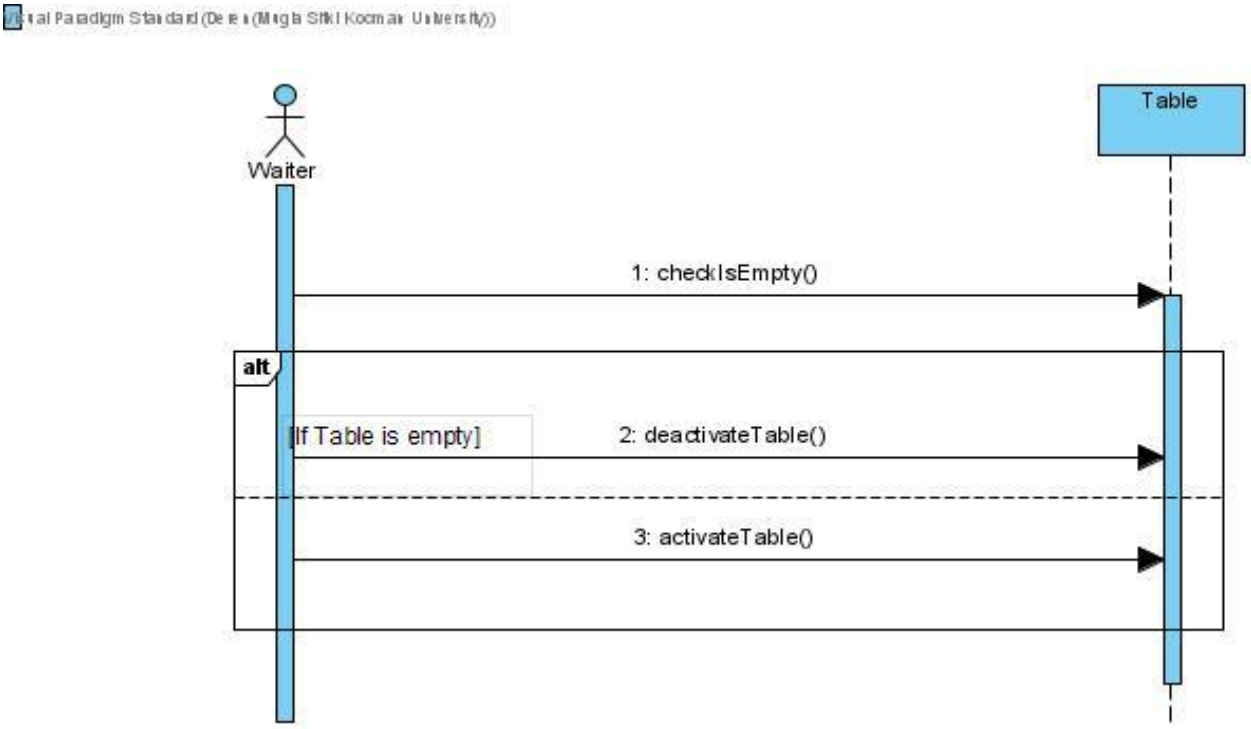
❖ Pay Bill Sequence Diagram



❖ Mark Meal as Cooked Sequence Diagram

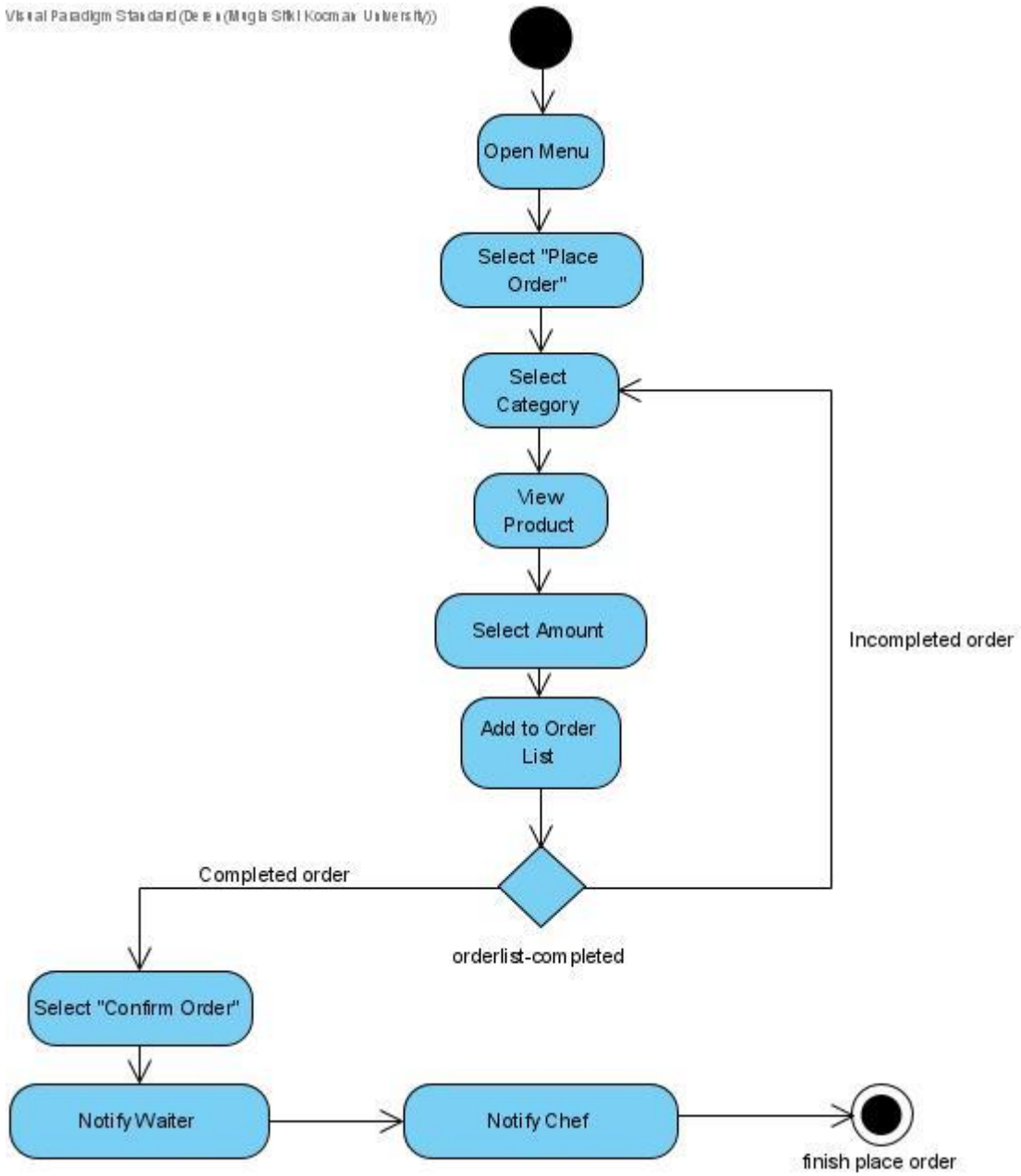


❖ Table Activation Sequence Diagram

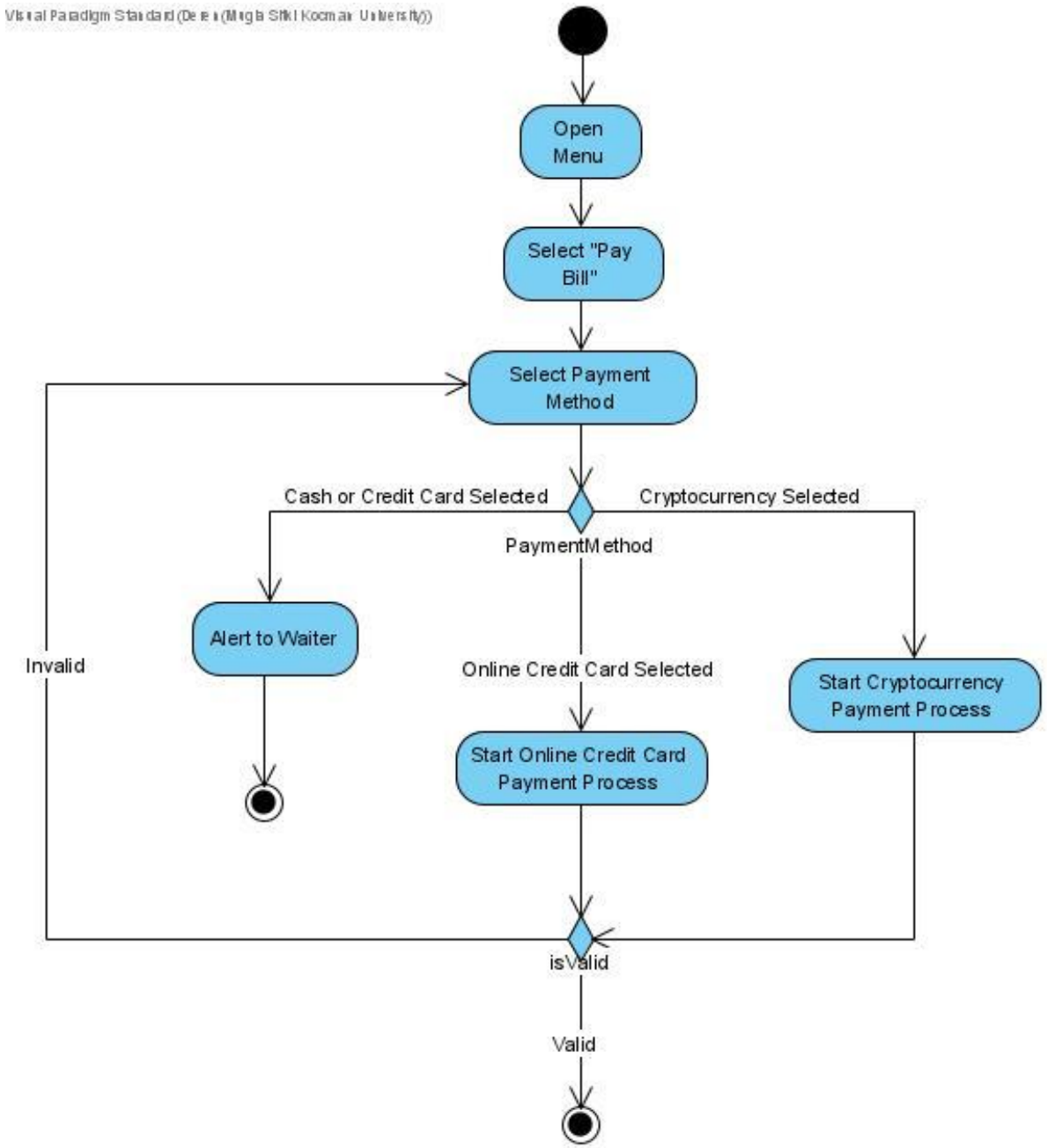


5.4 Activity Diagrams (at least one per team member)

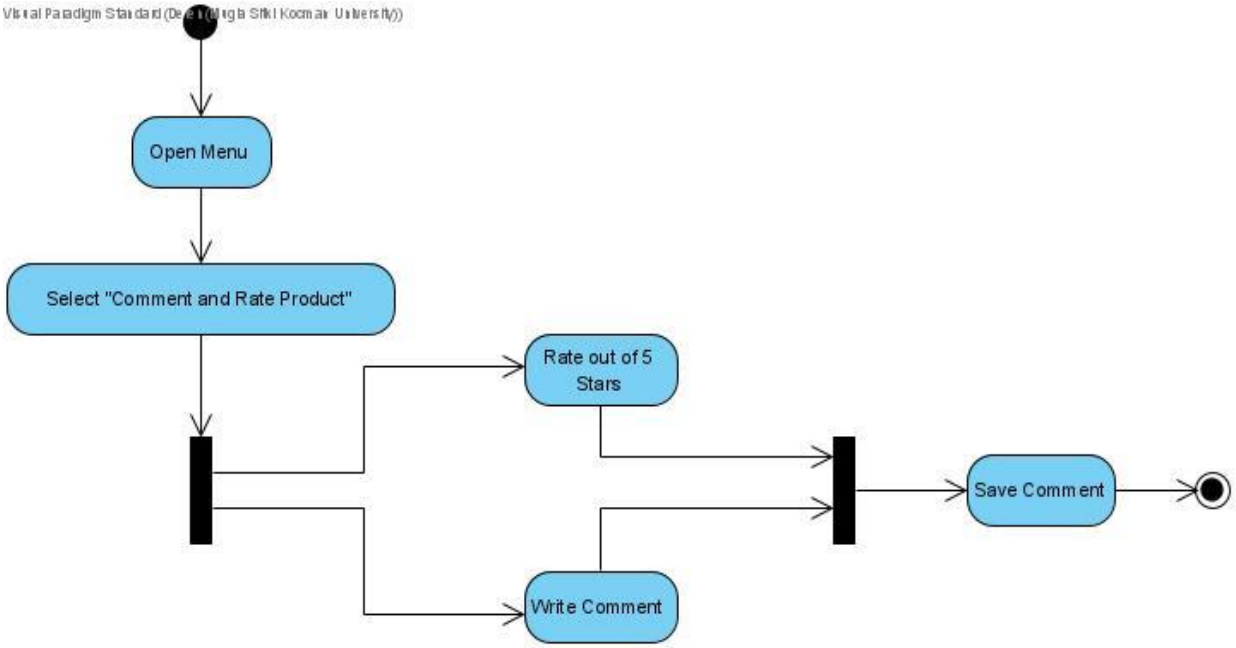
❖ Place Order Activity Diagram



❖ Pay Bill Activity Diagram

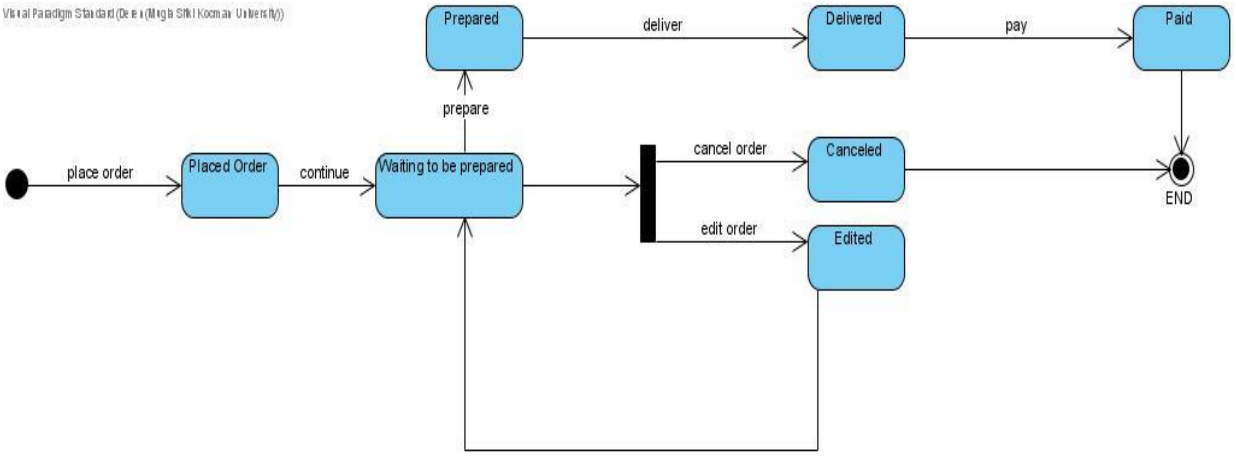


❖ Comment/Rate Product Activity Diagram



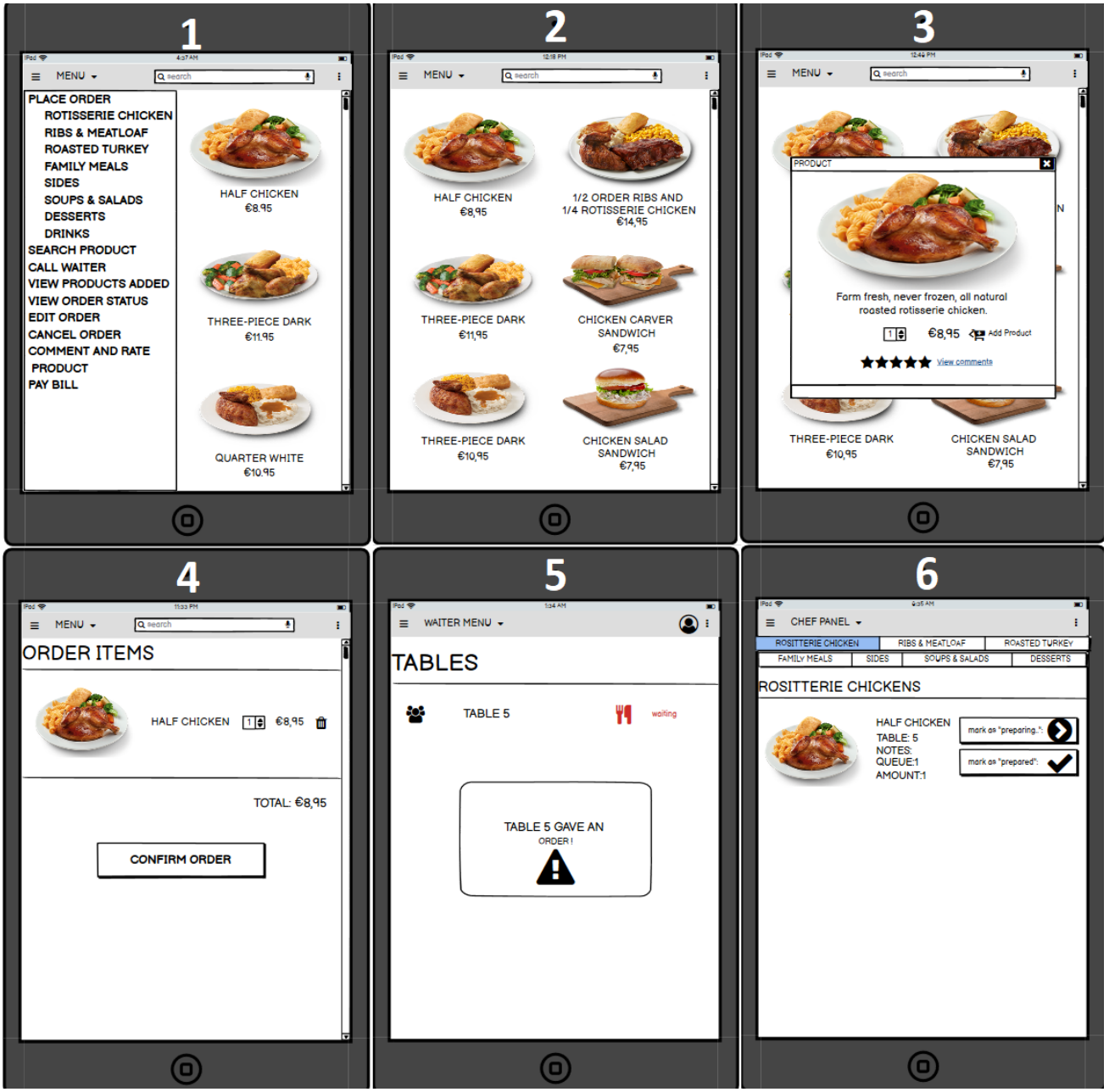
5.5 Statechart Diagrams (at least one)

❖ Order Class



6 User Interface Diagrams (at least one)

PLACE ORDER



7 Glossary

Crypto-currency: Crypto-currency is a digital asset designed to work as a medium of exchange wherein individual coin ownership records are stored in a ledger existing in a form of a computerized database using strong cryptography to secure transaction records, to control the creation of additional coins, and to verify the transfer of coin ownership.

WPA2-PSK: WPA2-PSK is the wi-fi security protocol.

8 References

[1]https://www.slideshare.net/Aurnob0071/software-requirements-specification-for-restaurant-management-system

[2]https://www.academia.edu/11259743/Software_Requirements_Specification_Restaurant_Menu_and_Ordering_System

[3]https://github.com/harismuneer/Restaurant-Management-System/blob/master/documents/SRS%20(Latest).pdf

9 Appendix