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Assignment 1: **Business analysis**

Make a business model of Likkebaard (current situation). Create next UML models:

a. Business use case diagram for the "ordering" process (business use case with actors, business workers). This use case is a transaction that starts when somebody contacts Likkebaard for making an order for meals and ends when the prepared meals are delivered at shipping address.

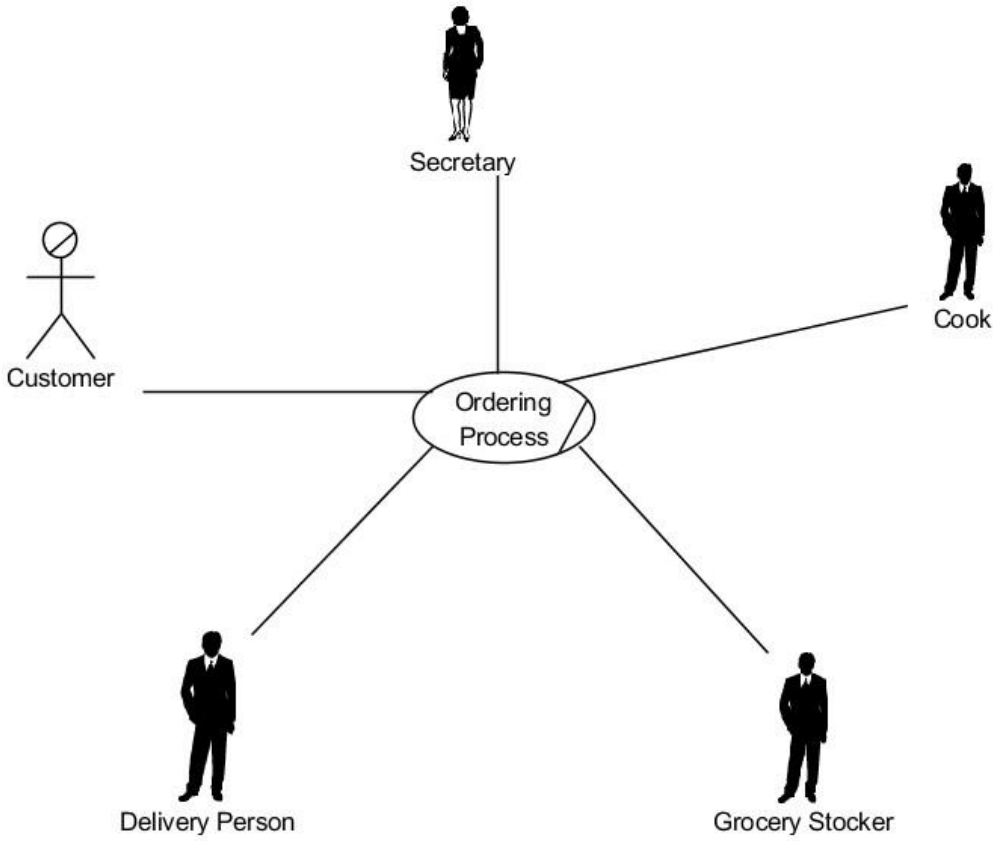
b. Overall Activity diagram (business process model) of the "ordering" process for the current.

c. Detailed Activity diagram of the action "register order" within the administration partition of the
overall activity diagram (transform this action in a calling activity in the overall activity diagram).

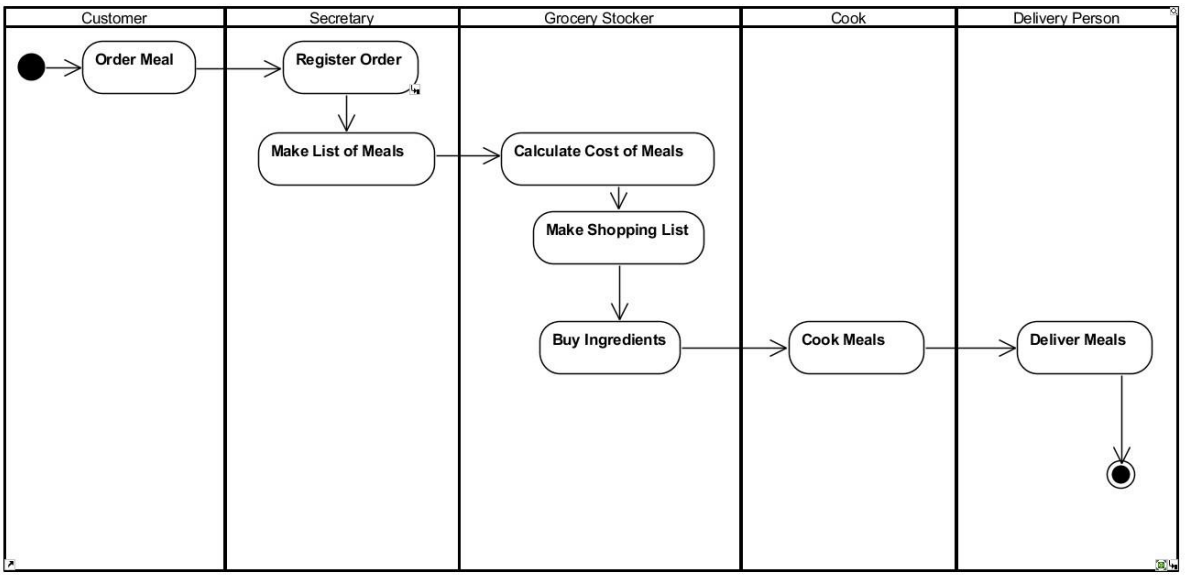
d. Business class diagram of the current situation. Focus on the data that is being recorded and stored in the current situation.

e. Business class diagram of the wanted situation. Focus on the data that should be recorded in the improved situation.

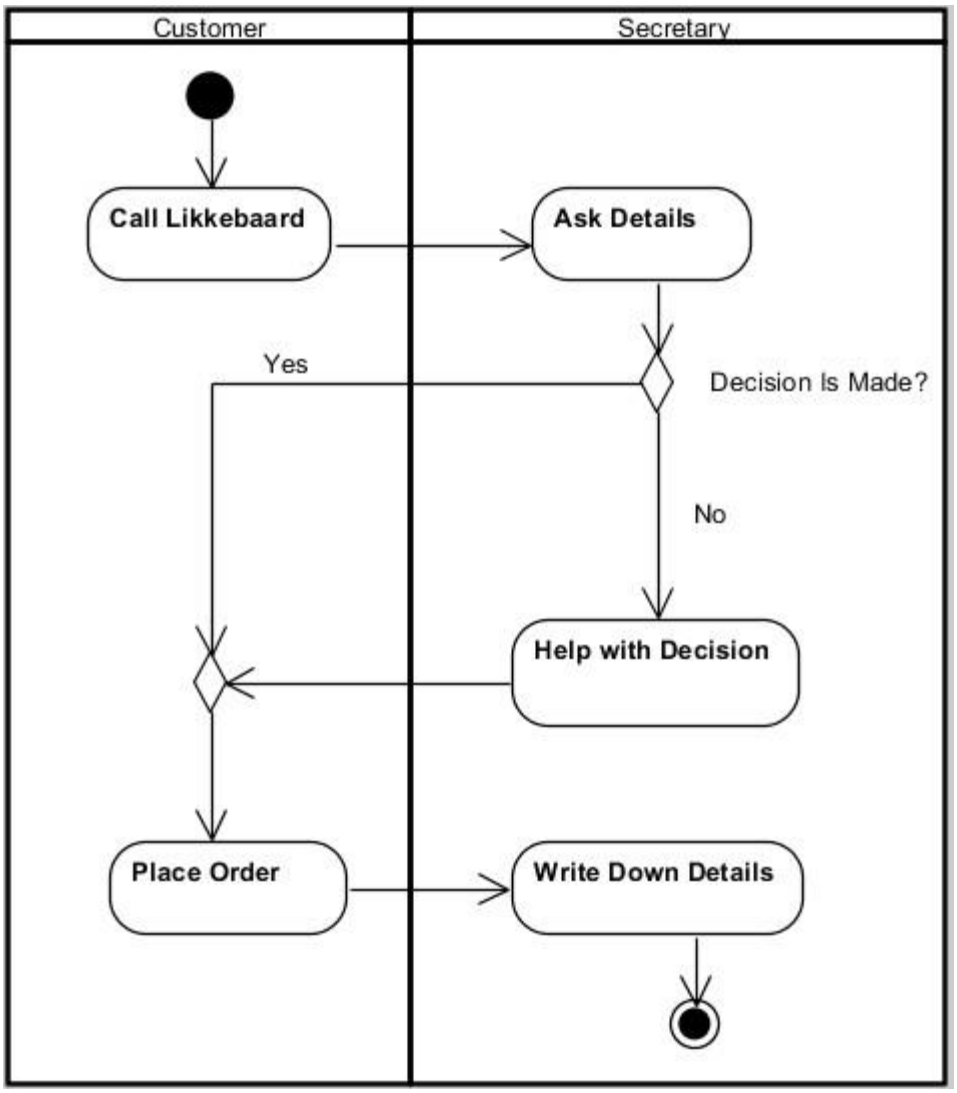
1a. Business use case diagram



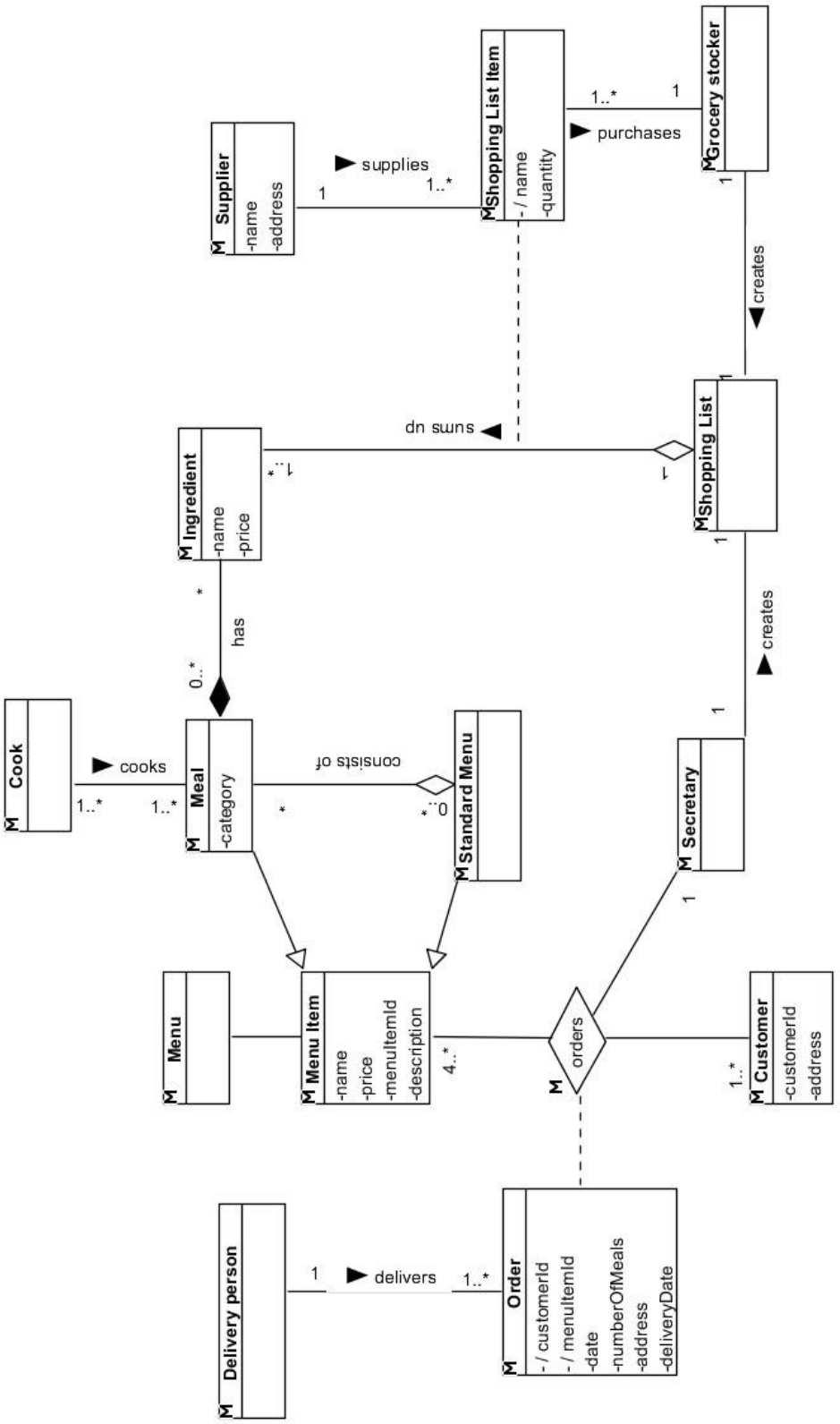
1b. Overall Activity Diagram



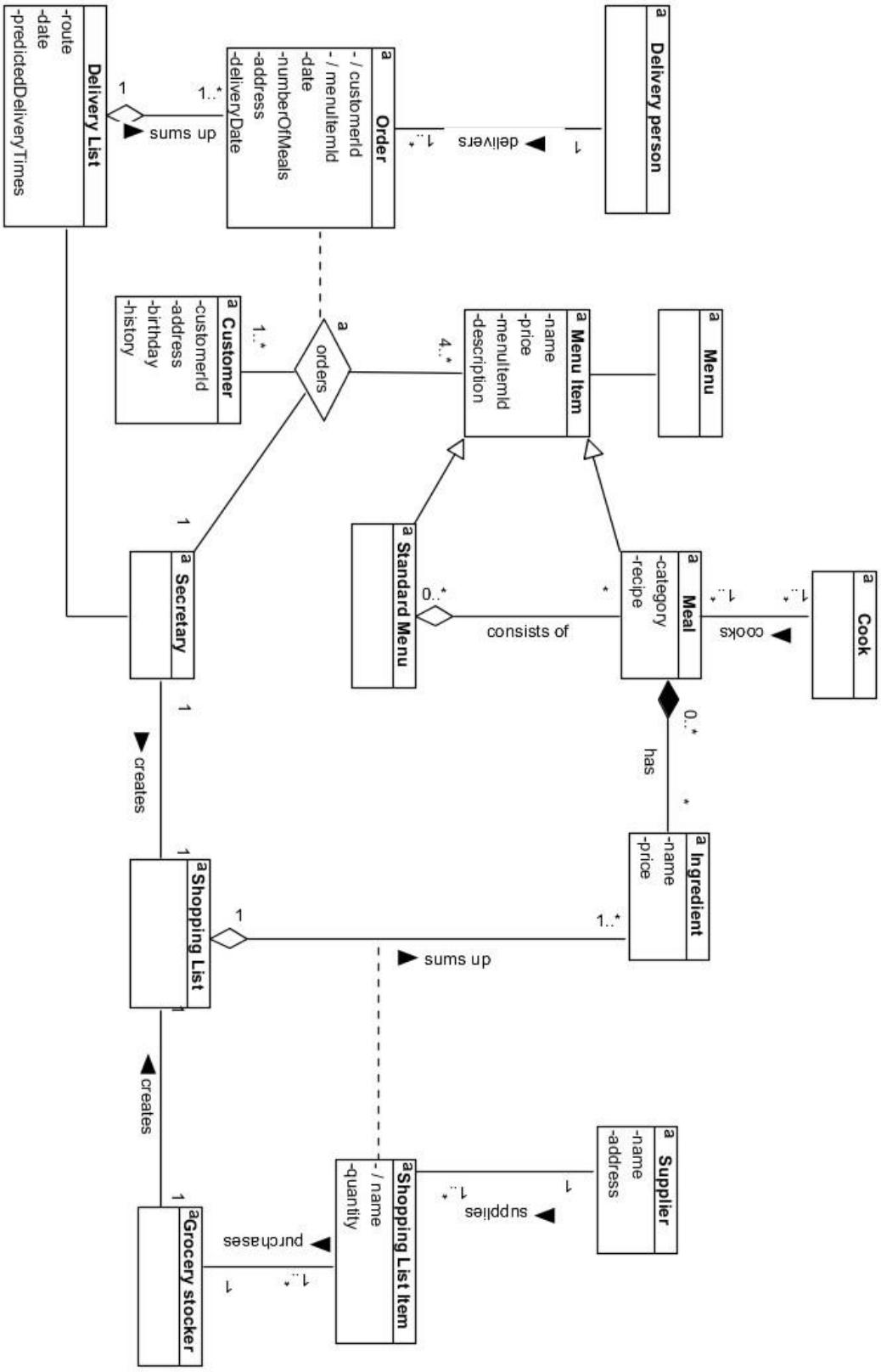
1c. Detailed Activity Diagram



1d. Business Class Diagram (current situation)



1e. Business Class Diagram (wanted situation)



Assignment 2: **Problem analysis**

a. Create a problem statement table with all the problems/opportunities of the current system. Use the Problem Statement template.
b. Each student describes 1 problem from this table in detail (PIECES). Use the PIECES-template. (4 students mean 1 problem statement table and 4 detailed problem descriptions)

2a. Problem statement matrix

Brief Statements of Problem, Opportunity or Directive	Urgency	Visibility	Priority or Rank	Proposed Solution
Problem: The meals don't always follow the same recipe and the cooks don't always use the same ingredients.	1 month	Medium	2	Database for standardized recipes and ingredients.
Problem: The deliveries don't always arrive at the promised time and the process could be more efficient.	ASAP	High	1	Write an algorithm that calculates the most efficient way to deliver all the orders, taking traffic into account.
Opportunity: Website for checking new menu and current deals, ordering meals, follow up on the delivery time, file a complaint or leave reactions.	6 months	Very high	3	Create website.
Opportunity: Create database for customer info so people can get deals on their birthday or when they make a certain amount of orders.	9 months	Medium	4	The secretary has to ask this personal data when taking orders and add the information to the database. A new application has to be written that sends e-mails on people's birthdays or when they deserve the loyalty bonus. This application has to integrated in the website.

2b. Problem description

Every time a meal is made, it tastes slightly different, and the cooks don't always use the same ingredients.

Cause:	No standardized recipes are used when cooking. All meals are made from the cook's memory, which can cause variations between cooks, but also from day to day with the same cook.
Effect:	Returning customers can receive different products from what they expected to receive. This has a negative effect on customer satisfaction.
Opportunity:	A database with standardized recipes can be created that would allow the cooks to always the exact same recipe to cook a meal.
Benefit:	Product consistency will be increased, and customer satisfaction will be improved. Cooking process will be more fluent.

2c. Problem description

The deliveries don't always arrive at the promised time and the process could be more efficient.

Cause:	Inefficient delivery
Effect:	Customers will be displeased if their food arrives late
Opportunity:	If the meals are delivered on time, more customers will likely order meals from us
Benefit:	More pleased customers means more customers will order from us
Constraint:	Difficult to write and implement algorithm
Possible Improvements:	Write an algorithm that calculates the most efficient way to deliver all the orders, taking traffic into account.

2d. Opportunity description

Website for checking new menu and current deals, ordering meals, follow up on the delivery time, file a complaint or leave reactions.

Cause:	Customers have a difficult time looking up the menus and meals of Likkebaard. It is also non-intuitive to leave feedback about previous orders.
Effect:	Since it is easier to look things up, there will likely be more customers. And those customers will order things faster.
Opportunity:	Ease of use is a very important factor in the decision potential customers make.
Benefit:	It is easier for the customer to check all menus and meals, as well as leave feedback. This will increase customer satisfaction and lead to new customers and happy customers.
Possible Improvements:	Making a simple website on which people can order will give less work to the secretary.

2e. Opportunity description

Create database for customer info so people can get deals on their birthday or when they make a certain amount of orders.

Cause:	It's very difficult to reward people when they make a lot of orders or when it's their birthday, because there's enough or even too much work for every employee as it is.
Effect:	Customers satisfaction will increase if their loyalty pays off. Sending them a special deal on their birthday can remind them of the business if they didn't order something for a while. The deal will probably lead to a new order because if the discount.
Opportunity:	A surprise like a birthday or loyalty deal can make the customers have very positive feelings about Likkebaard, which might lead to them talking about this with their connections.
Benefit:	Word of mouth will lead to new people hearing about Likkebaard and they might become customers in the future.
Constraint:	People may want to register on the website and make a very small order, just because they want to get a birthday deal. This needs to be avoided.
Possible Improvements:	To avoid the constraint, customers will have to make one or multiple orders that sum up to a minimum amount of money after registering, before they are rewarded on their birthday. This way it will be worth our while either way.

Assignment 3: **Product vision board**

Write a vision document. Use the Product Vision Board template. Consider the information listed in your problem matrix from assignment 2.

THE PRODUCT VISION BOARD

VISION STATEMENT

Provide quality meals for a reasonable price and deliver them in time to the customers.

TARGET GROUP	NEEDS	PRODUCT	VALUE
People who want to stay at home, but also want to have a healthy, fresh meal without having to cook it	Standardized recipes for each meal High quality, fixed ingredients for every meal	Freshly cooked meals, delivered at home	Higher customer satisfaction, which will lead to a greater revenue.
Secretary, because her job will be easier if the process becomes partly automated	Customer registration Check menu online Order online Follow up on delivery Cancel delivery	Website with automatization of making lists of ingredients and optimized delivery routes.	The staff will no longer lose time on tasks that can be done automatically. This lowers the labor costs.

Assignment 4: **Requirement analysis**

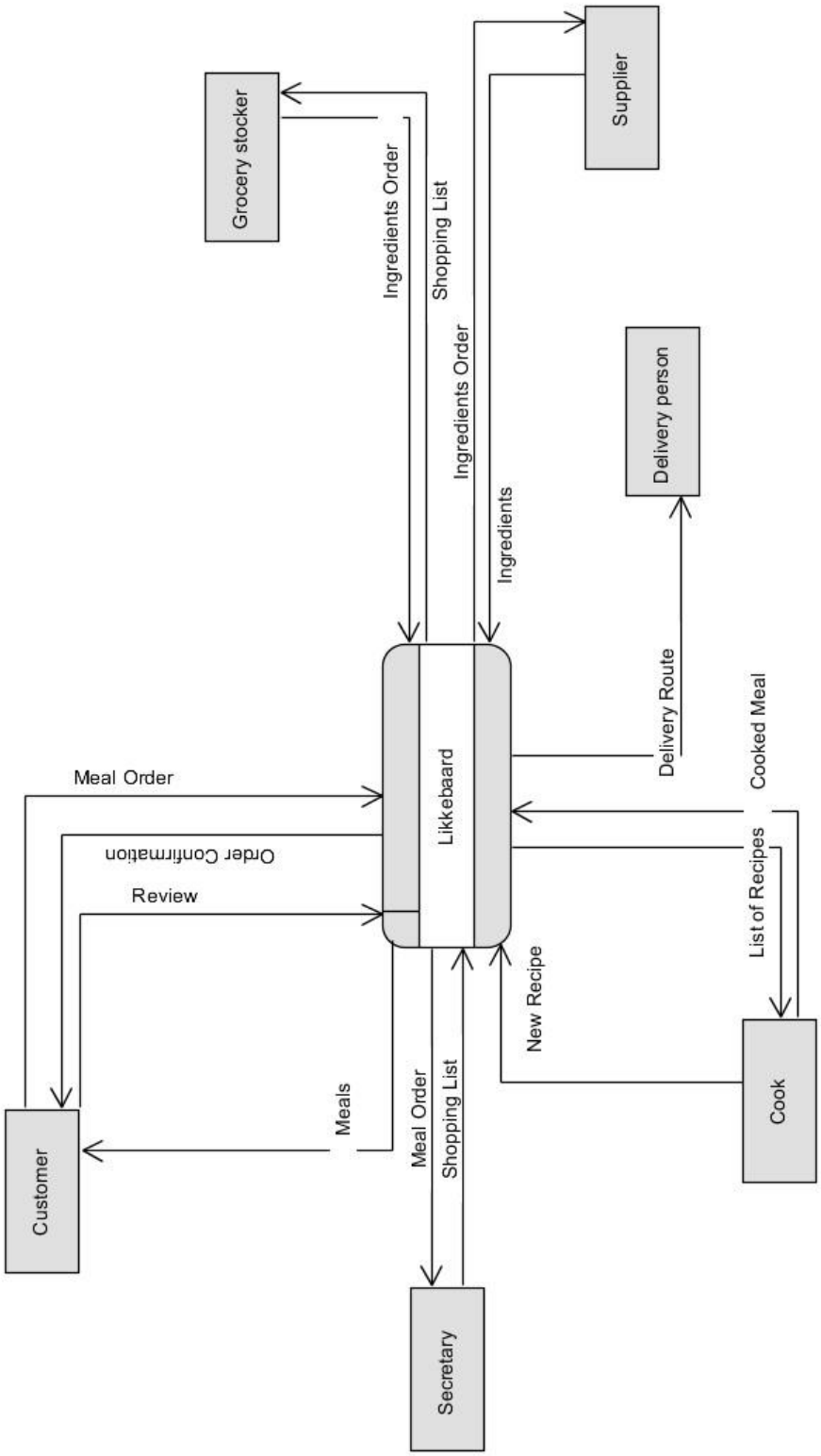
Create next models:

- **a.** Event response list with the 12 to 15 most important events (external, temporal and state events).
- **b.** Context diagram
- **c.** Make a list of relevant use cases for the scope described in your context diagram. Give a ranking for those use cases (MOSCOW). Motivate this ranking (economic, technical, operational, risk, logical reasons). Use the use case priorities template.
- **d.** Transform the list of relevant use cases into an UML use case diagram.

4a. Event response list

Event	Trigger	Source	Use case	Response	Destination
Customer places an order	New order	Customer	Create new order	Real-time link, Order details, Transaction, Order confirmation	Customer
Customer changes order	Order change request	Customer	Update order	Change confirmation, Transaction	Customer
Customer cancels order	Order cancel request	Customer	Cancel order	Cancel confirmation, Cancel Order Details, Transaction	Customer
Customer gets email and coupon on birthday	Customer birthday		Send birthday card	Create coupon, Send coupon, Send email	Customer
Customers wants overview of meals	Overview request	Customer	Check customer overview	Overview details	Customer
Grocery Stocker goes shopping	Every day at noon		Buy ingredients	Get shopping list details, Go shopping, Resupply stock	Stock
Cook wants to see recipe	Recipe request	Cook	Look up recipe	Recipe details	Cook
Customers enters new meal	New meal form request	Customer	Order new meal	Meal form, Add meal, Meal confirmation	Cook, Customer
Customer gives feedback	Incoming feedback	Customer	Process feedback	Feedback form, Add feedback, Feedback confirmation	Secretary
Delivery person requests delivery addresses	All meals are ready	Cook	Check route	Receive address details	Delivery person
Get all orders of the day	Beginning of work day		Check daily overview	Receive order details	Cook
Delivery person delivers orders	Address details received	Delivery person	Deliver orders	Delivered order	Customer

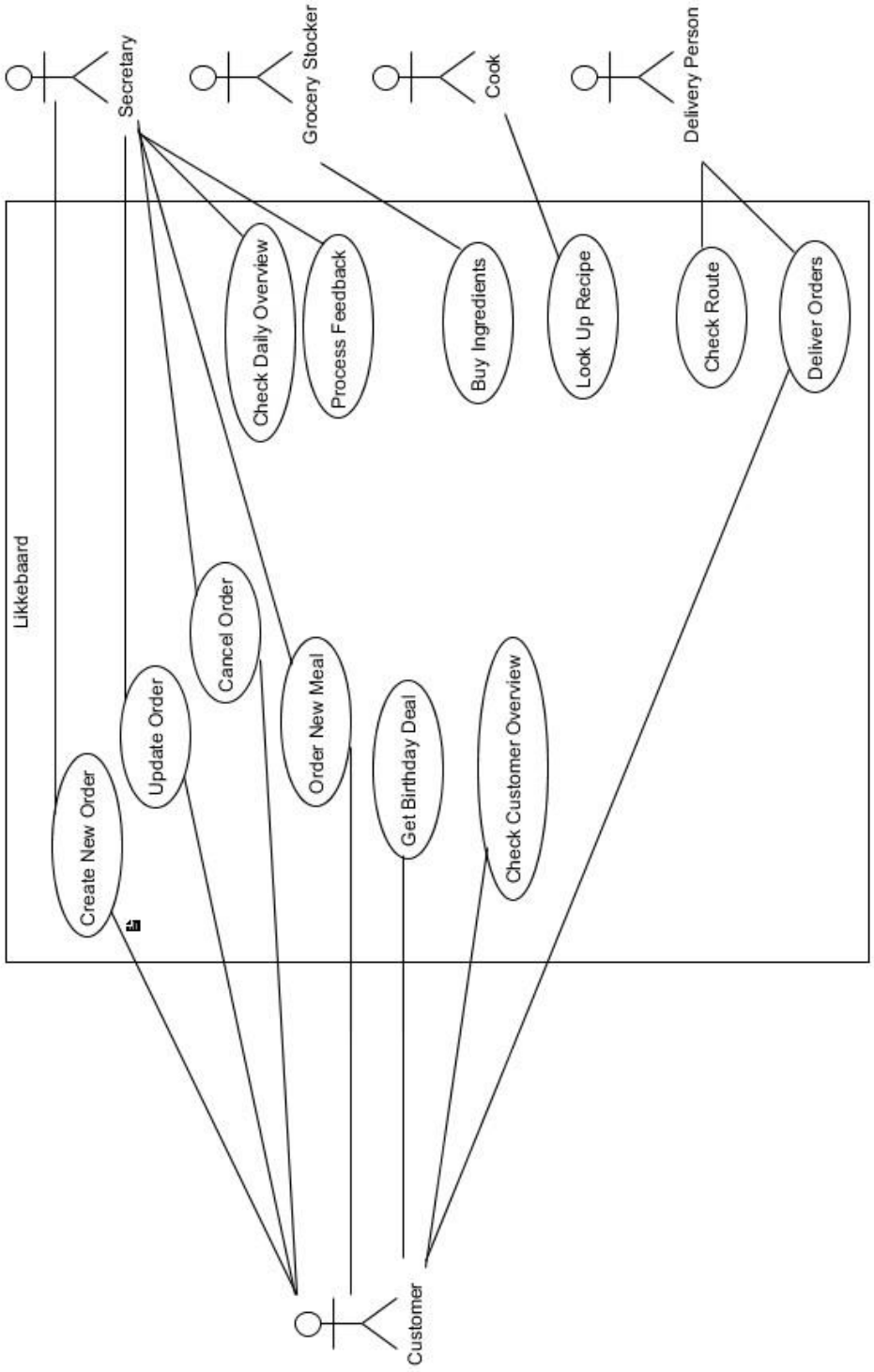
4b. Context diagram



4c. List of relevant use cases

Use case	Priority (M,S,C,W)	Release (1,2 of 3)	Motivation priority
Create new order	M	1	The business cannot function without this.
Update order	C	3	It's already possible to cancel an order and make a new one.
Cancel order	S	1	Customers could get really angry if this isn't possible.
Send birthday card	C	3	People are not counting on this.
Check customer overview	C	3	Customers only need this if they made multiple orders at once, which won't happen very often.
Buy ingredients	M	1	The business cannot function without this.
Look up recipe	S	1	This is necessary if the cook doesn't know the recipe.
Order new meal	S	2	It's not very hard to implement this and it can be frustrating for customers if they want to eat something that Likkebaard doens't offer.
Process feedback	C	2	It can be frustrating for customers if nothing happens with their feedback.
Check route	S	1	The delivery person needs to know the route. If not, he might not be able to find certain addresses which will lead to very angry customers.
Check daily overview	S	2	It's easy to forget orders if there is no overview.
Deliver orders	M	1	The business cannot function without this.

4d. System Use Case Diagram



Assignment 5: **Business rules & non-functional requirements**

Make next lists:

- **a.** Make a list of relevant business rules (at least 10 rules). Use the business rules template.
- **b.** Make a list of non-functional requirements (quality attributes). Identify at least 10 non-functional requirements spread over the different categories of non-functional requirements. (In ISO9126.pdf (in zip file) you can find an English translation for the quality attributes)

5a. Relevant Business Rules

ID	Description rule	Type	Static/dynamic	Source
1	Orders have to be made before 12PM.	Constraint	Dynamic	Secretary
2	Orders cannot be changed after 12PM.	Constraint	Dynamic	Secretary
3	The preparation of a meal cannot take longer than 150 minutes.	Constraint	Dynamic	Cook
4	An order needs to have at least 4 meals.	Constraint	Dynamic	Cook
5	A customer can only order one menu per day per address.	Constraint	Dynamic	Cook
6	If one of the guests is vegetarian, a menu can be combined with a vegetarian menu.	Event	Static	Cook
7	If the prices are changed, the price of the day of the order is charged.	Event	Static	Secretary
8	If a meal consists of three or more dishes, a reduction of 10% is granted.	Event	Dynamic	Secretary
9	The price for a dish is the cumulative price for the ingredients plus 40% for the cost of the preparation and the profit.	Deduction	Dynamic	Secretary
10	Every six months the agreed prices of the suppliers are settled.	Event	Static	Grocery stocker

5b. Non-Functional Requirements

Type	Requirement	Description
Reliability	Recoverability	The orders, the recipes and the addresses of the clients must not be lost if the system fails.
Usability	Understandability	An experienced internet user must be able to make an order within five minutes, even if he visits the order page for the first time. An inexperienced user has to be able to find the phone number so he can make an order by phone.
	Learnability	Novices should be able to figure out how to make an order by themselves.
Efficiency	Time behaviour	The system has to cancel the order if the client doesn't finish their order in ten minutes entering their credit card information.
Functionality	Interoperability	There will be a system to calculate the route for the delivery person. This needs to be integrated with the website, so the customers can follow up on the delivery of their order.
	Accurateness	It is important that the correct amount of money is charged for an order when paying online.
Maintainability	Changeability	If new meals or menus are added, the order module should be able to offer these with as little changes in the code as possible.
	Testability	It has to be possible to test the changes in the menu before a new version of the website is put online.
Transferability	Installability	Everything can be done on the website. Maybe an application will follow, but this will never replace the website. So nothing has to be installed.

Assignment 6: **Logical analysis – flow of events**

In this part we continue with the list of relevant use cases list and the use case diagram from assignment 4. In assignment
6 we focus on one particular use case, namely “create new order”.

- **a.** Textual description of use cases. Describe the flow of events for the use case “create new order” from your use case list. Think about all possible scenario’s (alternatives and exceptions) for this use case. Read Description_UC_Create new order.docx Make use of the flow of events template and enter as well the use case description in visual paradigm (not possible in community edition)!! To make a flow of events in VP right click on the use case – choose ‘open use case details…’ – choose ‘flow of events’)
- **b.** Draw a system sequence diagram for the main success scenario of the use case “create new order” from step 4
- **c.** Draw an activity diagram for the use case “create new order” from step 4. In this diagram we can see the basic flow (as actions on a vertical line) and all alternative scenarios (on side lines)
- **d.** Draw the refactored use case diagram (starting from use case diagram from assignment 4). Make use of include and extend, relationships between use cases, generalization between actors)
- **e.** Draw the main use case diagram as a package diagram
- **f.** Draw a domain class diagram for the use case “create new order” from step 4 (perform a textual analysis on your flow of event description from step 4). Try to use aggregation/composition, inheritance, association classes, role names, …
- **g.** Draw a statechart diagram for the domain class “Order”. Consider all the different states in which an order can be within de ordering business process.

6a. Flow of Events

Use case ID + name:	**UC02 Create New Order**
Primary actors:	Customer & system
Secondary actors:	Head chef
Short description:	A customer places an order on the website.
Preconditions:	- Customer is registered on the website with a username and password. - Customer has provided his address, phone number and e-mail.
Postconditions:	- System has registered the order. - Customer has paid for the order.
Basic flow:	1. Customer visits website. 2. System returns homepage. 3. System requires authorization, shows login page. 4. Customer logs in with username and password. 5. System authenticates customer. 6. Customer navigates to menu page. 7. System returns menu page. 8. Customer selects predefined menu. 9. System asks for number of guests. 10. Customer selects number of guests. 11. System registers the recipe(s). 12. System asks for delivery date(s) and time(s). 13. Customer selects delivery date(s) and time(s). 14. System asks for delivery address. 15. Customer gives delivery address. 16. Customer confirms order info. 17. System returns payment page. 18. Customer pays full price with credit card. 19. System authenticates credit card information.
Alternative flows:	*A1: Personalised menu* The A1 sequence starts at point 7 of the main success scenario. A1.8. Customer selects a meal for each category they want. The scenario goes back to point 9.

	A2: Customized menu The A2 sequence starts at point 7 of the main success scenario. A2.8. Customer selects meal(s) from the menu list. A2.9. Customer uploads recipe(s) for personal meal(s). A2.10. Recipe(s) are saved in the database. The scenario goes back to point 9. *A3: Vegetarian menu* The A3 sequence starts at point 9 of the main success scenario. A3.10. Customer selects a vegetarian menu. A3.11. System asks for number of vegetarian guests. A3.12. Customer selects number of vegetarian guests. The scenario goes back to point 11. *A4: Customer wants to pick up order* The A4 sequence starts at point 14 of the main success scenario. A4.15. System calculates pick up discount. The scenario goes back to point 16. *A5: Delivery is a large delivery* The A5 sequence starts at point 17 of the main success scenario. A5.18. Customer pays half of the price with credit card. A5.19. Customer pays half of the price one day before delivery. The scenario goes back to point 19. *A6: Order contains a customized menu* The A6 sequence starts at point 16 of the main success scenario. A6.17. Head chef approves of the order. A6.18. System authenticates credit card information. A6.19. System sends e-mail to customer with calculation of price. The scenario goes back to point 18. A7: Customer cancels order The A7 sequence starts at point 16 of the main success scenario. A7.17. System asks for cancel confirmation. A7.18. Customer confirms cancellation. A7.19. System discards all order info. The scenario goes back to point 2. *E1: Multiple orders on one delivery date on one account*
Error flows:	The E1 sequence starts at point 15 of the main success scenario. E1.16. Customer gets error message saying he already made an order for that day. The scenario goes back to point 15.

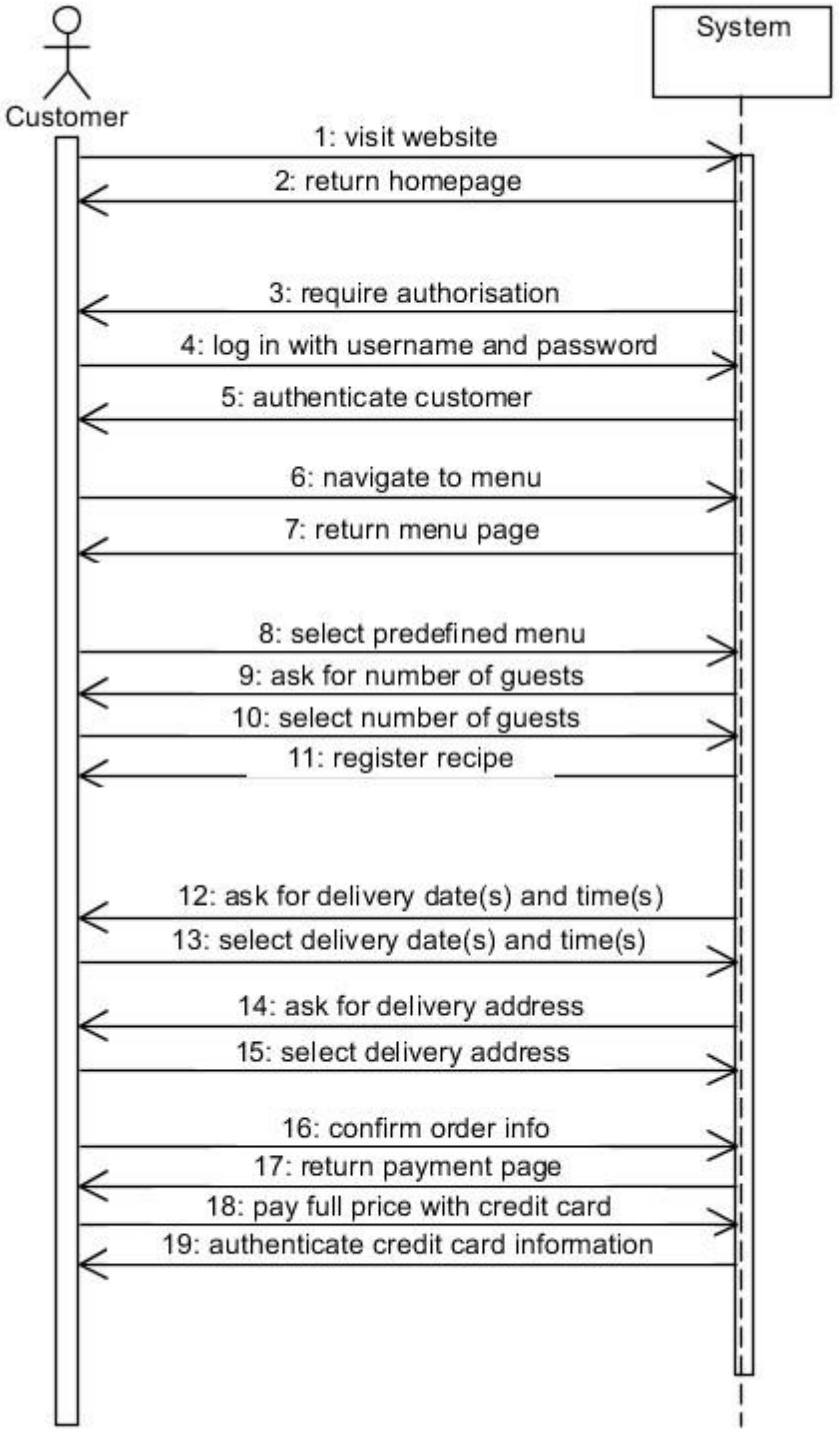
	E2: Maximum capacity of chosen delivery date is reached The E2 sequence starts at point 15 of the main success scenario. E2.16. Customer gets error message saying it is no longer possible to make an order for that day. The scenario goes back to point 15. *E3: Order is made past order time* The E3 sequence starts at point 15 of the main success scenario. E3.16. Customer gets error message saying it is no longer possible to make an order for that day. The scenario goes back to point 15. *E4: Large delivery* The E4 sequence starts at point 15 of the main success scenario. E4.16. Customer gets error message saying it is no longer possible to make an order for at least 10 people within the 7 days after making the order. The scenario goes back to point 15.

6a. Flow of Events (Visual Paradigm)

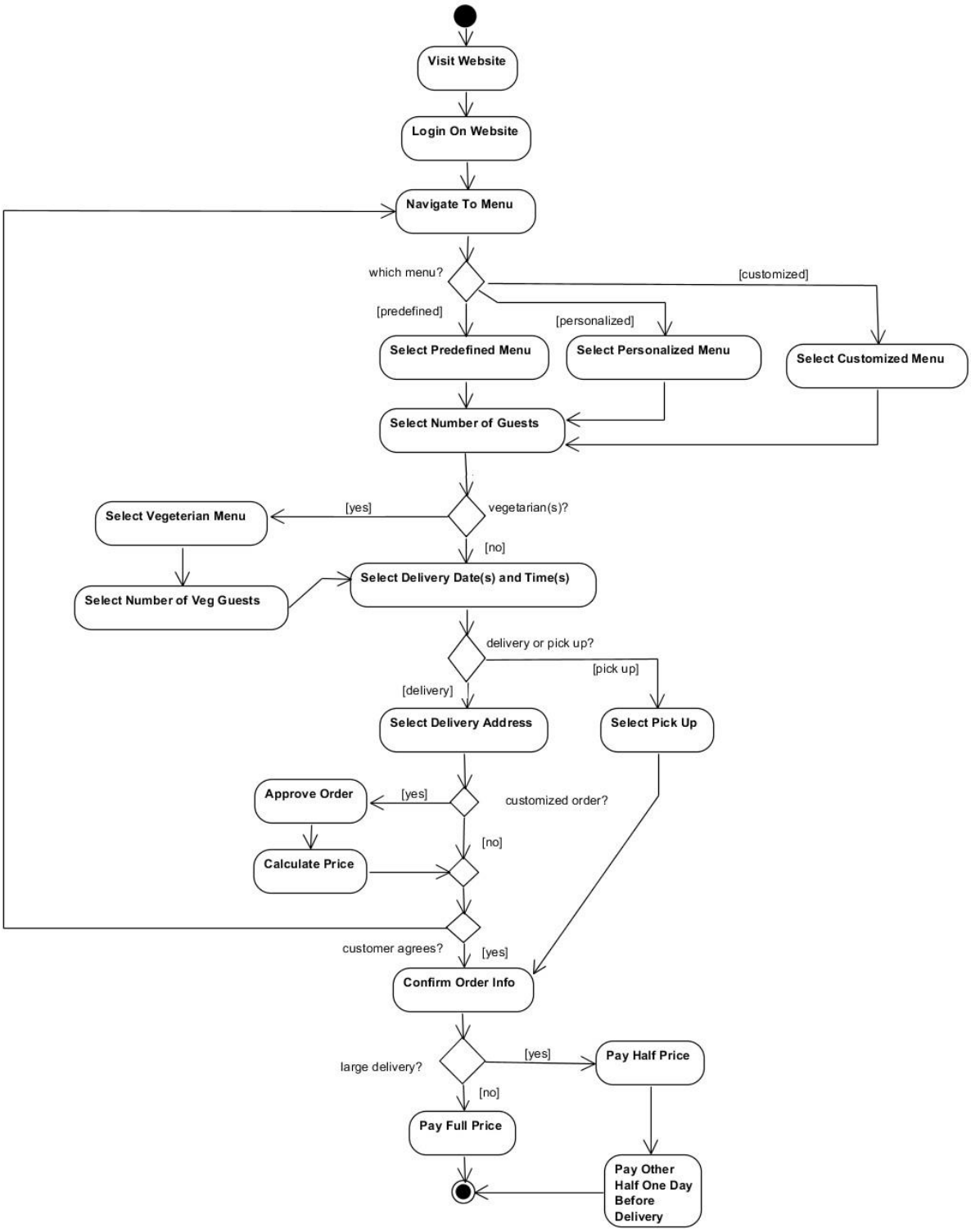
1. Customer visits website.
2. System returns homepage.
3. System requires authorization, shows login page.
4. Customer logs in with username and password.
5. System authenticates customer.
6. Customer navigates to menu.
7. System returns menu page.
8. if Customer wants predefined menu.
   8.1. Customer selects predefined menu.
9. else if Customer wants a personalized menu.
   9.1. Customer selects a personalized menu.
   9.2. Customer selects a meal for each category they want.
10. else if Customer wants a customized menu.
   10.1. Customer selects a customized menu.
   10.2. Customer selects meal(s) from the menu list.
   10.3. Customer uploads recipe(s) for personal meal(s).
   10.4. Recipe(s) are saved in the database.
11. else if Customer has one or more vegetarian guests.
   11.1. Customer selects a vegetarian menu.
   11.2. Customer selects number of vegetarian guests.
   end if
12. System asks for number of guests.
13. Customer selects number of guests.
14. System registers the recipe(s).
15. System asks for delivery date(s) and time(s).
16. Customer selects delivery date(s) and time(s).
17. if Customer tries to make second order on one delivery date on one account.
   17.1. Customer gets error message saying he already made an order for that day.
   17.2. jump to 16. Customer selects delivery...
18. else if Maximum capacity of chosen delivery date is reached.
   18.1. Customer gets error message saying it is no longer possible to make an order for the chosen day.
   18.2. jump to 16. Customer selects delivery...
19. else if Order is made past order time of day.
   19.1. Customer gets error message saying it is no longer possible to make an order for that day.
   19.2. jump to 16. Customer selects delivery...
20. else if Delivery is a large delivery and date is within 7 days of order date.
   20.1. Customer gets error message saying it is no longer possible to make an order for at least 10 people within 7 d
   20.2. jump to 16. Customer selects delivery...
   end if

21. System asks for delivery address.
22. if Customer wants the order to be delivered.
  22.1. Customer selects delivery address.
23. else
  23.1. Customer selects pick up option.
  23.2. System calculates pick up discount.
  end if
24. if Delivery contains a customized menu.
  24.1. Head chef approves of the order.
  24.2. System sends e-mail to customer with calculation of price.
  end if
25. if Customer agrees to the order.
  25.1. Customer confirms order info.
26. else
  26.1. jump to 2. System returns homep...
  end if
27.
28. if Delivery is a normal delivery.
  28.1. System returns payment page.
  28.2. Customer pays full price with credit card.
29. else if Delivery is a large delivery.
  29.1. Customer pays half of the price with credit card.
  29.2. System authenticates credit card information.
  29.3. Customer pays half of the price one day before delivery.
  end if
30. System authenticates credit card information.
31. System returns homepage.

6b. System Sequence Diagram

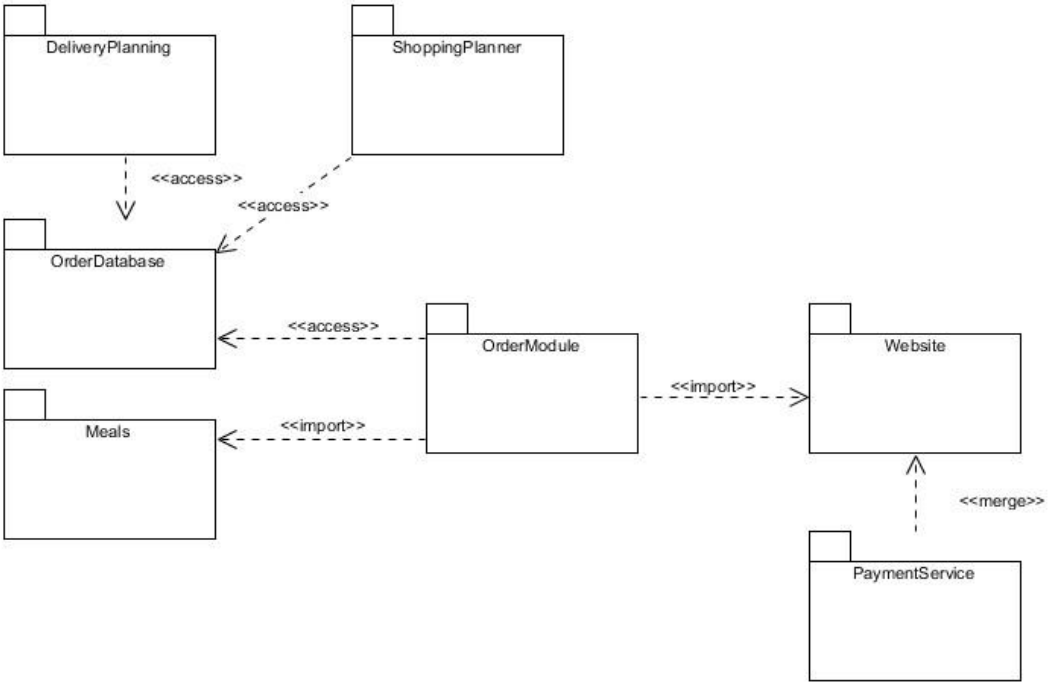


6c. Activity Diagram

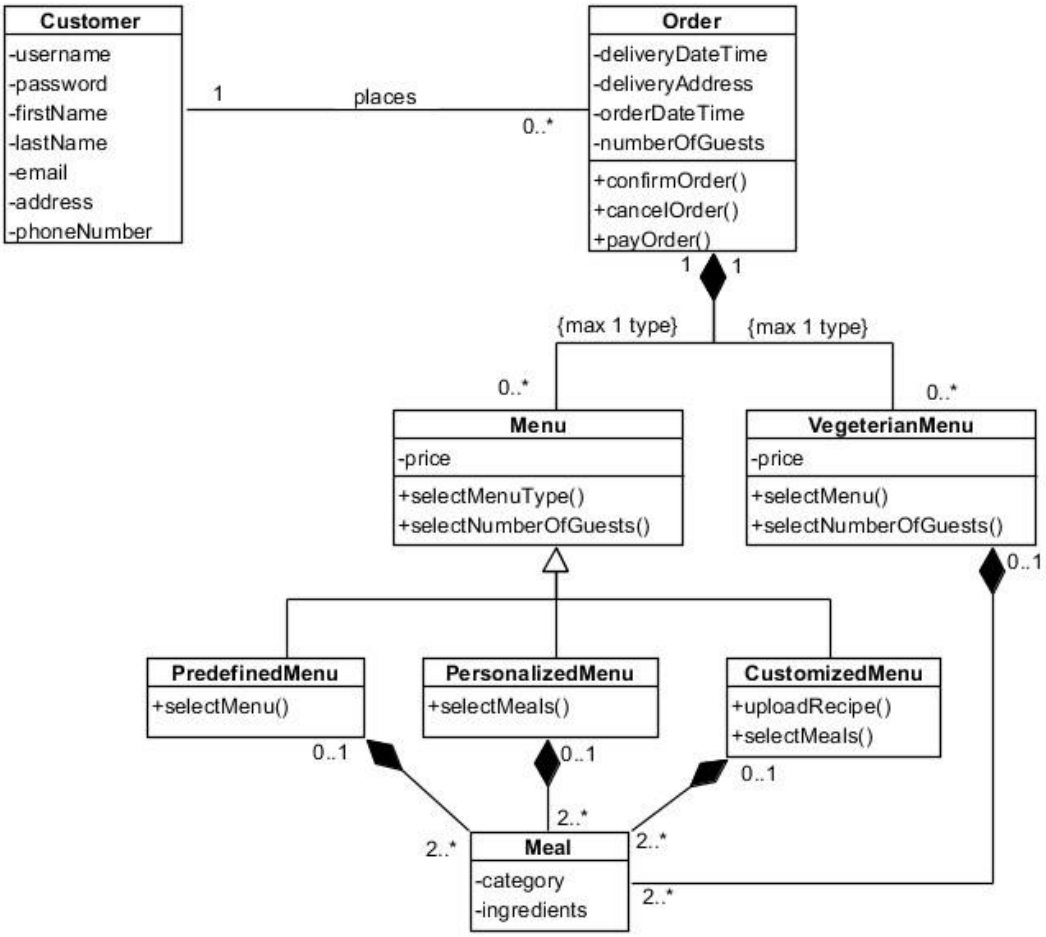


6d. Refactored Use Case Diagram

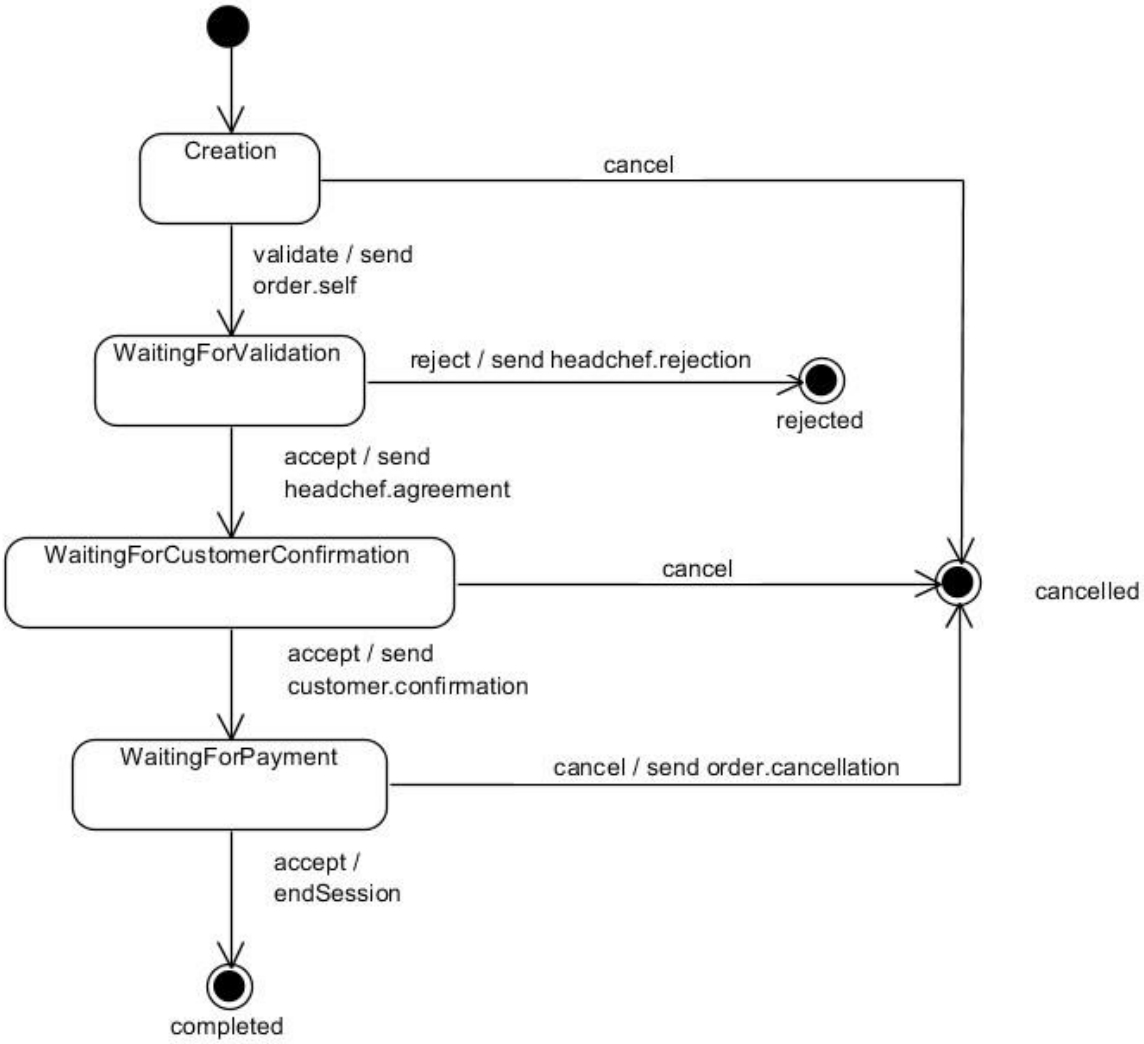
6e. Package Diagram



6f. Domain Class Diagram



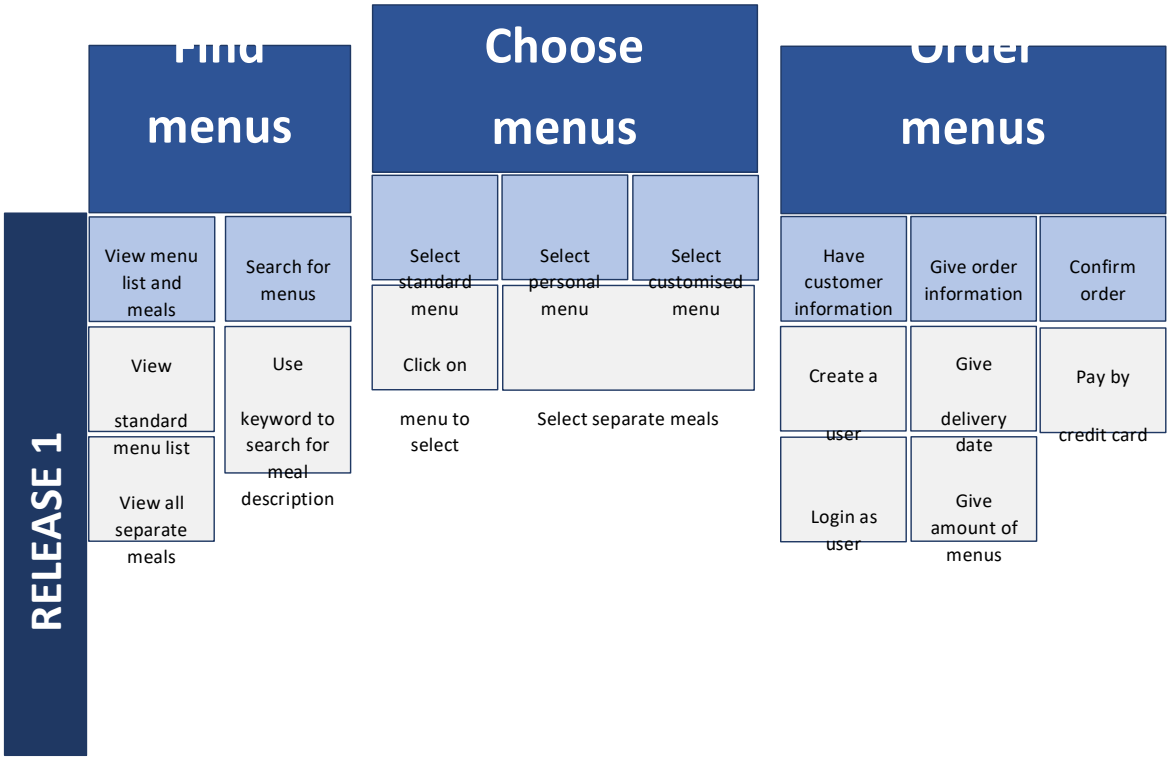
6g. Statechart Diagram

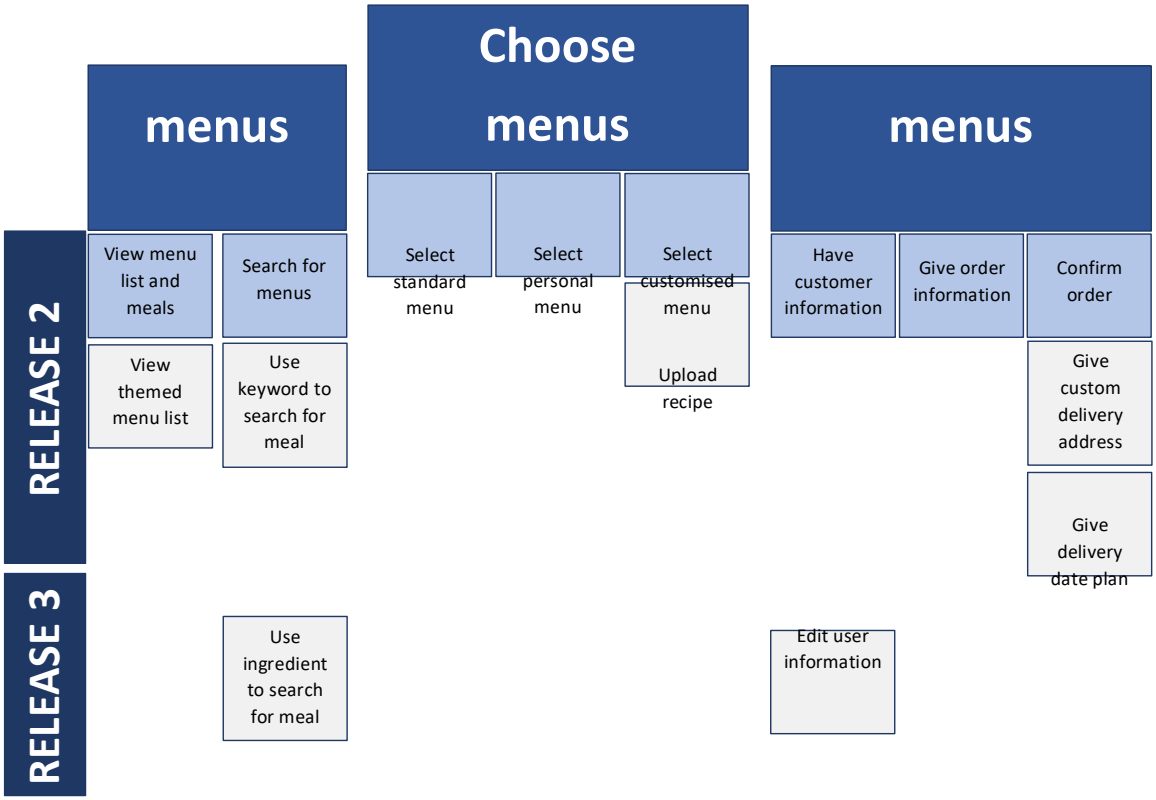


Assignment 7: **Requirement & logical analysis/agile approach**

a. Draw a user story map (focused on a website that supports the business process “order meal”). Provide 3 iteration levels in your user story map.
b. Create user stories cards (card title, conversations and confirmations (acceptance criteria)) for 8 user stories from the minimum viable product from your user story map. Create wireframes for those 8 user stories (using a wireframing tool of your choice). For describing the user stories and doing the wireframing you may also use the UeXceler tool in the professional edition of VP.

7a. User Story Map



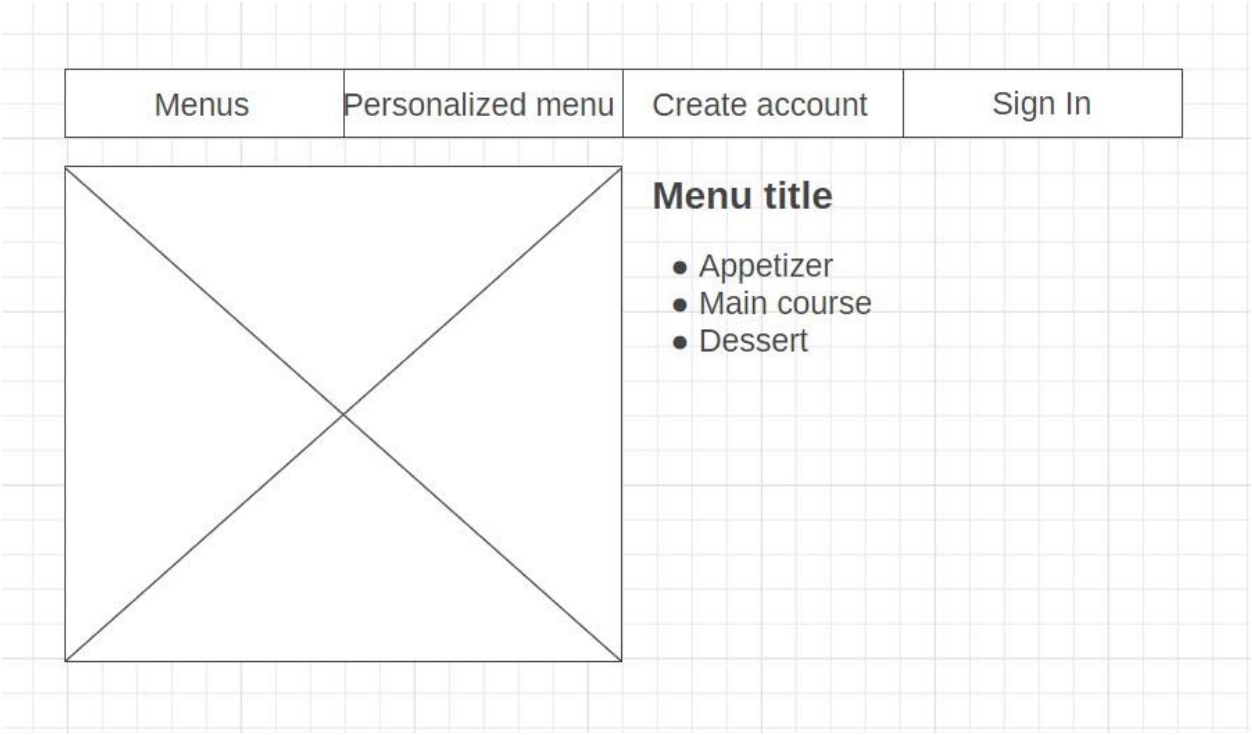


7b. User Story Cards + Wireframes

As a customer
I want to view an overview of all standard menus
so I can figure out which menu to order.

- *The menus are displayed as a photo*
- *Underneath the photo there is the name of the menu*
- *All meals are listed*
- *The menus will be sorted vertically*

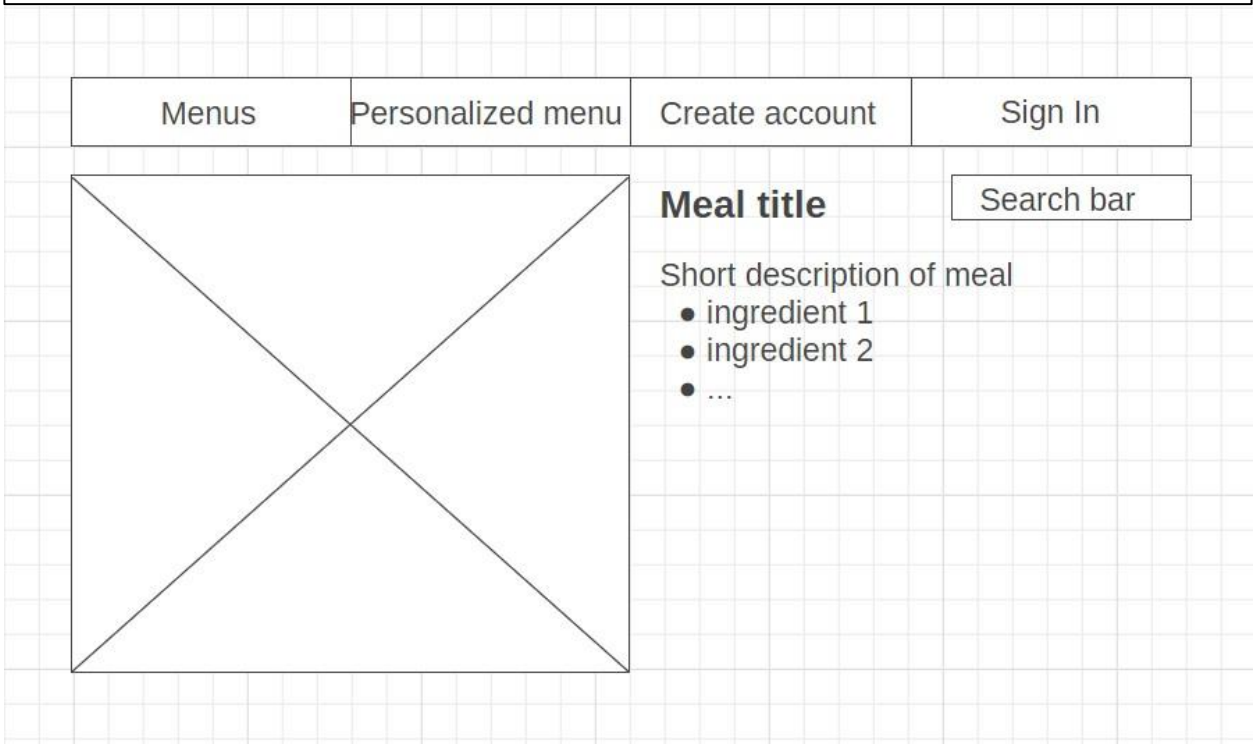
1. Click menu button
2. Look at menu list
3. Check layout and information



As a customer
I want to search the meals using a keyword
that is used in the title
so I can look up a specific meal.

- *There is a search bar in the top right corner of the meal page*
- *You can search for meals using words from the meal title*

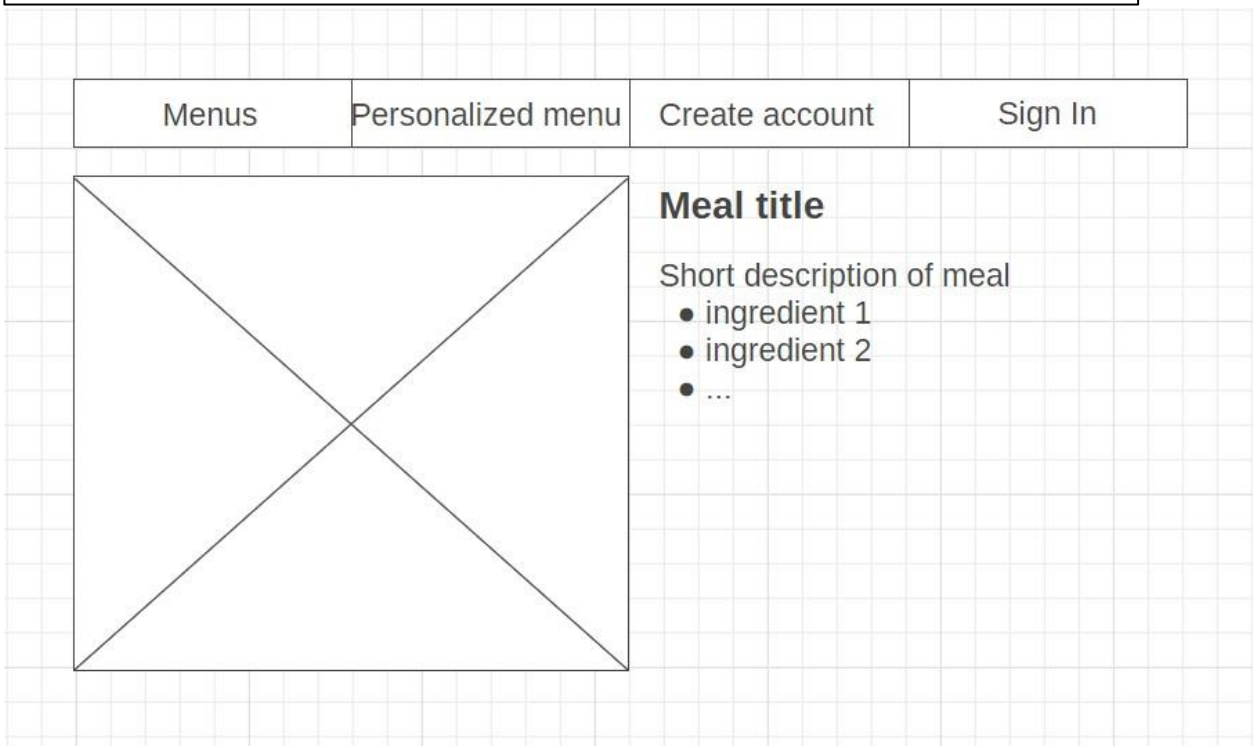
1. Click on the personalized menu button
2. Click the search bar in the right upper corner
3. Give in a meal that exists
4. Check if that meal is returned



As a customer
I want to view an overview of all available meals
so I can figure out the ingredients of every meal.

- *Each meal is displayed with a picture, title and ingredient list*
- *The meals are sorted vertically*

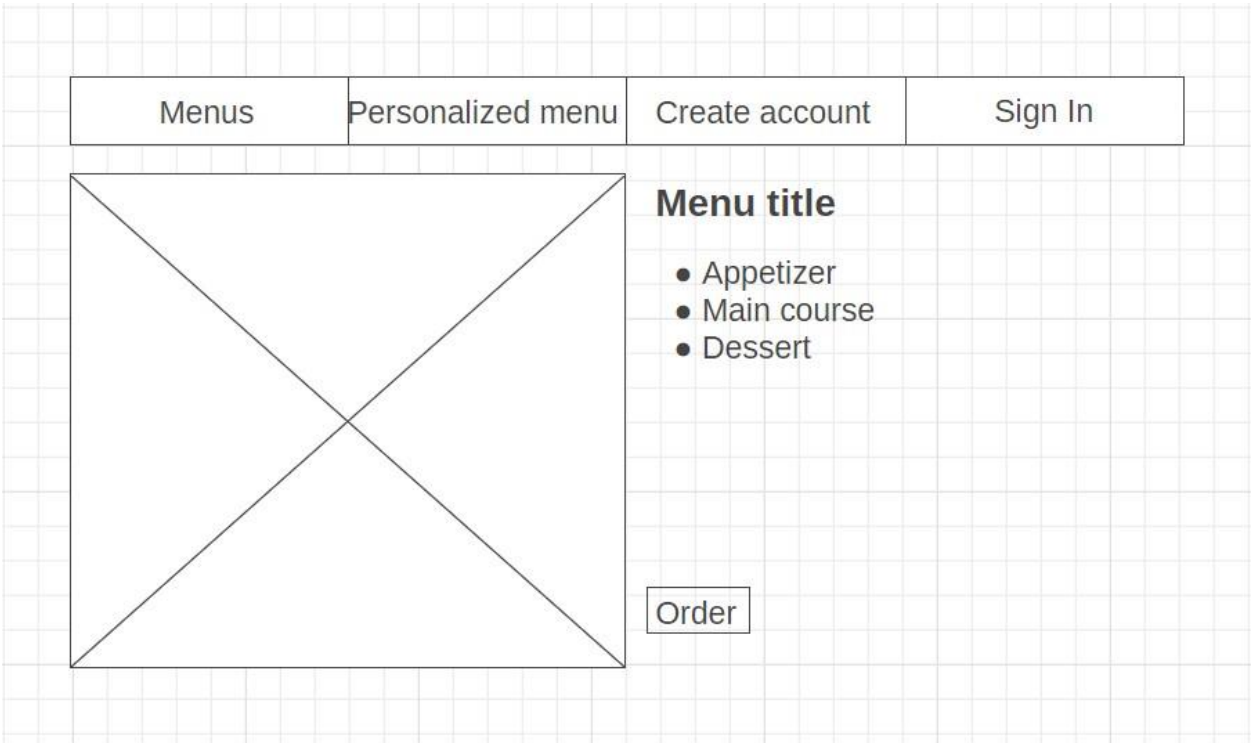
1. Click the personalized menu button
2. Look at the meal list
3. Check if the layout is correct



As a customer
I want to click on menu
so I can select that menu
so I can order that menu.

- *There will be a button next to the picture of the menu*
- *When I click on the button, I will be taken to the order confirmation page*

1. Click on the menu button
2. Look at the menu list and choose a menu
3. Click on the order button
4. Check if the order confirmation page is returned



As a customer
I want to select separate meals from each course
so I can puzzle together a customized menu.

- *One meal per course can be selected*
- *After I have selected a meal, a checkmark is shown next to it*

1. Click the “Select menu” button.
2. Scroll down to the separate meals section of the menu list.
3. Select a meal for each desired course.
    a. *Only one meal per course*
    b. *Checkmark next to selected meals*
4. Click the “Place order” button.

As a first-time customer
I want to create an account
so my information can be saved by Likkebaard and used again in the future instead of requiring me to fill it in every time.

- *Account information includes:*
  - *First name*
  - *Last name*
  - *E-mail address*
  - *Password*
  - *Home address*
  - *Credit card information*
- *The password needs to be at least 8 characters long and requires at least one number and one capital letter.*

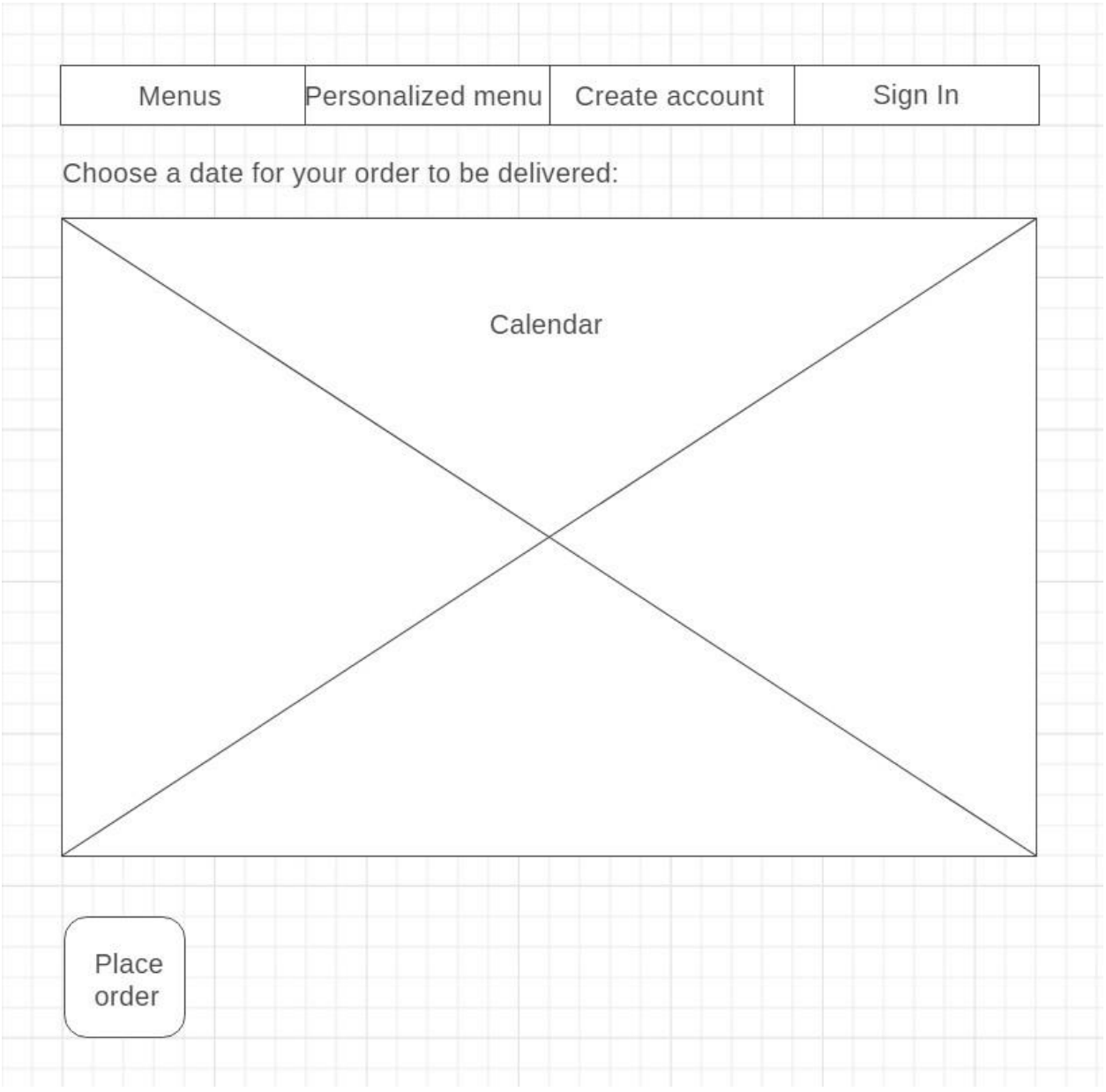
1. Click the "Create new account" button.
2. Fill in the following fields:
   a. *First name*
   b. *Last name*
   c. *E-mail address*
   d. *Password*
   e. *Confirm password*
   f. *Home address*
   g. *Credit card information*
3. Password authentication checks whether it is a safe enough password:
   a. *At least 8 characters*
   b. *At least 1 number*
   c. *At least 1 capital letter*
4. Click the "Create account" button.


Menus
Personalized menu
Create account
Sign In
First name
Last name
E-mail address
Password
Confirm password
Home address
Credit card information
Create account

As a customer
I want to select a date and time for my delivery to be made
so I can receive my delivery at exactly the moment I want it.

- *Only one delivery per user per day*
- *Deadline for scheduling delivery on a day is 1pm that day*
- *Maximum 15 deliveries per day over all users*

5. Click the "Select delivery date" button.
6. Select the correct date on the calendar that appears
7. System checks whether date is valid:
    a. *1 delivery per day, per user*
    b. *No delivery far that day past 1pm*
    c. *No more than 15 deliveries total for a day*
8. Click the "Place order" button.



As a customer
I want to select the number of menus I want delivered
so everyone who is visiting me can have a menu.

- *If any of the guests is vegetarian, a separate vegetarian menu can be selected for them*

9. Click the "Place order" button.
10. Fill in the number of menus you want delivered.
11. Tick off checkmark box if there are any vegetarian menus required.
    a. *Vegetarian menus are displayed*
    b. *Fill in number of vegetarian menus*
12. Click the "Select delivery date" button.

Assignment 8: **Technical analysis/use case realization**

For the main success scenario of the use case “create new order” (from assignment 6) you create:

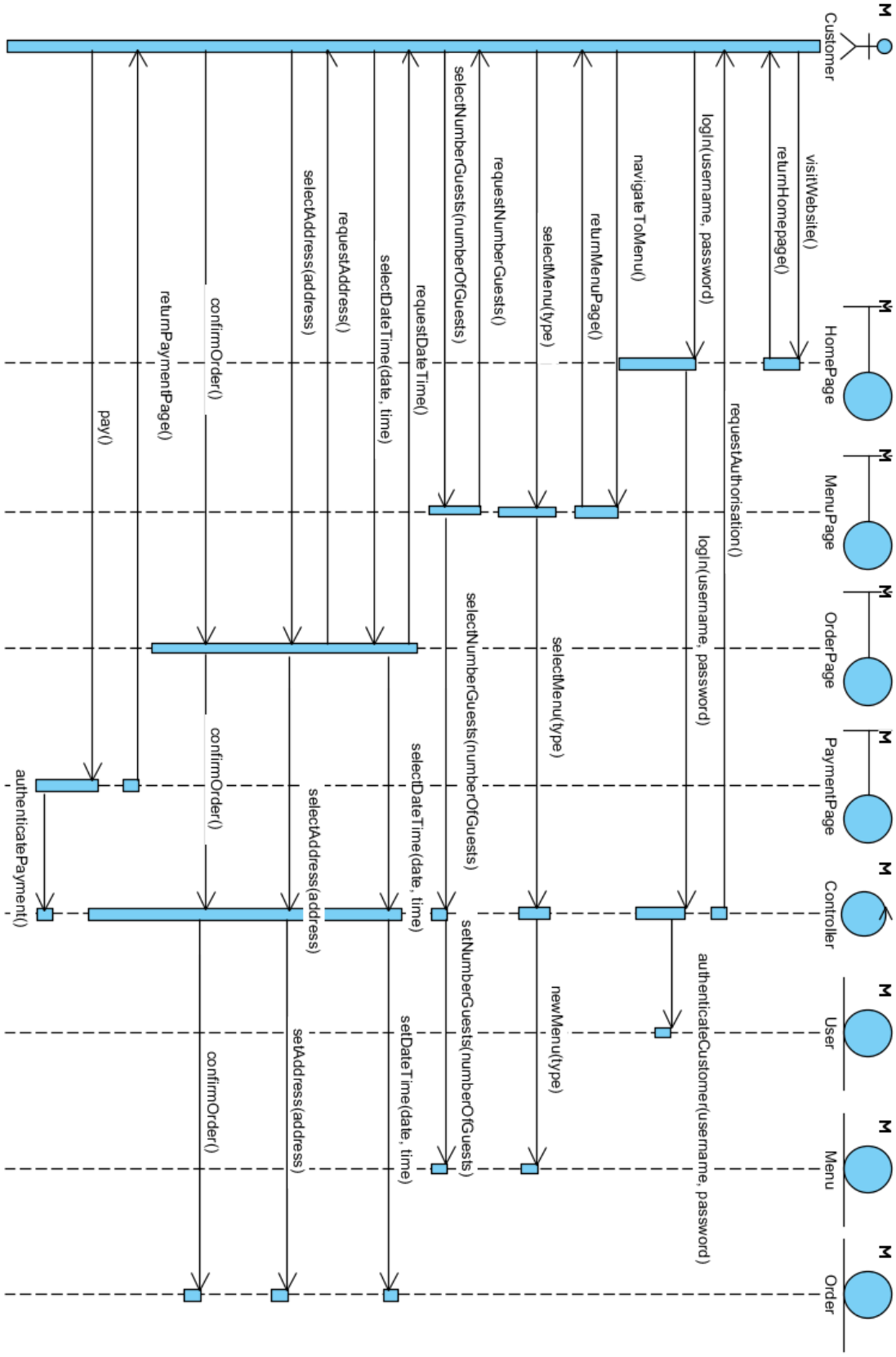
a) A MVC sequence diagram

b) A communication diagram

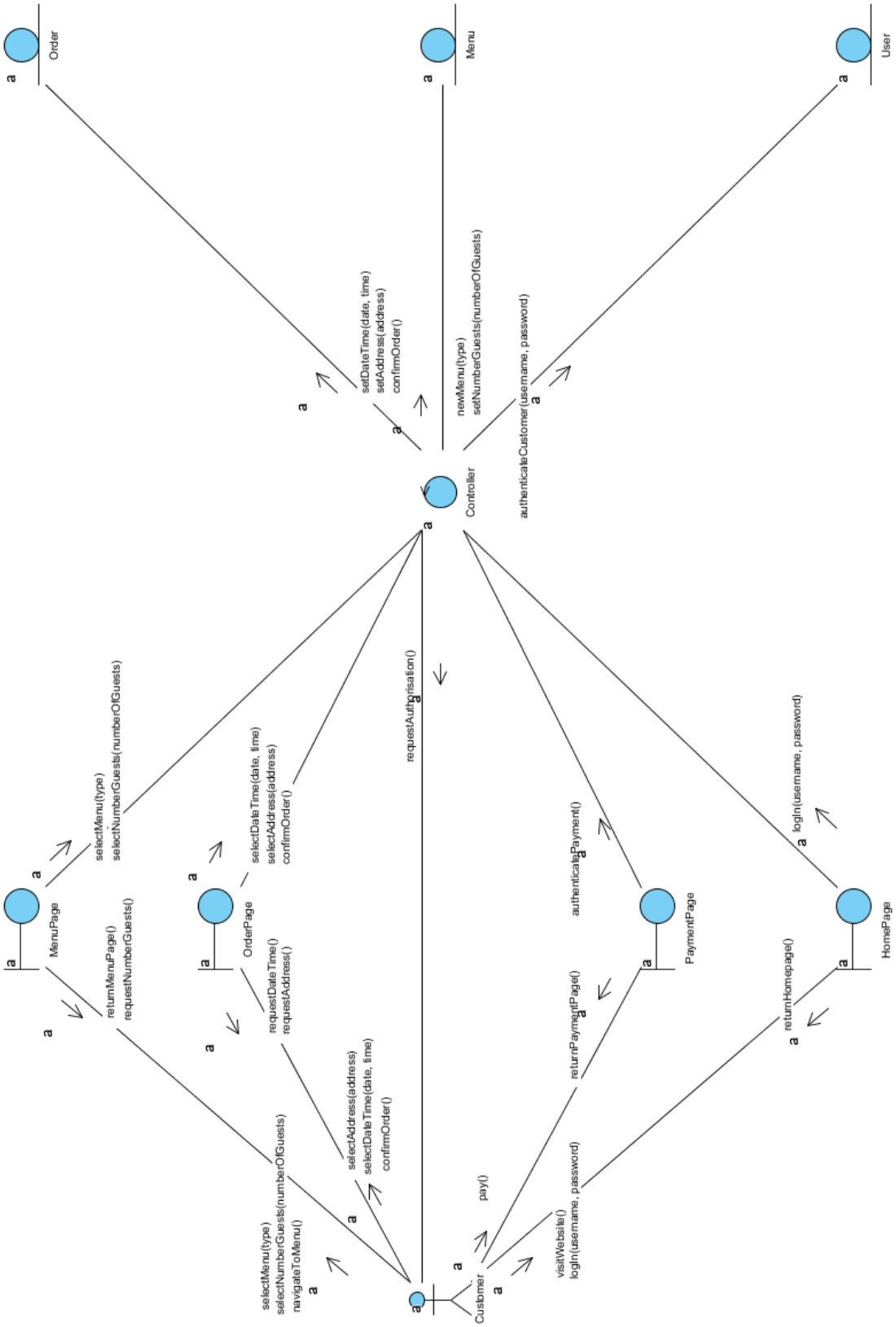
c)

Draw the **design class diagram** for the main success scenario of the use case ““create new order” using your information from the sequence/communication diagram. Use packages (layers), attributes, operations, associations, dependencies, navigabilities, constraints.

8a. MVC sequence diagram



8b. communication diagram



8c. design class diagram