404! Requirements Specification

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1. Executive Summary

1.1 Project Overview

When you first open a restaurant, usually you do not have a lot of capital and you focus to invest in the most important elements of the business and neglect the importance of having an information management system.

However after you gain a loyal customer base and create a very well known brand (image), your customer number increases and you can not manage any more the flow of information with “primitive” programs such as Excel. In order to be more efficient and effective in your service, you have to adapt with new technology and create a customized Restaurant Management Information System.

Our restaurant is located in Durres, one of the most important cities in Albania, around 33 km away from the capital, with 500-600 thousands citizens living there and always the first choice of many people to spend weekends or summer days near the beach. Durres is easily accessible for everyone living in Albania. According to our research, during summer sundays around 800000 tourists visit Durres, increasing the Durres’ population into 1.3-1.4 million which means that our customer base will increase and we have to make sure that we will offer them the best service we can and to optimize each activity.

For us to be able to optimize, to be fast in making orders and delivering these orders, to control the increase in the number of employees and also to keep track of all data in order to analyze and forecast for each process, our only solution is to build a customized Restaurant Management Information System.

1.2 Purpose and Scope of this Specification

The purpose of this system is to automate all processes of the restaurant online.The software will be used by all the parties, including owner, manager and employees. Currently the restaurant doesn't use

a certain system but only MS-Excel to record the employee data and inventory. With the increase in the number of customers, suppliers, employees and cash flow, it is necessary to track in an efficient way all the operations of a business. This system will provide a working environment that will be more flexible and efficient. It will facilitate the communication between all internal actors like the owner, manager, economist, the servers, the bartenders and other employees of the restaurant. Since the restaurant is a medium size business, involvement of the suppliers in the system is outside of our scope.

In this scope:

- Product/service description (discussed in Part 2)
- Functional and non functional requirements (discussed in Part 3)
- User case scenarios (discussed in Part 4)

2. Product/Service Description

This is a software that aims to create a communication channel between all the actors inside a restaurant that will facilitate the operation and organization of the restaurant. It is created on the basis of the client's requirements by following the way the company operates with actors inside and outside the restaurant. What our project suggests is a way to automate all processes of the restaurant online. Each employee can checkin/out at the system and have his wage calculated automatically. They can also check their timesheets daily/weekly/monthly and also make complaints/suggestions to the owner/manager at the end of their shift. Every bill and calculation will be registered by the system, making it easier for the manager to calculate profit, sales and tips at the end of the shift. In case of any reservations due to customer demand, the manager is the only one that can book/reserve a table in the system. The managers will get alerts regarding the need for supply directly from the system, so they can directly place orders for the suppliers. Servers and bartenders can open and close their tables easily using the system, while every transaction is transparent to everyone. Each economic transaction,

like employee's wages and/or bill payments for the suppliers will go directly to the economist account. In this way, the owner can track and handle in real time all operations occurring at the restaurant.

2.1 Product Context

Our product is a software for better management of the restaurant. There are a lot of businesses that are recently adjusted with the latest technology, so there are many similar products like ours. Of course, there is a huge difference from others, because it is especially designed only for our client. It is an independent product, which will be managed by the owner and also has its own branches for the other employees. There is no interconnection of our system with other ones, because the restaurant is still in a medium size and does not have work relationships with other businesses or previous systems used. The suppliers are not in the objective of this system, because they do not possess a product like ours and cannot interconnect with us properly.

2.2 User Characteristics

The software will include/perform the interaction between 6 users, the owner of the restaurant, the manager, the economist, the server(s), the bartender(s) and other employees (kitchen & cleaning staff).

Owner:

The owner represents the person that owns the restaurant. He/she can have access in all the documents and timesheets of his employees, check their hours and wages. Also, he/she can check the suppliers, the inventory and every bill account. The owner can open and edit/delete every account registered in the system. He/she is the only one who can register the manager and the economist in the system. He can also double check before the wage of the manager and economist is transferred to the relevant accounts. Every employee logs in the system using a specified id.

Manager:

The manager is registered from the owner and should clock in/clock out at the beginning/ending of his/her shift. He/she can register/add/delete employees, access and change their timesheet in case of any problem. He/she is the only one that can delete/edit an order/ table after it is put in the system. (In case the server makes any mistake with the order, or the client doesn't want the item anymore). He/she is the only one that can book tables according to the customer demand. The manager can also disable any item in the menu in case the restaurant has run out of it. He/she will get an alert for items that request immediate supply, so that he/she can make the orders to the suppliers.

Economist:

The economist is registered by the owner and he/she has access to every economic situation in the restaurant. After the manager puts an order for the suppliers, the bill will go directly to the economist account for him/her to make the necessary payment. Also, he/she is responsible for each employee wage transaction. Also, he will take care of all necessary documents regarding taxation.

Server:

A server is registered from the manager. He/she should clock in/clock out at the beginning/ending of his/her shift. He/she can check their timesheet to check the hours they have made during the period. They can open tables, take orders from the clients and put them in the system. They can also close tables when the clients are gone. The server should cashout at the end of his/her shift.

Bartender:

A bartender is registered from the manager. He/she should clock in/clock out at the beginning/ending of his/her shift. He/she can check their timesheet to check the hours they have made during the period. They cannot open tables and take orders from the clients but they have some reserved seats at the bar in case any client wants to drink something there. He/she cannot take food orders. They can close their

seats in the system once the clients are gone. The bartender should also send an alert to the manager if the bar is running out of any item.

Other employee:

Other employees' sectors include the kitchen staff and the cleaners. He/she should clock in/clock out at the beginning/ending of his/her shift. He/she can check their timesheet to check the hours they have made during the period.

2.3 Assumptions

- Manager might not come to work one day so one of the waiters (assigned from the manager) can take responsibility over the manager`s flow of actions.
- System might be down for a certain part of the day and the waiters have to write bills physically and then enter them into the system.
- If the customer doesn't show up within 30 minutes of the reservation time, the manager should delete the reservation.
- It is assumed that the Owner will have access rights to all other employees accounts and to all data entered by each employee and update the system through any connected device effectively and efficiently.
- It is assumed that each employee and the Owner will have access in the system through a simple connection via a computer or mobile device.
- It is assumed that the computer devices used to access the system will have either Linux, Mac OS or Windows operating systems. The mobile devices are assumed to have either IOS or Android operating systems.
- It is assumed that the Waiters must be equipped with a tablet for taking orders.

2.4 Constraints

The project will have the possible following constraints:

- Scope:

Client's requirements should be completed in detail. There shouldn't be any extra function outside the scope.

- Schedule:

Project needs to be finished by the beginning of June, and no later.

- Quality:

The software's user interface should be easy to understand. Users should take no longer than 10 minutes to learn how to use it.

- Budget

The software that we are developing is web based and it needs to be maintained time by time (Bug fixes and keeping it up to date).

- Resources:

Due to the situation created by the Corona Virus every analysis and research should be made by the internet or phone.

- Risks:

The law nr 9887 on protection of personal data should be respected.

Every user must have basic knowledge on using a web application.

The users must have internet access in order to use the software.

- Other constraints can be found during the way.

2.5 Dependencies

Dependencies that the users of the system need to know in order to operate within the system.

- The owner is the only one that can register or delete the manager and the economist accounts in the system.
- The servers, bartenders and other employees can be registered also by the manager.
- The manager cannot edit the employees dashboard without the approval of the owner.
- The employees cannot be registered in the system without all the data needed for the company to hire a new employee.
- The servers and bartenders cannot delete any order/table without the approval of the manager.
- The server cannot order an item which is disabled from the manager.
- The bartender is obligated to contact a server for any food order.
- The bartender cannot take more than 4 clients at a time. (only 4 seats available)
- A server cannot pick/edit/change a table which is already chosen from another server.
- The employees cannot edit or change their timesheets without the approval of the manager.
- Orders for the suppliers cannot be made without the alert of the system towards the manager.
- The manager cannot add items/amount in the inventory without providing the bill as well.
- The economist cannot process his and the manager's salary with the approval of the owner.
- The manager and the economist cannot access or make any changes if they are not clocked in.
- The servers and bartenders cannot serve or put orders in the system if they are not clocked in.

3. Requirements

3.1 *Functional Requirements*

Req#	Requirement	Comments	Priority	Date Rvwd

BR.1	Register restaurant name on database	Enter the restaurants details	1	20.4.20
LR.2	Handle multiple accounts	Based on user, each will have a certain interface	1	20.4.20
BR.3	There is one admin, one manager, one economist, waiters and bartenders and the kitchen staff	Every user will have certain rights	2	20.4.20
BR.4	Each account should be secured with passwords	The password should fulfill the regular expression rule	2	20.4.20
BR.5	Handle the unregistered users.	Each user should be registered.	3	20.4.20
LR.6	Manager manages servers and bartenders and the other employees.	Is responsible for their actions and functionalities.	~~2~~	20.4.20
BR.7	Handle suppliers.	Manager should be able to handle the suppliers	~~2~~	20.4.20
BR.8	Handle inventory.	Whenever there is a product missing, an alert will be shown on the manager's account so they can make the correct order and then add the amount on the database.	~~2~~	20.4.20
BR.9	Adding a new food, drink or category.	Manager is responsible for these actions.	~~2~~	20.4.20
BR.10	Able to view cash flows.	Economist, Manager and Owner	~~1~~	20.4.20
BR.11	Able to view the starting date, ending date of each cash flow , revenue, expenses and net profit.	Economist, Manager and Owner.	~~1~~	20.4.20
BR.12	Employee Payments.	Payments are handled by the economist.	~~1~~	20.4.20
BR.13	All employees can clock in and out of their shift.	The system will keep track of working hours the waiter has made in his shift	~~1~~	20.4.20
BR.14	When checking out an order the system should apply the VAT automatically.	Before printing the receipt the VAT (20%) will be calculated and displayed	~~2~~	20.4.20

BR.15	The waiter is able to check tables available to choose for the orders.	If the waiter chooses an occupied table, warnings will appear on his screen.	~~2~~	
BR.16	Able to watch the number of tables he has served.	The waiter's orders will have the date, id, number and the total price of each and it can be accessed by the manager and the owner.	~~2~~	20.4.20
BR.17	Close the tab of a customer.	Waiters can close their open tabs by cash or credit card.	~~2~~	
BR.18	Cashout at the end of the shift.	The waiters and bartenders should cashout at the end of the shift so the sales and tips are shown and declared.	~~2~~	20.4.20
BR.19	Able to check hours worked during the week.	Each employee is able to check and print their working hours.	~~3~~	20.4.20
BR.20	Able to leave and receive notes.	Each employee is able to receive and leave a note from/to the manager and the owner.	~~3~~	20.4.20
BR.21	Able to change the timesheet of each employee.	Manager can edit the timesheet of employees in case of any problem.	~~3~~	20.4.20
BR.22	Check daily sales of each bartender and server.	Manager and owner can access the daily sales of each employee as they are saved in the timesheet database/interface.	~~2~~	20.4.20

BR.23	Check and upload documents of the taxation.	Only the owner can access the documents, while they are uploaded only by the economist.	~~3~~	20.4.20
BR.24	Request PDF for bills, sales and employees timesheet.	PDFs are generated upon the request of the owner.	~~4~~	20.4.20
BR.25	Able to edit all pages.	Only the owner can edit all pages.	~~2~~	20.4.20
BR.26	Able to add the new workers in system	Owner , Manager	~~2~~	20.4.20
BR.27	Able to leave notes for the Owner.	Manager , Economics, Bartender, Waiters , Other Employees	~~4~~	20.4.20
BR.28	Check the seats in the bar.	Bartender	~~3~~	20.4.20
BR.29	Print the bills in the bar.	Bartender	~~2~~	20.4.20
BR.30	Open employee dashboard.	Owner , Manager, Economist.	~~2~~	20.4.20
BR.31	Check and see the customers and suppliers bills.	Owner , Manager, Economist.	~~3~~	20.4.20

BR.32	Can attach pdf of the scanned bill of the suppliers.	Manager	~~3~~	20.4.20
BR.33	Can take the customer's reservation by the phone.	Manager	~~3~~	20.4.20
BR.34	Open the table and see their orders .	Manager, Owner Waiters	~~3~~	20.4.20
BR.35	Reserve a table for the customer’s reservation.	Manager	~~2~~	20.4.20
BR.36	Delete the table reservation when the customer does not show up.	Manger	~~2~~	20.4.20
BR.37	Leave a HeadWaiter in charge when the Manager will not come at work.	Manager	~~1~~	20.4.20
BR.38	Print the Timesheet	Owner	~~4~~	20.4.20
BR.39	Check Sales	Economist , Owner	~~2~~	20.4.20
BR.40	Check and Add documents for each month.	Economist , Owner	~~2~~	20.4.20
BR.41	Make a pdf of sales of 30days grouped by Id/numbers.	Economist , Owner	~~2~~	20.4.20

BR.42	Delete orders	Only the manager can delete an order giving the reason for it.	~~1~~	20.4.20
BR.43	Payment with credit card.	Waiter, Bartender	~~1~~	20.4.20
BR.44	Choosing an occupied table/seat.	Server and Bartender get a warning message.	~~1~~	20.4.20
BR.45	Check their tables.	Waiter and Manager	~~2~~	20.4.20
BR.46	Putting an order in the system	When the waiter puts an order in the system, it will automatically print at the bartender's computer.	~~2~~	20.4.20
BR.47	Check the deleted items/orders.	The owner can check the deleted items/orders attached with the date and reasons.	~~4~~	20.4.20
BR.48	Request PDF of the deleted items/orders.	The manager can generate and print a PDF of the deleted items/orders attached with the date and reasons.	~~4~~	20.4.20

3.2 Non-Functional Requirements

3.2.1 Product Requirements

3.2.1.1 User Interface Requirements

- The software will be web-based and can be accessed by any browser, such as google, mozilla, safari, and internet explorer.
- The system must be usable without printing a guide or watching an explanation video, it shouldn't take more than 10 minutes to learn how to use it. Therefore the user interfaces must be as easy as possible. There will be different system modules in order to structure and simplify the user interface.
- In order for the users to log in to their main page, they should type in their unique work number. If the number is wrong and it is not recognized by the system, an error message explaining the situation will be shown in the screen.
- If the login is successful, the system will direct the users to their main page displaying their dashboard.
- Server dashboard will visually represent all the key factors of the other modules. A side bar is provided in the left so that the user knows what functionalities he can perform.
- Bartender dashboard will visually represent all the key factors of the other modules. A side bar is provided in the left so that the user knows what functionalities he can perform.
- Employee dashboard will visually represent all the key factors of the other modules. A side bar is provided in the left so that the user knows what functionalities he can perform.
- Economist dashboard will visually represent all the key factors of the other modules. A side bar is provided in the left so that the user knows what functionalities he can perform.
- Manager Dashboard will visually represent all the key factors of the other modules. A side bar is provided in the left so that the user knows what functionalities he can perform.
- Owner Dashboard will visually represent all the key factors of the other modules. A side bar is provided in the left so that the user knows what functionalities he can perform.
- Myhours dashboard will make it possible for all users of the system to check their working hours.

- Employee Dashboard is accessed only by the manager, owner and economist and displays details regarding all users registered in the system and their characteristics.
- Timesheet dashboard is accessed only by the manager and the owner and it displays the daily activity of all employees such as time in & time out and sales.
- Suppliers and Inventory dashboard is accessed by the manager and the owner and it displays the list of all suppliers of the business and items in inventory followed by their characteristics.
- Bills dashboard displays all the bills of the clients and also the bills of the inventory. It can be accessed by the owner, manager and economist.
- Notes dashboard can be accessed by all the users of the system. They can leave any message for the manager and/or the owner.
- Menu dashboard can be accessed from all the users besides the economist and “other” employees. It displays the menu divided into two sections, drinks and food.
- Tables dashboard can be accessed by all the users of the system besides the economist and “other” employees. It displays all the tables available in the business, followed by the open and reserved ones.

3.2.1.2 Usability

After the software will be delivered to the client, we should make sure that all the employees can navigate it efficiently.

3.2.1.2.1 Usability Testing

We will use the moderate method of usability testing, which consists in a supervisor (one of us or all of us) who introduces the way how to use it to the client, although its user interface will be very easy to manage. The client can make questions and take answers by us.

3.2.1.2.2 Accessibility & Efficiency

This information management system can be accessed only by having an internet connection, like Wi-Fi or network connection. The devices to open the software are a lot: a smartphone, tablet (any kind of touch-screen table), browser in a laptop or PC. Nowadays, all the tablets and smartphones include all the possible apps to store information, materials, documents, inventory that can be used in the software by the owner, manager, economist etc. This facilitates the management from the administrator from any possible place he can be.

3.2.1.2.3 Flexibility

Our product will be very easy and well organized to be understood. The system will have an error detection process, which will handle any possible error very quickly, so the employees will not have any worries or difficulties. The interface will be organized in that way that each action will have its own button with a description, so the client will not get confused.

3.2.1.3 Efficiency Requirements

3.2.1.3.1 Capacity and Space

Since it is a web application, minimum system requirements for the computer to run a web application are:

- Operating System should be Windows 7 or later, linux and MAC compatible.
- Processor should be Intel Pentium 4 or later.
- Memory should be 2GB min (4 GB recommended).

Taking into consideration the number of users of the software (approximately 20) and the total pages of the software (about 200-300 pages):

- Web server hard drive size - 27,5MB
- There should be up to 20 simultaneous users supported.

3.2.1.3.2 Latency

- The maximum acceptable time for a service request shouldn't be more than 8 sec.

3.2.1.4 *Dependability Requirements*

3.2.1.4.1 Manageability/Maintainability

3.2.1.4.1.1 Monitoring

This restaurant information management system will have to be monitored by us for any possible failure or error in order to be corrected as soon as we can. It will have included an error handling process.

This will be done by error reporting functions, which will report directly to us the concern or feedback of the user. These functions allow us to customize problems by their level of importance. One of these functions will be the logging ones, which allow you to send messages to an email for example.

The other part will be handled by our data collection and records of all activities including HTTP requests during the day.

3.2.1.4.1.2 Maintenance

Except the construction of the all system, we have focused our attention also in the continuous maintenance.

According to some modularities and our interface design, there will be buttons, which give the possibility to keep your employees organised. Here are included the add, delete, edit their personal information buttons in order to maintain the changes in the list.

About the complexity issues, we know that the level of innovative services is continuously growing, so there is a special team to adapt with the rapid changes of the technology by perfecting the interaction between pieces of code. Since complexity can be measured as the quality grade, our system's grade

will always be high. Also, every action that has been taken is saved in our server and in our database and it can be restarted anytime if any possible disaster occurs.

3.2.1.4.2 Availability

Include specific and measurable requirements for:

- The software should work 24/7, even though it will be used 12-15 hours per day.
- The system is committed to be available from 9am to 12 am, so it requests a high availability level.
- The software is supposed to cover all geographical areas. (while they have internet access)
- Impact of downtime on users is quite high and can result in data loss and lost productivity.
- The maximum permitted number of failures per hour shouldn't exceed 3.
- MTBF should be 0,33 failure/hour.

3.2.1.5 Security

3.2.1.5.1 Protection

- When the manager or owner registers new users, a random work number is generated for that user encrypted with the b- encryption standards.
- Usage of x-xss-protection security header.
- Implement https, use the 2 golden rules (filter external input and escape output).
- For the data integrity, the software will always do validations and keep an audit trail.

3.2.1.5.2 Authorization and Authentication

- The users cannot change by themselves their work numbers, but the manager can by using the Two Factor Authentication method.
- The database is centralized and can only be accessed by the authorized users (owner and manager), who perform all CRUD functionalities.

- Session to be used for currently logged in users.

3.2.1.6 System Interface/Integration

The database will be provided to employees such as bartenders, waiters and other employees only as information. They would not have access to change anything on the menu or the structure of the database. Only the owner and the manager will have access to the DB configuration.

Credit card machinery configuration system. (to be revised later)

3.2.1.6.1 Network and Hardware Interfaces

Our system is a web application that will be stored in a web server, which means that the browser will create a TCP connection with the server. Every browser is able to support this connection, ensuring us that our system will function properly and each employee who would have access to his/her page if they provide the correct credentials.

3.2.1.6.2 Portability

- Php used as portable scripting language
- Operating system- Windows 7 or later, linux and MAC compatible.

3.2.1.7 Data Management

Entities:

Employee

Menu Items

Order

Inventory

Bills

Timesheet

Sales

Table

Suppliers

Employee table will contain all the general information about the employee

emp_id integer PK

emp_name varchar max 15

emp_surname varchar max 15

emp_birthday DATE - format YYYY-MM-DD

emp_status (this option will help us to differentiate owner, manager, economist, waiters, bartenders, other employees) varchar max 20

emp_photo

----Storing images in a database can potentially put unnecessary load on your database and the network between your database so a general practice is to store images in directories on the file system and store references to the images in the database. e.g. path to the image,the image name, etc.---

emp_email varchar 50

emp_hourly_wage int default =0

Employee Information

can be accessed upon login

uniquely represented by ID

Only the owner and the manager have the right to add, delete, update.

Timesheet

This table will be connected with the Employee table through emp_id

time_id integer PK

clock_in TIMESTAMP - format: YYYY-MM-DD HH:MI:SS

clock_out TIMESTAMP - format: YYYY-MM-DD HH:MI:SS

emp_id

daily_wage[(clock_out - clock_in)*emp_hourly_wage from emp table which is connected by emp_id]

Everyone will have the right to put a timesheet record which means anyone would clock in and clock out but only the owner and manager have the right to edit or delete the record.

Suppliers

We decided that suppliers would not have individual access in our system but we still need a table with supplier information in order that the manager can contact the suppliers.

sup_id int PK

sup_name varchar 50

sup_email varchar 50

sup_phone_nr int

sup_products varchar 50

The supplier information will be accessible only to the owner and the manager.

MenuItems

menu_item_id int PK

dish_name varchar 50

dish_price int by default =0

type varchar 20 (Food or Beverage)

product_name varchar 20 (Ingredients)

ing_id (will connect with inventory table through inv_id)

amount_of_ingredient

Owner and the manager will have access here to change meanwhile the bartender and waiter can only see the information in the database but cannot add or delete a menu item.

Order

order_id int pk

menu_item_id(menu table) FK

emp_id (employee table) FK

table_id (table_id) FK

order_total int default=0

Table

table_id int PK

open_time TIMESTAMP - format: YYYY-MM-DD HH:MI:SS

closed_time TIMESTAMP - format: YYYY-MM-DD HH:MI:SS

status int (1 or 0)

order_id (connect with order) FK

Waiter and manager can open and close a table.

Daily_Expense

exp_id int PK

daily_date DATE - format YYYY-MM-DD

exp_amount int

Sales

sale_id int PK

daily_date DATE - format YYYY-MM-DD FK (Daily_Expense)

profit (order_total - ex_amount)

Bill (for the bills of supplier)

Bill_id int PK

Bill_date DATE - format YYYY-MM-DD apo DATETIME - format: YYYY-MM-DD HH:MI:SS

Bill_supplier FK for supp_id

Bill_description varchar 100

Bill_amount int

Bill_pdf

Inventory

inventory_id int PK

product_name varchar FK (MenuItems)

supplier_id int FK (Supplier)

amount_available int

Our interface main goal is to be easy and fast to use in order to be efficient. The interface will be developed using html, css , bootstrap. A majority of the menu items will be just to select them so the waiter would not have to type and spend time.

All users of our system will have their personal credential (work number) in order to login and access their page. Records will be created everyday when the employee will clock in and clock out in order to create a proper timesheet and a proper way of calculating the checks in the end.

3.2.2 Organizational Requirements

3.2.2.1 Environmental Requirements

Since our software is web based, it will be stored in a server maintained by a software house or on a server chosen by the client. It needs to be maintained in order to function and work properly. By maintaining a web application, we mean keeping it up to date and fixing bugs. The servers running your web application also require occasional review and updates, like updating the database (MySql) and the web server (Apache). Apart from this, for the software to work properly, each user that is willing to use it, should have internet access and a device with the minimum requirements as stated in the Capacity and Space Requirements.

3.2.2.2 Operational Requirements

3.2.2.2.1 Operations

Specify any normal and special operations required by the user, including:

- Periods of interactive operations

The system should be available from 9am to 12 am.

- Periods of unattended operations

Unattended operations include the time between 12 am to 9 am.

- Data processing support functions

We will use validations to ensure that each input is appropriate and not malicious.

Summarize at the end of each working day the sales and expenses in a detailed report by using a sorting algorithm to arrange the data.

Classify all the items of the menu and inventory according to their category.

- Backup and recovery operations

There is available a backup server, in case that our current server breaks down for any circumstances.

- Safety considerations and requirements

Each user has its own address with an unique ID and password and only he can log in to its page. Also, a random work number is generated for each user encrypted with the b- encryption standards, so every personal information is secret and cannot be accessed.

For every HTTP request that is being generated, there will be applied the 2 Golden Rules (filter external input and escape output).

- Disaster recovery and business resumption

We are using MySQL for the database and Apache for the server. Everything is being recorded and saved in case of any fatal crashes of the system. There is a backup server, which will be used to restart the system and it only needs some confirmations from the user or from our IT supervisor.

3.2.2.2.2 Threats

3.2.2.2.2.1 Security Threats

- ***Security misconfiguration***

A web application like the one we are developing requires frequent maintenance and configuration so it can run properly and effectively. The owners of the software should keep communication with the developers and assign penetration tests to check the software's capability of handling sensitive data. In this way, the owners and developers can find out the software's vulnerabilities and improve them.

- ***Brute Force***

Brute Force means when hackers try to guess the username of a certain user by trying different tactics and the forcelly gain access on these accounts. In our case, each user has a work number, which can

be guessed if encryption is not used. Also, the company should keep an audit trail (as explained in the security and protection section), in order to register all the logins and transactions of the users within the system.

- ***Injection Attacks***

These attacks come in different injection types and try to attack data in the web applications.They usually hijack control over the website owner's database through the act of data injection into the web application. The data injected gives the website owner's database instructions that have not been authorized by the site owner themselves. That's why it is very important to use input validation and robust programming.

3.2.2.2.2.2 Emerging Technologies

The developers should be aware of the emerging technologies and try to improve the system time by time. For example, some restaurant management systems use a button to write and access a certain table, while others have arranged the tables in the system and you can just click the table and use it for any order. The second one is easier for the employees to use, reduces time and makes the operations more effective and efficient. The system should be in a process of continuing development.

3.2.2.3 Development Requirements

3.2.2.3.1 Client-Side Programming (Front End)

- HTML (Hypertext Markup Language)
- CSS (Cascading Style Sheets)
- Bootstrap (to maintain the connection between html and css)
- JS (JavaScript)

3.2.2.3.2 Server-Side Programming (Back End)

- Programming Language - Simple PHP

- Database - mySQL
- Server - Apache

3.2.3 External Requirements

3.2.3.1 Regulatory and Legislative Requirements

Here are the functions or modularities that are created in accordance with law and regulations standards.

3.2.3.1.1 Sales & Bills & Documents & Inventory

According to Law No. 9228 dated 29 April 2004 on Accounting and Financial Statements, our client is obliged to apply the National Accounting Standards (NAS), since it consists as a medium-size enterprise. According to taxes on profit, there is a need by law to keep track of every sale that is made and declared in every bill, in order to generate legal profits. These ones are organized in sales and bills functions controlled by the economist and owner. This accounting period consists in 12 months. The currency that is used to keep track is Albanian currency (lekë) and in Albanian language. Accounting books and records should follow a double-entry basis and a chronological arrangement. Businesses should verify their assets and liabilities by declaring an organized inventory. According to taxes on profit, there is a need by law to keep track of every sale that is made and declared in every bill, in order to generate legal profits. Also, TVSH should be included in the receipt, so everything is transparent to the client.

These regulations are organized in sales, bills, documents and inventory pages controlled by the economist, the manager and the owner.

3.2.3.1.2 Employees dashboard & Timesheets

According to “Kodi i Punes” in Albania, the owner is obliged to have a detailed list of personal information of the employees, to keep track about the overall period in work of an employee, to declare

the employees' wages and to declare and pay their insurances. This is all done at the employees dashboard and timesheets functions.

3.2.3.1.3 Privacy Policy

According to Law no. 9887, dated 10.03.2008 "On personal data protection", our system protects all the personal information of the employees.

3.2.3.2 Ethical Requirements

3.2.3.2.1 Software

The software should be developed according to the client's requirements and should deliver the optimal solution. It should be well documented and have the appropriate approvals. The software should be developed in such a proper way, that all the data and information collected and saved in its database is secure.

3.2.3.2.2 Developers

The developers should use the property of a client only in properly authorized ways, and with the client's knowledge and consent. They must keep private any confidential information gained in their professional work according to the respective laws. They should be accurate in stating the characteristics of software on which they work and avoid false claims. The developers should take responsibility for detecting, correcting, and reporting errors in software and associated documents on which they work. Developers should be aware of plagiarism, unethical and illegal actions .

3.3 Domain Requirements

This web based application will be used within the restaurant system/network and it does not need to communicate with any other system. It should be accessed only by the users that are registered in the system (all the employees).

4. Software Designs

4.1 User Scenarios

General Scenario 1 - Log in Scenario

A. Successful Login

- User writes his/her work number and clicks the login button.
- If all his credentials are correct, he/she logs in.
- The system directs the user into his/her main page.

B. Failed Login

- User writes his/her work number and clicks the login button.
- If his credentials aren't correct, he/she can't log in.
- The system keeps them on the main page.
- An error message is provided : "Check your work number and log in again".

General Scenario 2 - Clock in Scenario

A. Clock in

- After logging in, the user clicks clock in.
- Automatically the system clocks the user in and allows him/her to perform other actions.

B. Not clocked in

- After logging in, the user tries to open one of the options in his dashboard.
- An error message is provided: “Please clock in!”.

General Scenario 3 - MyHours Scenario

- The user clicks the “MyHours”.
- A table representing date, time in and time out for the user is shown.
- The user clicks print.
- Timesheet for the last month will be printed.

General Scenario 4 -Clock out Scenario

A. Clock out

- When the shift of the employee ends, he/she needs to clock out.
- The user clicks the clock out.
- Automatically the system clocks him/her out of the system.
- The user presses exit.
- The user is logged out.

B. Not clocked out

- The user clicks exit.
- An error message is provided: “Please clock out before exit!”.
- The user stays at the same page.

1. Owner Scenarios (General Scenarios applied)

1.1 Employee Dashboard

- Owner clicks the “Employee Dashboard”.
- A table representing all the information of the employees is shown.

- Owner can edit the fields of the table.
- The owner clicks the Add button.
- A window is shown with all empty fields required for the employee to be registered.
- Owner completes the empty fields and clicks “OK”.

A. Successful

- If all fields are completed, the new employee is registered and shown on the employee dashboard.

B. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

1.2 Timesheet

- Owner clicks the “Timesheet”.
- A table representing all employees, their time in and out, their sales, and rate per hour is shown.
- A window is shown with all the fields of the table.

1.2.1

- The owner can print PDFs which print sales of 30 days grouped by number/id.

1.2.2

- The owner can print PDFs which print the salary of 30 days grouped by employee id.

1.3 Inventory

- Owner clicks the “Inventory”.
- A table representing information regarding the inventory is shown.

2.3.1 Add Button

- Owner clicks the Add button.
- A window is shown with all empty fields required for the products to be registered.
- Owner completes the empty fields and clicks “OK”.

A. Successful

- If all fields are completed, the product is registered and shown on the inventory table.

B. Not successful

- If any of the fields is missing, an error message will be provided for the manager:

  “Please fill in all the missing fields”.

1.3.2 Edit Button

- Owner clicks the Edit button.
- A window is shown with all the fields of the table.
- Owner can edit only the “available” field.
- After finishing, the owner clicks OK.
- The table is updated due to the changes.

1.4 Suppliers

- Owner clicks the “Suppliers”.
- A table representing all suppliers and their information is shown.
- Owner clicks the Add button.
- A window is shown with all the empty fields of the table.
- Owner completes the empty fields and clicks “OK”.

1.5 Sales

- Owner clicks the “Sales”.
- A table representing sales and its attributes like sales and expenses of the day is shown.
- The table is automatically updated at the end of each work day.
- Owner cannot make any changes to this tab.

1.5.1

- The owner can print PDFs which print sales of the last 30 days.

1.5.2

- The owner can print PDFs which print all sales saved in the database.

1.6 Bills

- Owner clicks “Bills”.
- Two options are shown on the screen of the owner:

1.6.1 Suppliers

- The owner clicks the “Suppliers”.
- A table representing all the transaction information regarding bills with suppliers is provided.
- Owner can press a PDF button which will print the supplier bills.

1.6.2 Customers

- The owner clicks the “Customers”.
- A table representing all receipts of the customers is shown with all the other details.
- Owner can print all the receipts if he clicks PDF.

1.7 Menu

- Owner clicks the “Menu”.
- Two options are shown on the screen of the owner:

1.7.1 Food

- A dashboard is shown with all the items regarding food in the menu of the restaurant.

1.7.1.1 Edit Button

- Owner clicks the Edit button.
- A table representing the product and its availability is shown and the options “edit” and “delete” is shown.

A. Edit

- If the owner wants to edit the availability of the product, he can click edit.
- A window will be shown and the owner can change only the availability field.
- Owner clicks “OK” and the product’s availability is changed accordingly.

B. Delete

- If the owner wants to delete that product, he can click delete.
- The product will be automatically deleted from the menu.

1.7.1.2 Add Button

- Owner clicks the Add button.
- A table is shown with all the fields needed to register a new product (food related) in the menu (name, availability and ingredients).
- Owner completes all the fields and clicks “OK”.

A. Successful

- If all fields are completed, the new food item is added in the menu.

B. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

2.7.2 Beverages

- A dashboard is shown with all the items regarding beverages in the menu of the restaurant.

1.7.1.1 Edit Button

- Owner clicks the Edit button.
- A table representing the product and its availability is shown and the options “edit” and “delete” is shown.

A. Edit

- If the owner wants to edit the availability of the product, he can click edit.
- A window will be shown and the owner can change only the availability field.
- Owner clicks “OK” and the product’s availability is changed accordingly.

B. Delete

- If the owner wants to delete that product, he can click delete.

- The product will be automatically deleted from the menu.

1.7.1.2 Add Button

- Owner clicks the Add button.
- A table is shown with all the fields needed to register a new product (beverage related) in the menu (name, availability and ingredients).
- Owner completes all the fields and clicks “OK”.

A. Successful

- If all fields are completed,the new beverage item is added in the menu

B. Not successful

- If any of the fields is missing, an error message will be provided for the owner: “Please fill in all the missing fields”.

1.8 Tables

- Owner clicks the “Tables”.
- A list of all opened tables in the restaurant is shown.

1.9 Notes

- Owner clicks the “Notes”.
- A table representing the notes, person who sent them and date is shown along with 2 empty fields for notes towards the manager or the economist.
- The Owner writes the note in the respective field and presses enter.

1.10 Deleted

- Owner clicks the “Deleted”.
- A table which shows Product, Amount and reason it is deleted is shown.
- Owner can press the PDF button to print a list of deleted items.

1.11 Documents

- Owner clicks the “Documents”.
- A table which shows all the documents uploaded from the economist is shown.

2. Manager Scenarios (General Scenarios applied)

2.1 Employee Dashboard

- Manager clicks the “Employee Dashboard”.
- A table representing all the information of the employees is shown.
- The manager clicks the Add button.
- A window is shown with all empty fields required for the employee to be registered.
- Manager completes the empty fields and clicks “OK”.

C. Successful

- If all fields are completed, the new employee is registered and shown on the employee dashboard.

D. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

2.2 Timesheet

- Manager clicks the “Timesheet”.
- A table representing all employees, their time in and out, their sales, and rate per hour is shown.
- Manager clicks the Edit button.
- A window is shown with all the fields of the table.
- Manager can edit only the time in and time out fields.
- After finishing, the manager clicks OK.
- The table is updated due to the changes.

2.3 Inventory

- Manager clicks the “Inventory”.

- A table representing information regarding the inventory is shown.

2.3.1 Add Button

- Manager clicks the Add button.
- A window is shown with all empty fields required for the products to be registered.
- Manager completes the empty fields and clicks “OK”.

C. Successful

- If all fields are completed, the product is registered and shown on the inventory table.

D. Not successful

- If any of the fields is missing, an error message will be provided for the manager:

  “Please fill in all the missing fields”.

2.3.2 Edit Button

- Manager clicks the Edit button.
- A window is shown with all the fields of the table.
- Manager can edit only the “available” field.
- After finishing, the manager clicks OK.
- The table is updated due to the changes.

2.4 Suppliers

- Manager clicks the “Suppliers”.
- A table representing all suppliers and their information is shown.
- Manager clicks the Add button.
- A window is shown with all the empty fields of the table.
- Manager completes the empty fields and clicks “OK”.

2.5 Sales

- Manager clicks the “Sales”.
- A table representing sales and its attributes like sales and expenses of the day is shown.
- The table is automatically updated at the end of each work day.

- Manager cannot make any changes to this tab.

2.6 Bills

- Manager clicks “Bills”.
- Two options are shown on the screen of the manager:

2.6.1 Suppliers

- The manager clicks the “Suppliers”.
- A table representing all the transaction information regarding bills with suppliers is provided.
- Manager clicks the Add button.
- A window with all the empty fields for the transaction to be registered is shown.
- Manager completes all the fields and clicks “OK”.

A. Successful

- If all fields are completed, the transaction is registered and shown on the supplier bills table.

B. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

2.6.2 Customers

- The manager clicks the “Customers”.
- A table representing all receipts of the customers is shown with all the other details.
- Manager can click any of the receipts.
- A window with the respective receipt is shown.
- The manager can click “Print” if he/she wants to print the receipt opened.

2.7 Menu

- Manager clicks the “Menu”.
- Two options are shown on the screen of the manager:

2.7.1 Food

- A dashboard is shown with all the items regarding food in the menu of the restaurant.

2.7.1.1 Edit Button

- Manager clicks the Edit button.
- A table representing the product and its availability is shown and the options “edit” and “delete” is shown.

C. Edit

- If the manager wants to edit the availability of the product, he can click edit.
- A window will be shown and the manager can change only the availability field.
- Manager clicks “OK” and the product’s availability is changed accordingly.

D. Delete

- If the manager wants to delete that product, he can click delete.
- The product will be automatically deleted from the menu.

2.7.1.2 Add Button

- Manager clicks the Add button.
- A table is shown with all the fields needed to register a new product (food related) in the menu (name, availability and ingredients).
- Manager completes all the fields and clicks “OK”.

C. Successful

- If all fields are completed, the new food item is added in the menu.

D. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

2.7.2 Beverages

- A dashboard is shown with all the items regarding beverages in the menu of the restaurant.

2.7.1.1 Edit Button

- Manager clicks the Edit button.
- A table representing the product and its availability is shown and the options “edit” and “delete” is shown.

C. Edit

- If the manager wants to edit the availability of the product, he can click edit.
- A window will be shown and the manager can change only the availability field.
- Manager clicks “OK” and the product’s availability is changed accordingly.

D. Delete

- If the manager wants to delete that product, he can click delete.
- The product will be automatically deleted from the menu.

2.7.1.2 Add Button

- Manager clicks the Add button.
- A table is shown with all the fields needed to register a new product (beverage related) in the menu (name, availability and ingredients).
- Manager completes all the fields and clicks “OK”.

C. Successful

- If all fields are completed,the new beverage item is added in the menu

D. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

2.8 Tables

- Manager clicks the “Tables”.
- A list of all opened tables in the restaurant is shown.

2.8.1 Click one table

- Manager clicks one of the tables.

- A window showing details regarding that table like the server, items ordered and total is shown.

A. Delete order

- Manager clicks the Delete Order button.
- A window requesting the reason for the delete is shown.
- Manager writes dhe reason and clicks “OK”.
- The order is deleted from the system, the table is now available.

B. Delete item

- Manager clicks the Delete Item button.
- This button is available for every item in the order.
- A window requesting the reason for the delete is shown.
- Manager writes the reason and clicks “OK”.
- The item is deleted from that order.

2.8.2 Reserve Button

- Manager clicks the Reserve button.
- A window requesting the table, name of the client and the time is shown.
- Manager completes all the fields and clicks “Add”.

A. Successful

- If all fields are completed,the reserved table is added in the reserved tables section.

B. Not successful

- If any of the fields is missing, an error message will be provided for the manager: “Please fill in all the missing fields”.

2.8.3 Reserved Tables

- Manager clicks the Reserved Tables.
- A table representing the reserved tables with the table number, name of the client and time is shown.

- Each row representing a reserved table, has a delete button.
- The manager clicks the Delete button.
- The table is deleted from the Reserved Tables section and it is now available.

2.9 Notes

- Manager clicks the “Notes”.
- A table representing the notes, person who sent them and date is shown along with 2 empty fields for notes towards the owner or the economist.
- The manager writes the note in the respective field and presses enter.

3. Economist Scenarios (General Scenarios applied)

3.1 Sales

- Economist clicks “Sales”.
- A table for Sales opens and shows attributes like: date, sale id, amount of sale, expenses and profit from each sale made.
- This table is automatically updated when the work day ends.
- The economist only checks without making changes to this page for further documents needed.

3.1.1 PDF (optional)

- Economist clicks “PDF”.
- A report of the sales made in the last 30 days is provided.
- The economist clicks the “Save” button to get the full report.

3.2 Bills

- The economist clicks “Bills”.
- A table with information regarding all transactions made with suppliers is provided.
- Informations consist in: bill number, supplier name, product, amount.

- The economist cannot make changes to this tab. He can only check it to gather his needed data.

3.2.1 PDF (optional)

- Economist clicks “PDF”.
- A report of the bills recorded in the last 30 days is provided.
- The economist clicks the “Save” button to get the full report.

3.3 Employees Dashboard

- Economist clicks “Employees Dashboard”.
- A table which shows the salaries made by each employee with their IDs and all the other personal work information is provided.
- The economist cannot make any changes in this tab.

3.3.1 PDF (optional)

- Economist clicks “PDF”.
- A report of the total salaries made in the last 30 days grouped by their IDs is provided.
- The economist clicks the “Save” button to get the full report.

3.4 Documents

- Economist clicks “Documents”.
- A table with the documents that he/she has already added is provided associated with each necessary attribute: year, month.
- Economist clicks the “Add” button if he has a new document to add.

3.4.1 Add button (optional)

- Another page with the required fields for the document to be added is shown.
- The economist completes all the fields and clicks “OK”.

A. Successful

- If all fields are completed, the new add is registered and shown on the documents table.

B. Not Successful

- If any of the fields is missing, an error will be provided for the economist: “Please fill in all the missing fields”.

3.5 Notes

- The economist clicks “Notes”.
- A small table is shown including the notes and its attributes: the date and person who sent them. Also, 2 empty fields for notes towards the owner and manager are provided.
- The economist only writes the note in the required fields and presses Enter.

4. Server Scenarios (General Scenarios applied)

4.1 Tables

- Server clicks “Tables”.
- A window that includes all the tables, their number and their position is shown.
- Server opens one of the tables.

A. Not occupied

- If the table is not occupied it will direct the server to the “Menu”.

B. Occupied

- If the server chooses a table that is already occupied, a window that shows a warning that the table is being used is shown.

4.2 Menu

- Server clicks on the “Menu”.
- He can choose between 2 options: Food and Beverages.
- After checking the client’s order, the server chooses the items.

- A window that includes all the items selected, their amount, the tvsh, the total price and the server name is shown. (the bill)
- Server clicks on “Print” to print the bill.
- Server clicks on “Pay” and two options are provided:

A. Pay in cash

- The payment is done directly in cash.

B. Pay with a credit card

- If the client chooses to pay with a credit card , the server can:

A. Swipe the card

B. Add the information manually

- If the information is added manually, a table that shows the “Code” is provided, it allows the user to write in the empty field.
- The server prints the bill again with the card transaction.
- The server comes back with the tip.
- The server enters the tip and clicks “Done”.

4.3 My Tables

- Server opens “My tables”
- A window that shows his tables is presented.

4.4 Cashout

- When the server clicks “Cashout”, it will print his cashout statement which involves sales, tips, profit and type of payments.

4.5 Notes

- Server checks “Notes”.
- A table that shows the note, date and the person that leaves the note is presented.

- There are provided two empty fields where the server can leave a note for the manager or the owner.
- The server writes the note in the respective field and presses enter.

5. Bartender Scenarios (General Scenarios applied)

5.1 Seats

- Bartender clicks “Seats”.
- Bartender checks the seats.

A. Seat is occupied

- If the seat is occupied, a warning will be shown that the seat is not available and the system will direct the bartender again to the seat choosing page and the bartender can choose a different seat.

B. All seats are occupied

- If all seats are occupied, a warning will be shown that there are no seats available **.**

C. Seats are not occupied

- The bartender can go to the menu page and can choose the drink for the customer.

5.2 Menu

- Bartender clicks on the menu.
- He has only one option: Beverages.
- After checking the client’s order, the bartender chooses the items.
- A window that includes all the items selected, their amount, the tvsh, the total price and the bartender’s name is shown. (the bill)
- Bartender clicks on “Print” to print the bill.
- Bartender clicks on “Pay” and two options are provided:

C. Pay in cash

- The payment is done directly in cash.

D. Pay with a credit card

- If the client chooses to pay with a credit card , the server can:

A. Swipe the card

B. Add the information manually

- If the information is added manually, a table that shows the “Code” is provided, it allows the user to write in the empty field.
- The bartender prints the bill again with the card transaction.
- The bartender comes back with the tip.
- The bartender enters the tip and clicks “Done”.
- Bartender does the cashout the same as the waiter.

5.2 Cashout

- When the bartender clicks “Cashout”, it will print his cashout statement which involves sales, tips, profit and type of payments.

5.3 Notes

- The bartender clicks “Notes”.
- A small table is shown including the notes and its attributes: the date and person who sent them. Also, 2 empty fields for notes towards the owner and manager are provided.
- The bartender only writes the note in the required fields and presses Enter.

6. Other Employee Scenarios (General Scenarios applied)

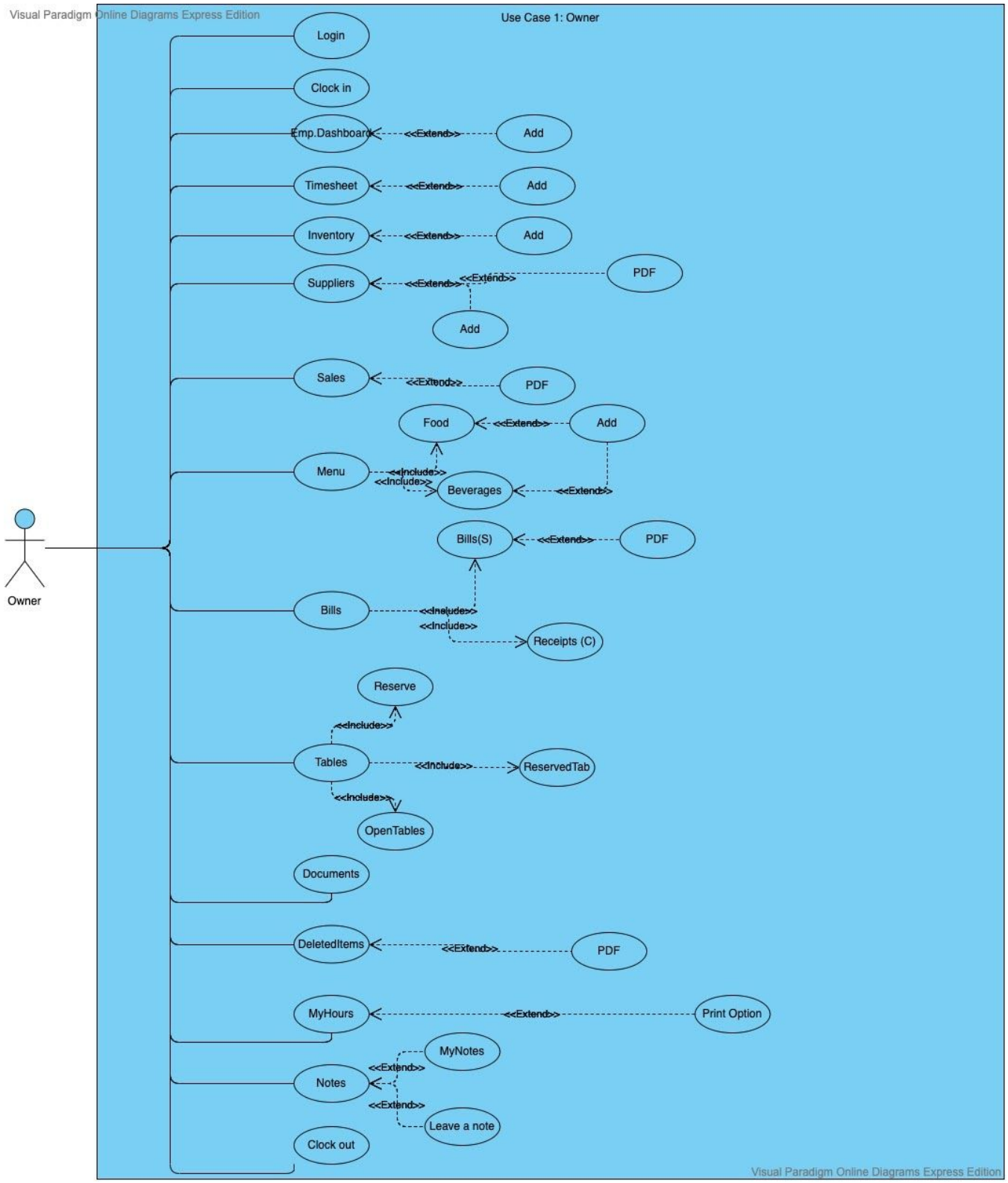
6.1 Notes

- The user clicks “Notes”.

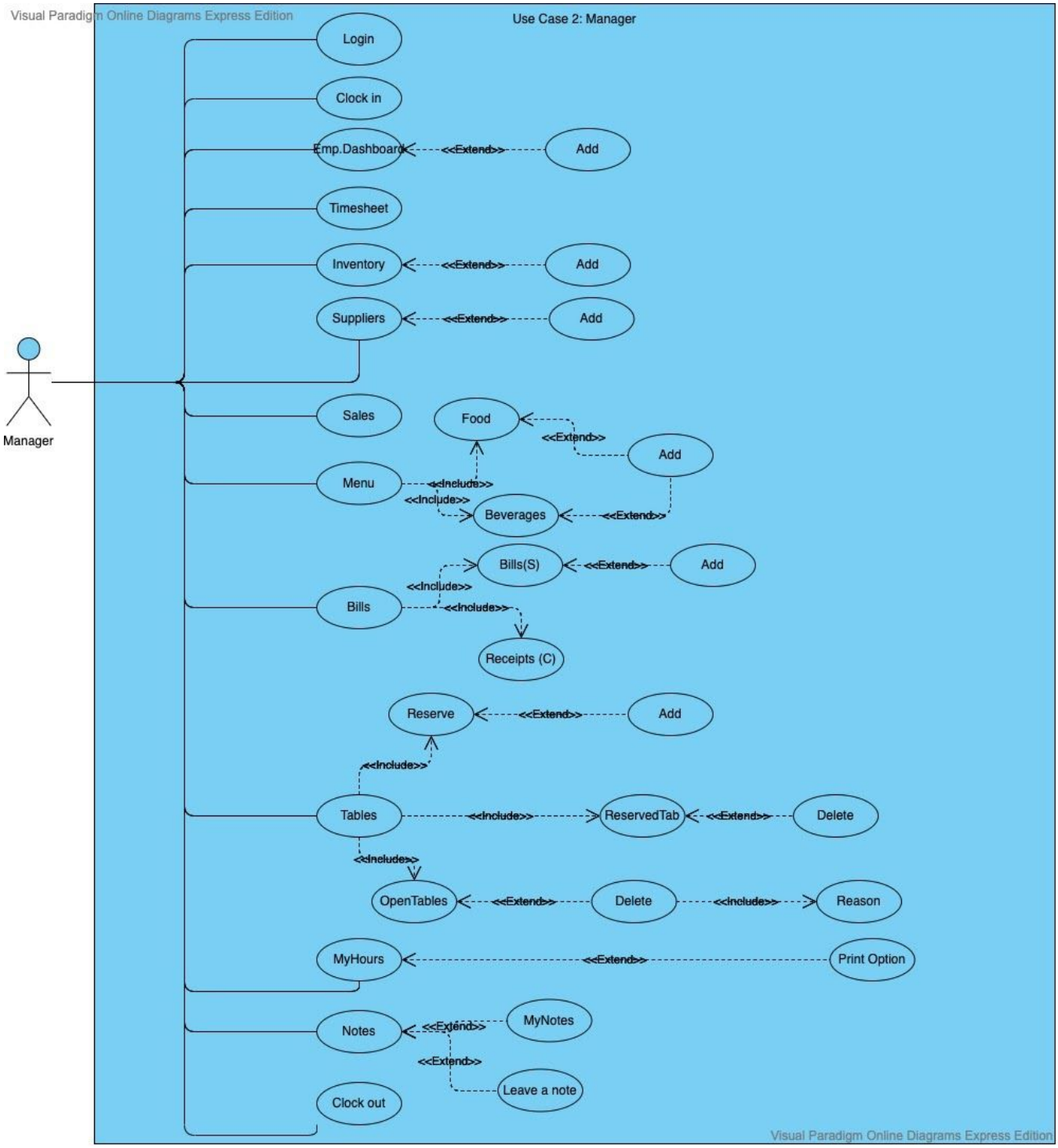
- A small table is shown including the notes and its attributes: the date and person who sent them. Also, 2 empty fields for notes towards the owner and manager are provided.
- The user from other employees only writes the note in the required fields and presses Enter.

4.2 Use cases

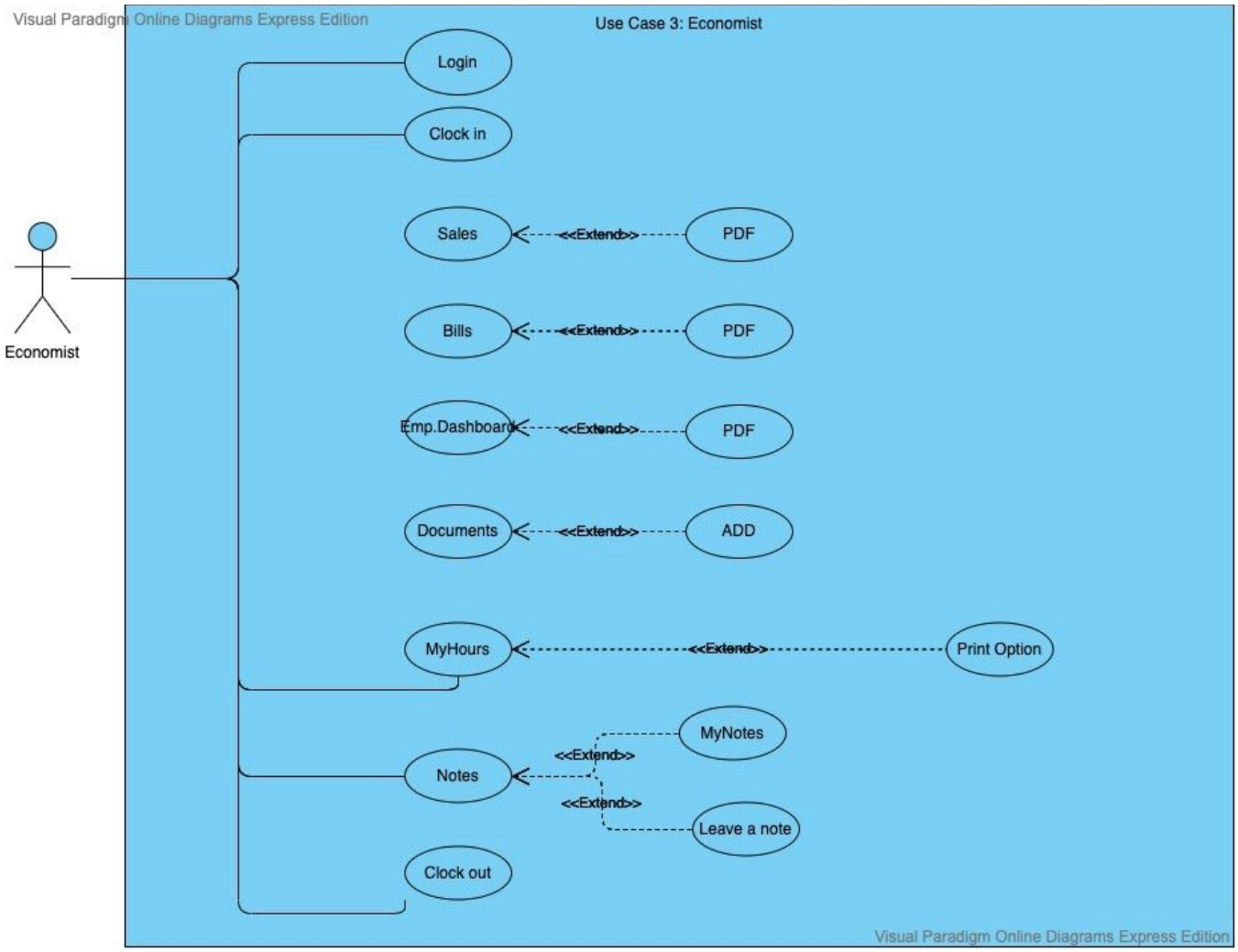
4.2.1 Use case 1: Owner



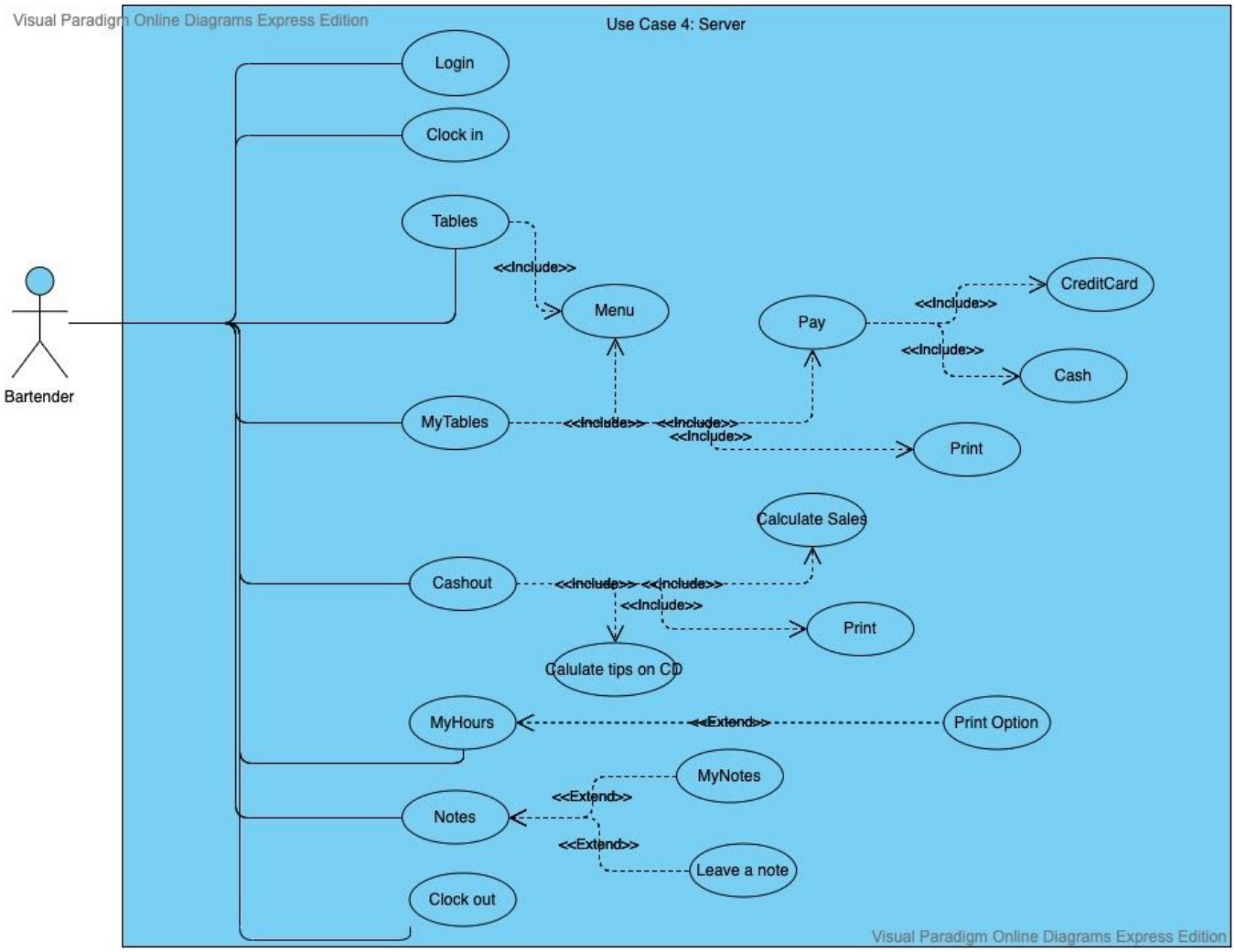
4.2.2 Use case 2: Manager



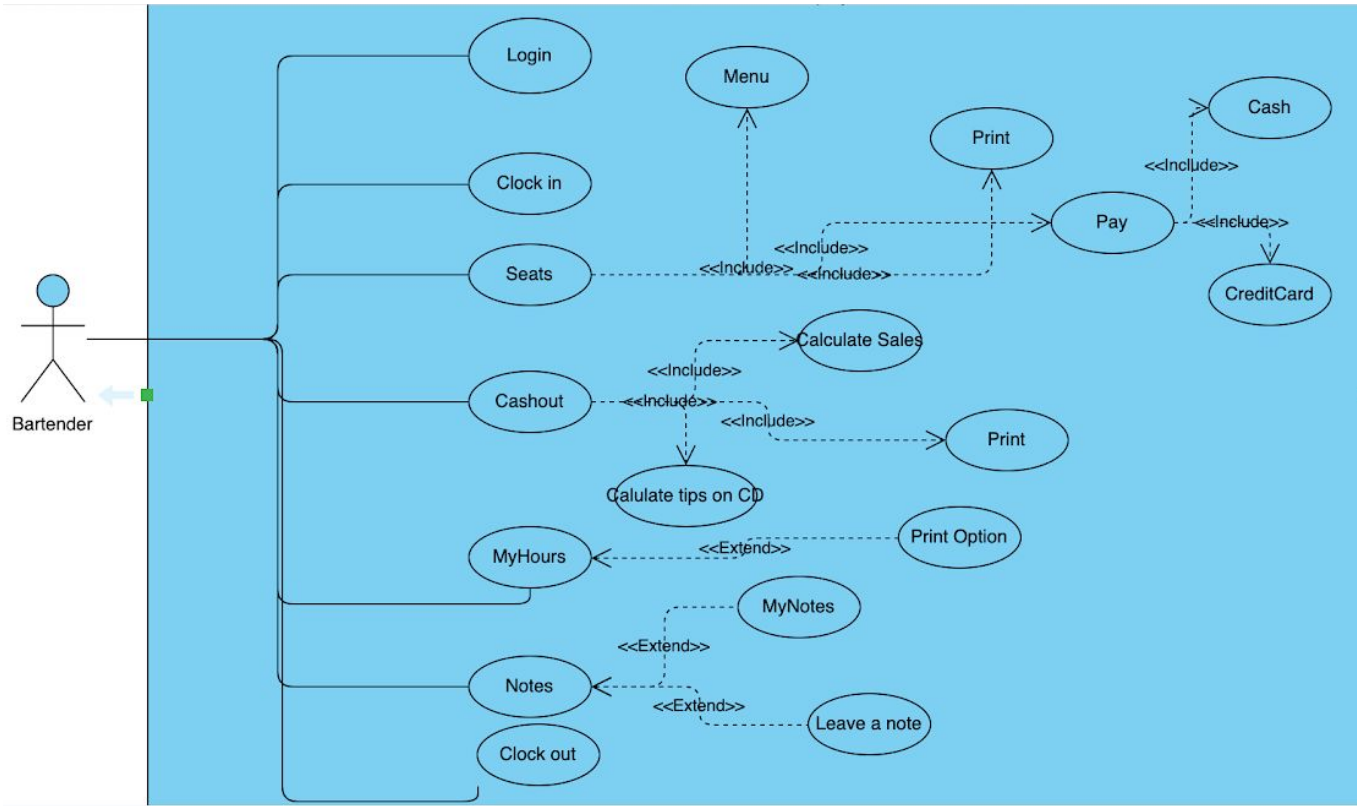
4.2.3 Use case 3: Economist



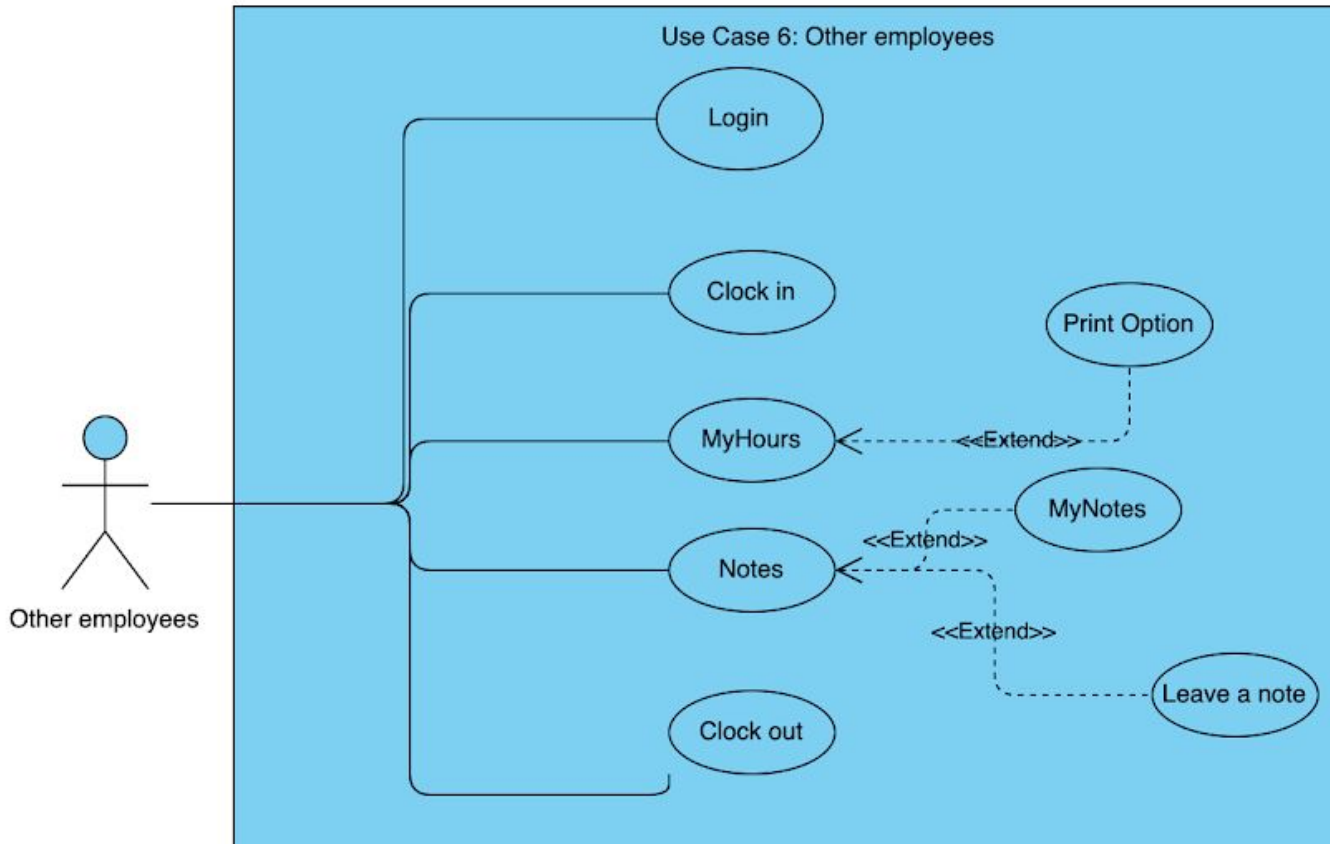
4.2.4 Use case 4: Server



4.2.5 Use case 5: Bartender



4.2.6 Use case 6: Other Employee



4.2.7 Use case 7: General Use Case