# Software Requirements Specification

## Blue Dog Café Rostering System


### ABSTRACT

The following report analyses the requirements specified by Blue Dog Café in creating a rostering system.



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# 1. INTRODUCTION

## 1.1 PURPOSE & USER CHARACTERISTICS

This document specifies the Blue Dog Café Rostering System (referred to in this document as the "system", "software" or "solution") which will replace the manual process of generating and distributing weekly rosters to employees. The solution is intended for café owners, managers and chefs, specifically those of the Blue Dog Café (referred to in this document as the "client" or "business"), who are required to create and distribute rosters to the business' employees. The Blue Dog Café Rostering System is an information system that provides the users with a more organised and efficient to create and send the weekly roster. Unlike the current manual (by-hand, non-digitised) rostering system, this product will be able to copy last week's roster for use as a template, search and sort the archive of past rosters for employee names and shifts worked, and automatically send the completed roster to the employees.

There are two main groups of users who will be utilising the software. The first user group consists solely of the owner of the Blue Dog Café (though will still be referred to as a group). The owner is involved with receiving roster suggestions and generating and sending rosters. This group has extremely limited technical experience and is not skilful in operating computers running the Windows desktop environment. However, they are familiar with spreadsheet applications, word processors, and the Macintosh desktop environment. All functions of the software are available to this group, their interaction with the system is unlimited. This user group will be in contact with the developer of the software who will be serving technical support when required.

Mangers and chefs make up the second group of users. They interact with the system to submit a suggested roster for the following week (though this is not a compulsory action). They have basic technical experience and are familiar with spreadsheet applications. This group is also familiar with the Macintosh desktop environment. Their time interacting with the system is limited to drafting suggested rosters and updating the current week's roster.

*The term "shift-block" is used throughout this document and refers to the time slot in which employees work (their shift). E.g. 08:00 to 13:00.*

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# 2. SCOPE

This document contains a complete description of the functionality of the Blue Dog Café Roster System project. It consists of use cases, functional requirements and non-functional requirements, which, taken together form a complete description of the software.

## 2.1 ITEMS WITHIN SCOPE

The scope of the software solution includes three main tasks—allowing rosters to be suggested, the generation of rosters by the user, and the sending of a completed roster to employees of the business.

The items that are within scope of this project include:

- Storing, editing and deleting employee data within a local encrypted file.
  *Data contains:*
  - *Full Name*
  - *Earliest start for each day of the week*
  - *Latest finish for each day of the week*
  - *Chef of manager?*
  - *Can close café at night?*
  - *Colour code*
- Allowing multiple user groups to log-on to the system via entry of a unique PIN (which can be modified).
  *The two user groups:*
  - *Chefs/Managers*
  - *Owner*
- Restricting access to certain functions for certain user groups.
  Chefs/Managers cannot use certain functions of the system.
- Generating a roster using dropdown lists with modifiable selections.
- Suggesting a roster after generation by chef/manager.
- Sending a roster automatically after completion via email.
- Archiving rosters and using archived rosters as an editable template for the next weeks roster.
- Searching through archived rosters and sorting the search results for analytical use by the client.
- Validating data entered into the system by the user and autocorrecting invalid entries to prevent erroneous/invalid data crashing the system.
- Alerting the user to errors and submitted suggestion rosters via message-boxes.

## 2.2 ITEMS OUTSIDE THE SCOPE

Due to time and cost constraints, some features and functions will not be available in the initial release of the software. This includes the ability to upload rosters to Facebook groups/accounts, and the ability for the software to run natively on macOS.


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## 2.3 Operating Environment

The software will operate on a desktop or laptop in the café where it can be accessed by the staff. The operating system that the software will be running on will be stand-alone Windows 7, 8 or 10.

Occasionally the computer on which the software is operating will be taken for use at home by the owner. This migration should not affect the operation as both locations supply an internet connection and all necessary files are stored locally.

The solution is required to input and archive (output) data in the Excel spreadsheet format. The final output (a PDF file) will need to be sent via email (using Outlook).

The only input method will be a mouse and keyboard—no touch support—allowing easy interactivity with small UI elements that would otherwise be hard to select. No other peripherals are utilised.

## 2.4 Application Architecture

The software will use a thick client application architecture primarily because it allows the application to be easier to use and user-friendly. This is important because the users of the system are not very experienced nor have technical skills, allowing the software to be used effectively by users of all skill-levels.

Thick clients require processing to be done locally on the user's system which eliminates the need for a central processing server and an always-on internet connection. This saves the business money and time, greatly improving efficiency.

This is type of application architecture is employable because all data is stored locally, and the device on which the software is executed is capable in terms of its processing power and memory capacity.



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# 3. FUNCTIONAL REQUIREMENTS

Note: All functions can be accessed by all user-groups unless otherwise stated. The “owner” user-group has access to every function of the system, while the “chef/manager” user-group is limited.

| No. | Requirement | Notes |
|---|---|---|
| FR01 | Require user to log-on with a PIN. | When the software is opened, users must log in as either an “owner” or a “chef/manager” before they are able to use the functions of the system. To do this, the user is required to enter a predefined PIN.<br><br>This is to prevent the employee data being decrypted by an unauthorised user (therefore violating privacy regulations). |
| FR02 | Prompt user to create new PIN. | If the file that stores the user-group’s PINs is missing/deleted or if no PIN is stored within the file, prompt the user to create a new PIN upon first log-on. Though this is insecure, it allows the client to regain access to the system if their PIN is forgotten.<br><br>*This should occur when the software is executed for the first time.* |
| FR03 | Allow PIN to be changed once logged-on. | Once a user is logged-on, they should be able to change the PIN for their user group (and only their group). This is in case the PIN becomes insecure. |
| FR04 | Store and encrypt user-group PINs. | The PINs must be stored for next log-on and must be encrypted so that they cannot be read by anyone with access to the computer. |
| FR05 | Validate data inputted into the software. | When data is being entered into the software, it should be validated against a regular expression to prevent incorrect/corrupt data entering the system as it can result in the software behaving unexpectedly.<br><br>This will require the use of the *Regular Expressions class*. |
| FR06 | Store employee data. | Take in personal data submitted to the owner by the employees and store it in a data store (spreadsheet) for use in the system.<br><br>The data store must also contain fields specifying whether an employee is able to close the shop and specifying a “colour code” (see NFR04).<br><br>Only the “owner” user-group can use this function.<br><br>*The term “employee” includes chefs/managers.* |
| FR07 | Edit/remove employee data. | Modify or remove employee data within the system.<br><br>Only the “owner” user-group can use this function. |

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| | | |
|---|---|---|
| FR08 | Employee data must be encrypted. | The spreadsheet containing personal employee information should be encrypted with a password to adhere to privacy regulations. |
| FR09 | Edit times of shift-blocks. | The owner user-group (only) can edit the times of the shift-blocks available for selection during roster generation. This includes a 'close' time which is used when a shift ends when the café is closing (a variable time). |
| FR10 | Names and shift-blocks selectable from dropdown list. | When generating a roster, employee names are selected from a dropdown list sourced from the employee data spreadsheet. Shift-blocks are selectable from a predefined list also. |
| FR11 | Disallow manual entry of fields during generation. | When generating a roster, employee names and shift-blocks are selectable from a noneditable dropdown (as above) to prevent invalid data entry (user cannot type). |
| FR12 | Copy last week's roster for use as a template. | When generating a new roster, it is required that the client can copy last week's roster to be used as a starting point so that they do not have to start from scratch each time. |
| FR13 | Generate rosters. | The solution must be able to generate a roster *(see above)* in the form of an excel spreadsheet. |
| FR14 | Suggest rosters. | When logged-on as a chef/manager, instead of being able to send a roster, users can suggest a roster. This means their generated roster is saved and shown to the owner on next log-on. |
| FR15 | Export rosters (as PDF). | Once generation of a roster is complete, it must be exported as a PDF, so it can be emailed *(see below)*. |
| FR16 | Send rosters via email. | At the same time as a roster is converted to PDF, a copy must be sent to every employee email listed in the employee data spreadsheet.<br><br>The "chef/manager" user-group cannot access the functions for sending a new roster (the initial version/first for that week) but may modify, resend and re-archive a roster that has already been sent within the current week. |
| FR17 | Archive past rosters. | At the same time as a roster is sent out it must be archived as an excel spreadsheet in a folder so that a record is kept for the business. (Rosters are archived with no expiry/deletion date. No requirement for deletion functionality.) |
| FR18 | Overwrite archived rosters during the same week. | If a roster is regenerated during the same week that the previous one was generated, upon archival the old roster must be overwritten. |
| FR19 | Search past rosters (by employee name). | Past rosters can be searched with an employee name as the search string. It should return a list of all the shifts allocated to the employee name, sourced from the entire archive of past rosters. |



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|---|---|---|
| FR20 | Sort search results. | Once the result of a search is returned, it must be able to be sorted by date—chronological order—or sorted by shift block starting time—from earliest in the morning to latest in the night. This allows the client to analyse the data in a meaningful way to increase the efficiency pertaining to the allocation of shifts on the rosters. |
| FR21 | Autocorrect closing times past midnight to “close”. | When defining shift-blocks, if the user specifies a closing time later than “12 am” (midnight), the software should autocorrect the entry to the variable time labelled “close”. |
| FR22 | Alert the user if closing time is prior to opening time. | When defining shift-blocks, if the user specifies a closing time prior to the opening time, show the user an error message containing details of the error and require that the user select another closing/opening time. *Do not save the ‘incorrect’ input.* |
| FR23 | Alert the user to missing/deleted files. | If a file the software depends on (e.g. PIN file or employee information spreadsheet) is missing, a message box should appear the next time the software is run, alerting the user to the fact that the file cannot be found, and that a blank “template” file has been created as a replacement (see below).<br><br>*This should not occur when the software is executed for the first time.* |
| FR24 | Replace missing files with a blank template. | If a file the software depends on (see above) is missing, create a blank “template” file consisting of the same structure to replace it. This file can then be filled out by the user as if the software was being run for the first time.<br><br>*This should occur when the software is executed for the first time.* |
| FR26 | Prompt user to save before closing. | If the user attempts to quit before saving their work, display a confirmation dialogue box. |
| FR27 | Provide useful error messages. | If the software catches an error, an understandable and useful error message should be shown to the user. |



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# 4. NON-FUNCTIONAL REQUIREMENTS

The following are the non-functional requirements specified by the client. Any requirements not mentioned in the following table do not require attention and will not affect evaluation of the final solution.

| No | Requirement | Notes |
|---|---|---|
| NFR01 | Usability—Full screen. | The application should run in full-screen mode and should not be resizable. It should be minimizable. |
| NFR02 | Usability—Basic UI. | Must not be graphics intensive as it may be running on old hardware. |
| NFR03 | Usability—macOS-like design language. | Should have similar layout, design, feel and behaviour of a basic macOS application. The client does not have an existing design language to adhere to, but prefers familiarity. |
| NFR04 | Usability—Big UI elements (and whitespace). | The buttons, text-boxes, images, etc should be large and obvious to the user. It should not be hard to read screen content, nor should it be hard to find anything. Ample whitespace should be used between objects to aid the clean design. |
| NFR05 | Usability—Employee names colour coded. | In the exported roster, employee names should be coloured according to the colour specified alongside their name in the employee data store. *See FR06.* |
| NFR06 | Usability—Logo displayed. | The application logo should be the client's business' logo. The logo should also be displayed at the top of each form. |
| NFR07 | Reliability—Must continue to function for at least 5 years. | The software must be able to perform its required functions for at least five years from the date of deployment. |
| NFR08 | Robustness—Validate all inputs to the system. | Any time a user is inputting new data into the system (e.g. names, times, email addresses) the data must be validated using *regular expressions* to prevent the code from crashing. |
| NFR09 | Robustness—Catch errors. | The software should not crash at any time. All errors should be caught and dealt with. |
| NFR10 | Robustness—Disallow autocorrection of manually typed data. | If the inputted data matches the regular expression with which it is validated against, the software should not attempt to autocorrect the data. |
| NFR11 | Maintainability—Easily updated/maintained. | It is important that the code is easily serviceable and updatable if, for example, the operating environment changes. This will reduce time and therefore the cost required to make changes to the system. |



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| | | |
|---|---|---|
| NFR12 | Response Rates—Three clicks to send roster. | It should take a maximum of three clicks (not including roster modifications) to copy last week's roster and send and archive the new roster. |

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# 5. CONSTRAINTS

Time (Economic) – This is the most impactful constraint on the project. Solution should be completed by 22nd August 2019. This means some features cannot be included due to the limited amount of time for development (*see Out of Scope*).

Social Factors – Technical expertise – Level of user experience is low (especially regarding the Windows environment), so the software must be accordingly user friendly.

Legal Requirements – The Blue Dog Café has no privacy policy, but they assert that personal employee data should always be protected by security features if it is in their systems (verbal contract), so the files containing employee data and PINs must be encrypted, and the solution must be locked with a log-on screen and a PIN.

Technical Factors…

Speed of Processing – Must be able to copy last week's roster, send the new roster and archive the new roster within three clicks (not including the generation of the roster (arranging shifts)).

Capacity – Should fit within one gibibyte of disk space and use less than one gibibyte of memory. This should not be a hindrance.

Availability of Equipment – There is no existing hardware because the current solution is not computerised. The client will be supplying their own laptop/desktop computer running Windows 7 or newer.

Compatibility – The software must be compatible with Windows 7 or newer (this is what the client has). It must be able to export completed rosters in the PDF format so that it can be read by other computers.

Security – The system should be protected with a log-on screen where users must enter a PIN to access the software. The PINs should be stores in an encrypted file. All data that is collected from employees and stored on file must also be encrypted.

Usability Factors…

Usefulness – The solution's interface must be familiar to the user, it must look and behave similar to that of basic macOS applications.



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# 6. DATA COLLECTION (EXISTING SYSTEM)

Four different types of data collection methods were researched. Having weighed up the pros and cons of these different types, it was decided to employ the following three…

| **Collection Method** | **Justification** |
|---|---|
| A digital Questionnaire containing questions (short answer and true/false answer questions) distributed to the owner as a Google Form prior to conduction of an interview. | Questionnaires are useful for covering question points that do not require elaboration—yes or no questions especially—and is very easy to distribute. The responses are immediately fed-back and the process of interpreting the user-base's satisfaction with the current system is straight forward. I will specifically utilise a questionnaire to hasten the process of data collection by using the responses as a basis for elaboration during the interview. The complications of retrieving data via questionnaire—poor response rate and limited depth/elaboration of questioning—are combatted using an interview. |
| Interview of owner directly, conducted face-to-face, for which questions were drafted prior. | Interviews can expand on and dive deeper into questions raised in the questionnaire; this is crucial to a complete data collection. It is possible to seek out additional information when more clarity is required and change the direction of the interview should new information negate the necessity for certain question topics (for example; if it is found that only one user uses the system, all multi-user related questions are discarded). Though there is a possibility of biased data being collected, between the benefits of an interview and the use of an observation, the disadvantages are outweighed. |
| Observation of the current system in use by the owner during a typical time-frame. | Observations provide an unbiased view of the operation and use of the system. The user cannot inject their opinions into their actions and the observer has no knowledge of how the system functions. Although observations are typically time-consuming and expensive, that will not be the case for me as I only have one user to observe. Additionally, the specific time will not affect the observation as the system in question is not used over long periods of time (longer than the observation). Therefore, the pros of this collection method are more significant than its cons. |


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### 6.1.1 Questionnaire (Google Form)

1. What information do you need to make a finished roster? (e.g. Employee names, preferred shifts, pay rates, contact details?) [written answer]
2. How are employees informed of their shifts/how is the roster sent? [written answer]
3. Are past rosters stored on file/archived? [yes/no]
4. If so, how often and with what speed and ease do you need to access archived rosters? [written answer]
5. Does anyone else have access to the roster system? If so, whom? [written answer]
6. Are employee's personal data protected? If yes, how so? (e.g. key for a filing cabinet, password on photos) [written answer]
7. What information is displayed on a completed roster? (Shift times, employees, hours?) [written answer]
8. How long does it usually take to create a roster? [written answer]

#### Questionnaire Answers

1. Employee names, availability, and if they're able to open/close the cafe.
2. The roster is photographed and sent via Facebook/SMS or is printed and physically posted in the cafe.
3. Yes, they are archived.
4. Not often, but speed is required due to the circumstances in which a search would occur. Great ease of use is preferable.
5. The chefs and some trusted managers have access to the system.
6. Personal data is not collected and therefore nothing is protected.
7. Employee names and allocated shifts.
8. Roughly half an hour.

### 6.1.2 Interview Questions

1. Who has access to the system?
2. What task does each user/group perform?
3. Do any users/groups have special permissions?
4. What data goes into the system?
5. What data comes out of the system?
6. How is the data inputted to the system?
7. How is the data outputted from the system?
8. Where does the data come from?
9. Where does the data go?
10. What data is stored?

#### Interview Answers

1. Rachele, the chefs, and trusted managers.
2. Everyone creates rosters (only one per week), and Rachele finalises/approves rosters.
3. Only Rachele can send the final roster.
4. Employee names, availability, and if they're able to open/close the cafe.
5. Employee names and allocated shifts.
6. Employees inform Rachele of their availability and their names. Their ability to open/close the cafe is stored on file and updated with their experience.
7. The final roster is photographed and sent digitally or printed and posted in the cafe.
8. Input data is sourced from employees.
9. Output data is destined for the roster delivery system (Facebook, SMS, or physical posting).
10. Employee names, availability (preferred hours), whether they can open/close the cafe, and past rosters (stores separately).


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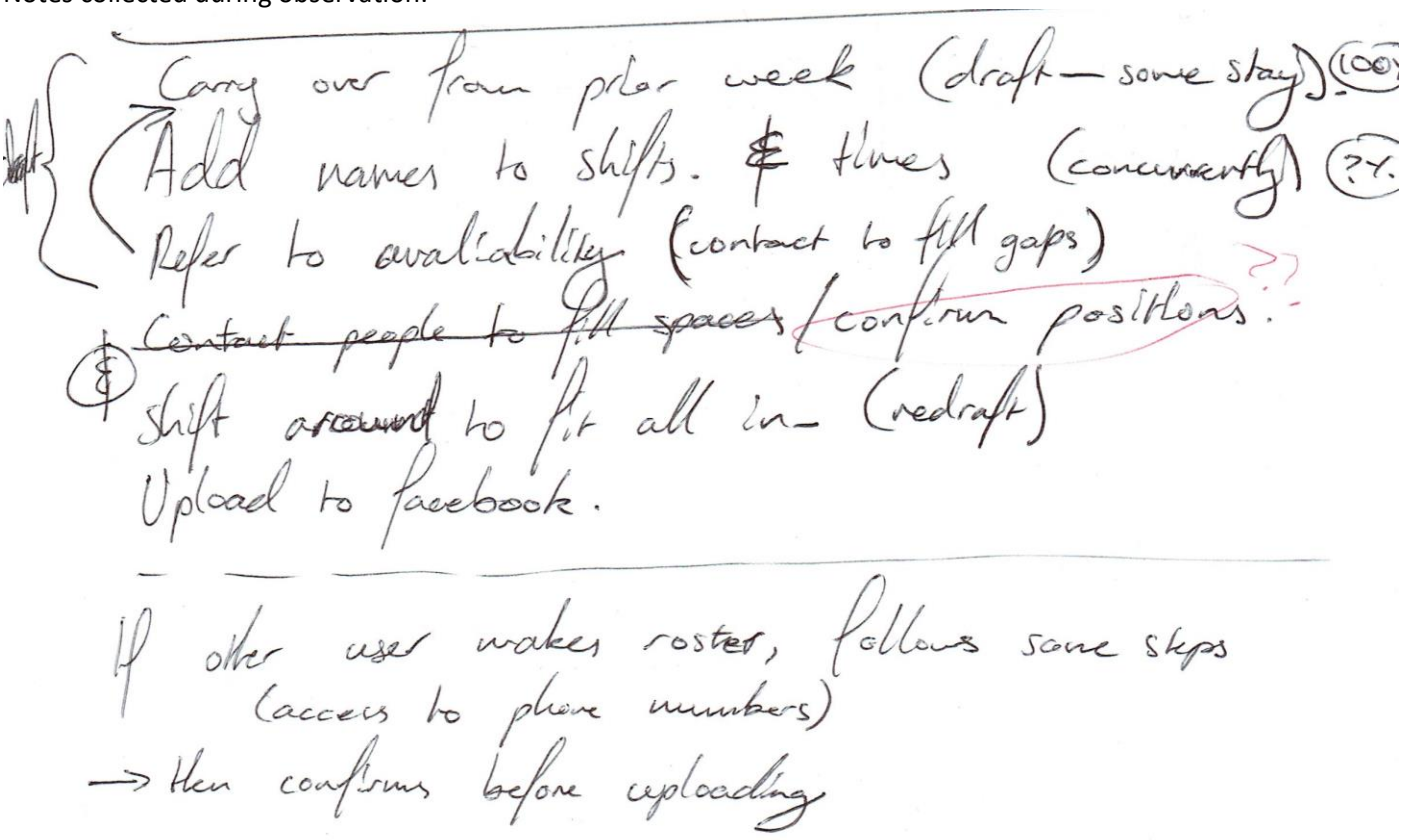
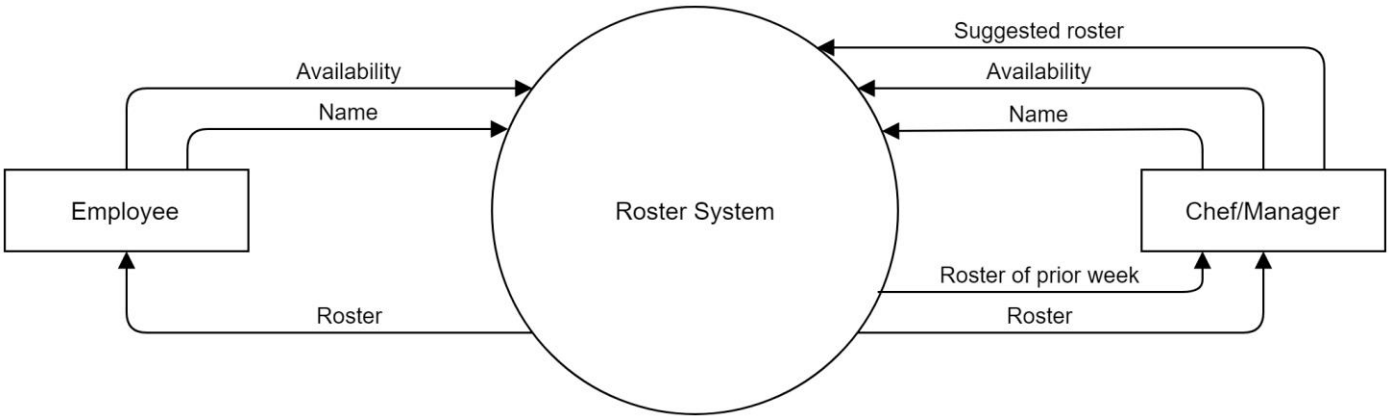
### 6.1.3 Observation

Notes collected during observation:




## 6.2 CONTEXT DIAGRAM



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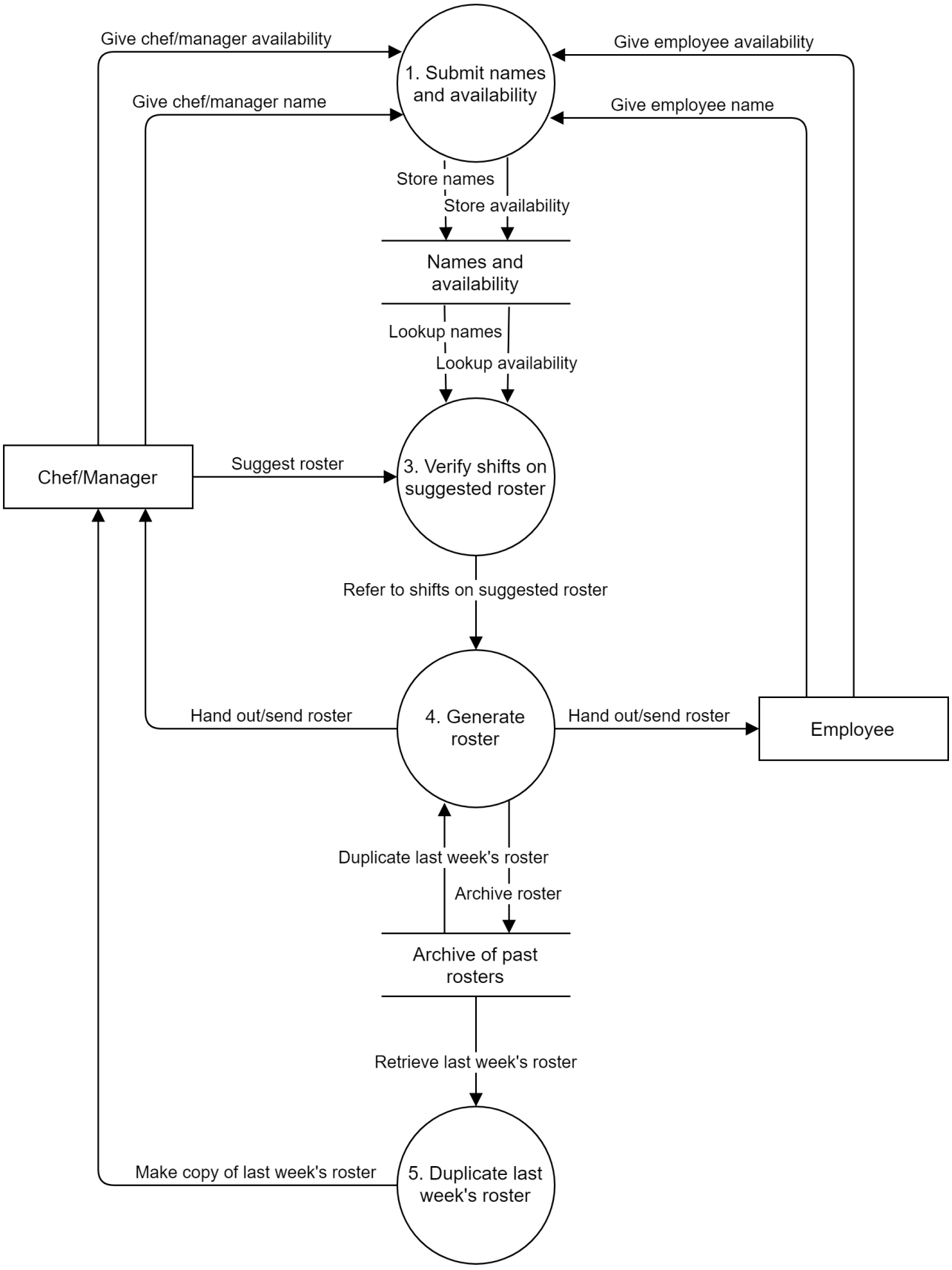
## 6.3 DATA FLOW DIAGRAM







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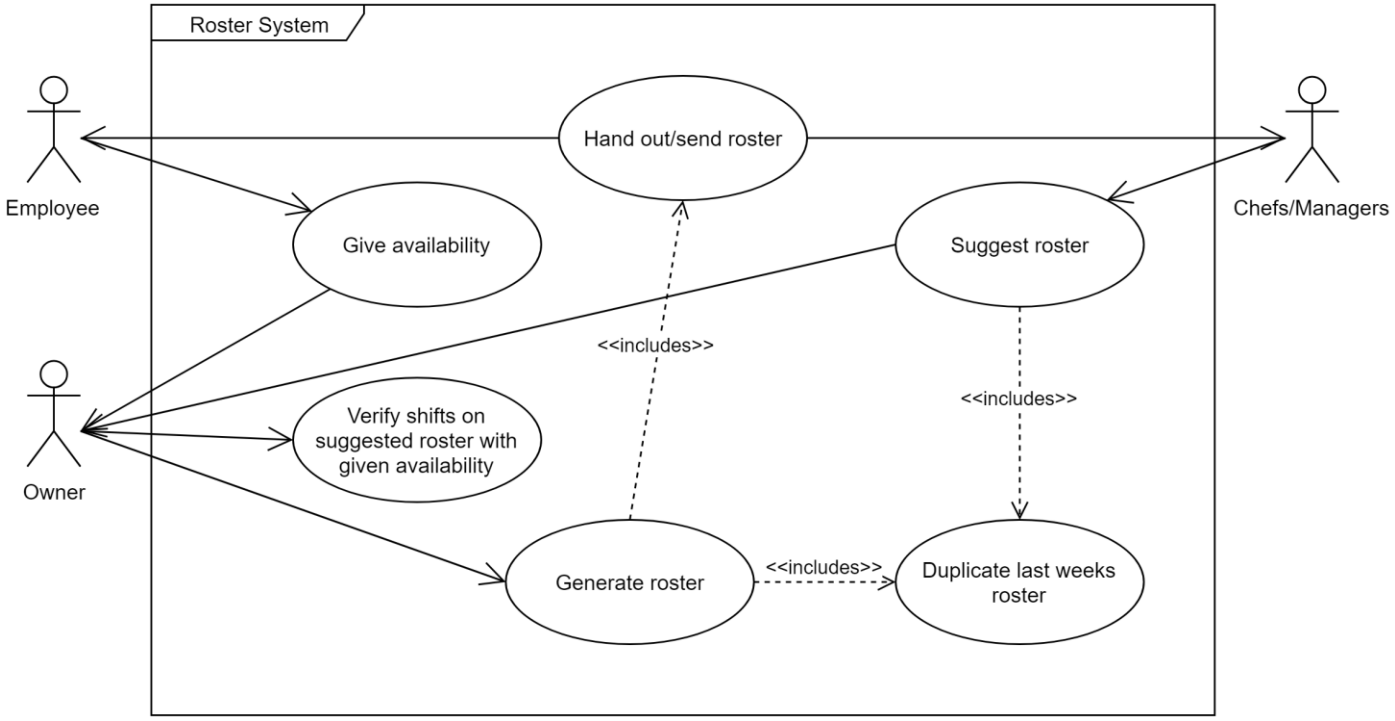
## 6.4 USE CASE DIAGRAM




## 6.5 USE CASES

| No. | Use Case | Notes |
|---|---|---|
| UC01 | Give availability | Employees send in their availability to the owner, who stores them in a file for later recall. |
| UC02 | Duplicate last week's roster | The owner or a chef/manager will access last week's roster and make a copy of it for use as a template. |
| UC03 | Suggest roster | The chefs/managers may submit a roster to the owner that they have generated from a template. |
| UC04 | Verify shifts on suggested roster with given availability | The owner will check with the names and availabilities stored on file to ensure that every employee can make it to their shifts on the roster. |
| UC05 | Generate roster | The owner will create a roster (based on the suggested roster if there is one). |
| UC06 | Hand out/send roster | The owner will distribute the roster to employees and chefs/managers by posting or sending it. |



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