2 – Investigation

Contents

2.1 Existing System

2.11 Investigation

Method of Investigation	Reason for Use	Evidence Location
Interview – general staff members	Provides an understanding of how the system should operate in everyday use, finding the potential dos and don'ts. Staff members' experience will be reliable to provide an accurate picture on how the works, allowing me the see the positives and negatives of the current system and where I could look to improve	Below
Study existing doc and Doc analysis	First-hand experience into what the system should look like and how it should behave. This will also help me to understand the input and output requirements as well as a deeper understanding of the processes that occur which I will look to include in my design and prototype for the system	Below
Desk Based research	This will allow me to see a wide range of systems like mine that are of a high quality and used successfully for large organisations. This can provide me with some ideas for my system and again help me understand the limitations of the system I am creating based off my limited resources and time frame.	2.2 page 11

Interview

1. What features do you like about the system? Can you search, add, delete?
2. What features don't you like?
3. What features would you like to add or remove? Things that would make it easier etc?
4. Are there any automated features which requires no/little manual work?
5. Was there anything that was difficult to learn how to use on the system?
6. Visually is the system easy to navigate?
7. How would you search for a specific customer? Are there multiple filters?
8. How quick can bookings be made/deleted?

2.12 Key Findings

Interview: I started the interview by asking members of staff what they liked and didn't like about the current system. This led into further discussion about different aspects of the system. From the members of staff, I had spoken to, two had worked there a long time and the third had only been their a few months. This therefore gave me an in depth understanding of how the system has worked over a long duration but also to see if there have been any changes for the better.

1. Yes, you can do all simple features required to make a booking such as creating and deleting bookings. The bookings can be edited or cancelled too. It is simple to use and easy to make bookings. Each booking contains the name of the person booking the hall, the room of the booking, the date and time and duration of the booking. The person who books is usually a member or is asked to become one if they are not. A member must give their general details including name, address and contact details(phone/email). They also stated that the system user friendly enough for the members of staff to use easily.
2. The members of staff felt that the software for the system was out-of-date as the system would be updated relatively slowly. This then would lead to issues with bugs and crashes that is a nuisance more than a failure of the system.
3. They told me that there was a user guide for the system and that they would benefit from a regularly updated version of the user guide. The member of staff who had worked there for only a few months felt that if the guide was up-to-date then it would've allowed her to become more familiar with the system a lot faster. They also mentioned that the guide could be more user friendly, helping new staff members who aren't as computer technical as others.
4. The system isn't difficult to use, but more annoying for members of staff to learn, which is why they would prefer a more helpful guide.
5. Visually staff felt that the system is easy to navigate but basic and bland. They described the icons and poor quality and one of the members of staff said the system looked like "Windows 90 something."
6. To search for customers there is calendar that lets you jump to specific dates to view the bookings of that day.
7. Deleting bookings are messy. Instead they replace the booking with someone else's booking. To do this they have to add another activity onto their original booking that they are trying to remove. This works the same for editing bookings. They also have a bug on the system. Previously they had a separate price scheme for peak/off peak times which would prevent bookings from overlapping at the change in price time, which was at 5pm. This would prevent bookings being made for a two-hour length from 4-6pm. This price scheme is no longer in effect, yet the system still prevents staff from making a two-hour booking from 4-6, instead they must create two separate bookings for the customers who want to book this time slot.

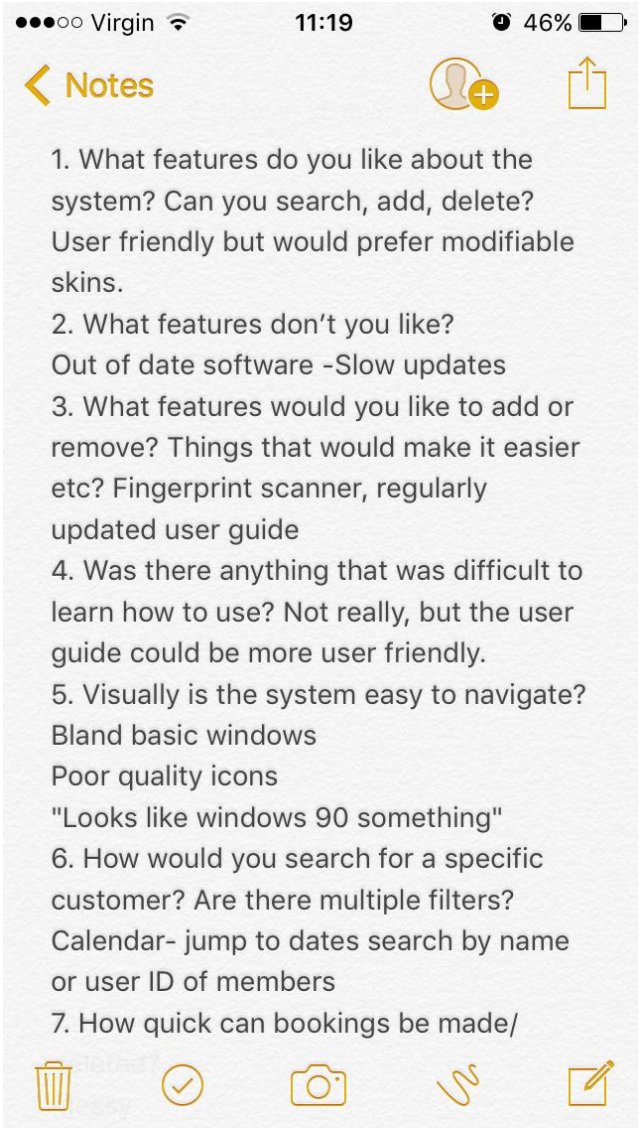
Other comments

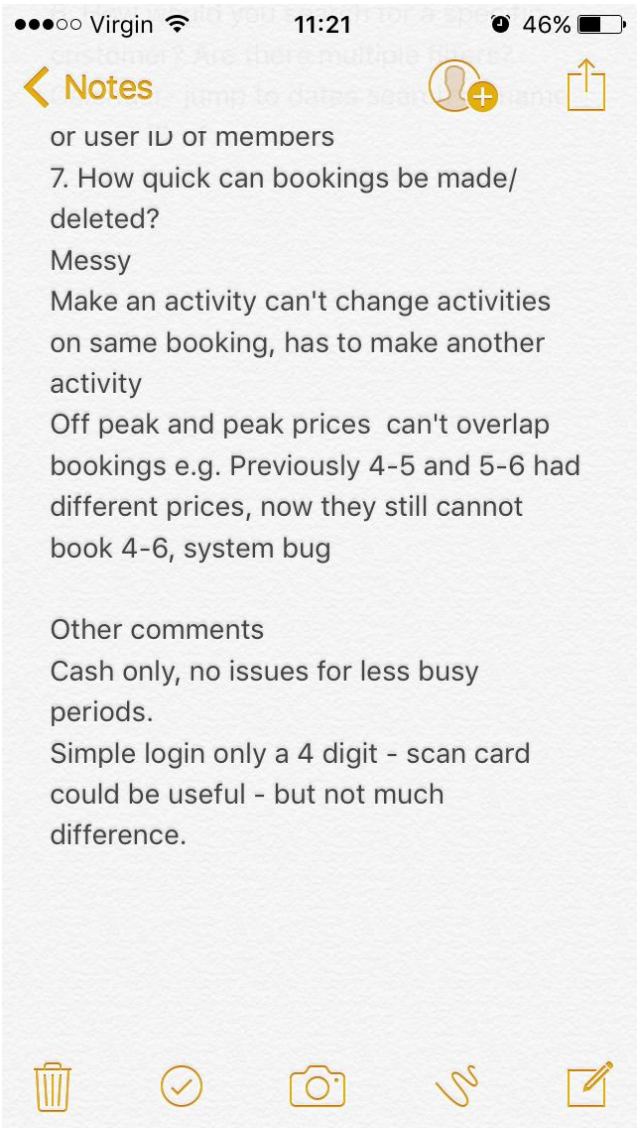
- Currently they are still taking cash only payments. The staff feel this is good enough for less busy periods, however they would prefer another option if possible when it gets busy.
- I asked staff how they felt about the security of their current login and they felt that it is fine the way it is, as they use a simple 4-digit login. They agreed that a card which they would scan to login could be more useful, but they said it wouldn't make much difference.

Overall from my interview with the members of staff I have learnt a lot about the potential design and interface of my system, as well any features I should include in my system to make it more user friendly for the members of staff to use. This includes a better-quality visual and a more effective booking process, making it more efficient to use. This has also taught me on what things that I could potentially

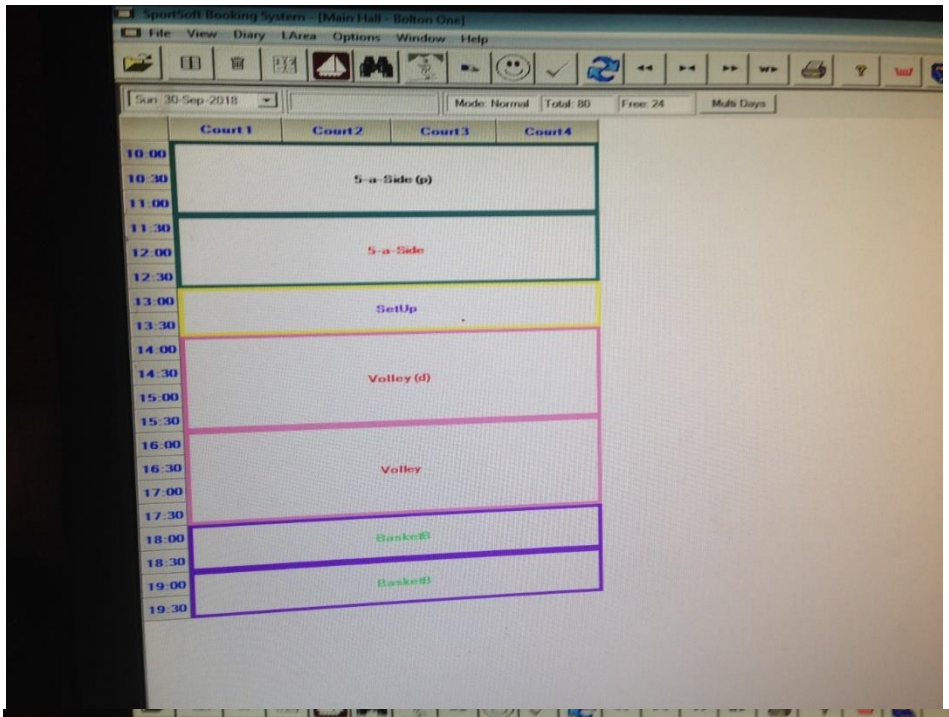
keep the same such as the login process and the calendar feature which lets staff find bookings on different days.

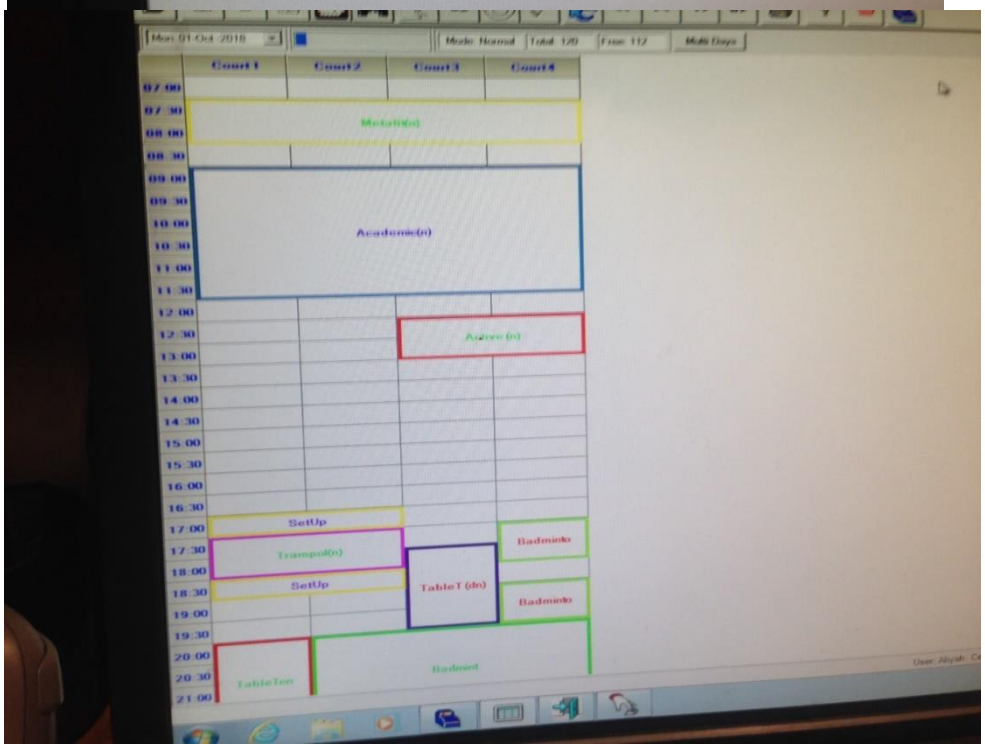
Evidence – Interview Script

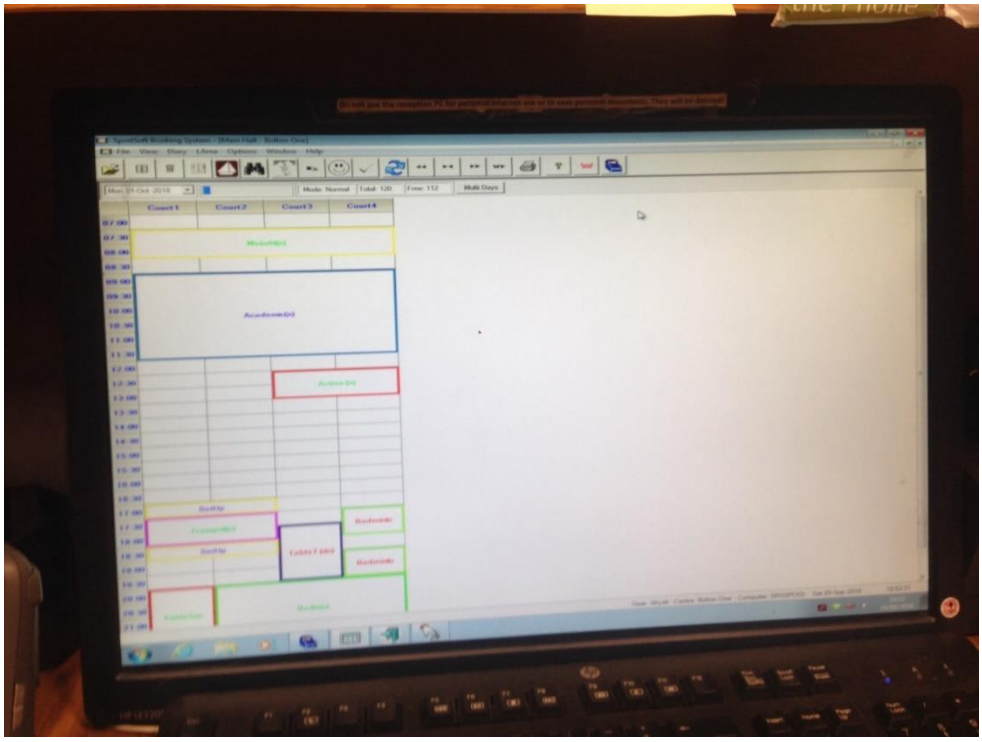




Studying Existing Documentation: During my investigation I asked the business if I could look at their system and how it works whilst also allowing me to take a few photos of their screens which I could use as ideas to implement into my design and prototype. With this I developed a greater understanding of the systems inputs and outputs and how it would look visually. I saw that the bookings are filtered by dates which are displayed in tables and can easily be navigated to find bookings on a specific day. They also show the duration of the bookings and the activity that the customers have chosen to do. These ideas are quite useful and I will consider them when designing my prototype and deciding on the features I wish include in my system.






Court1
Court2
Court3
Court4

2.13 Inputs, Processes & Outputs

Booking File

Inputs	Description	Example
Staff username	Staff members will have to input their username to gain access to the system	
Staff password	Staff members will have to input their password to gain access to the system	
Customer Name	The name of the customer for the booking will be entered	
Customer Phone Number	The customers phone number is entered	
Date & Time of booking	The date and time of the booking is selected from the options available	
Sports Hall/Room Number	The sports hall for the booking is also selected	
Payment info	The customers card details are entered	
Customer email	The customers email is inputted	

Processes	Description
Login verification	The staff username and password are verified against a list of usernames and passwords in a text file
Login validation	Several validation methods are used on both the username and password to see if they can be verified
Generate confirmation email	An email confirming the booking is generated
The booking information is written to a file	The information on the booking is stored into a file that stored all the bookings made
The booking is added to the list/table by reading from the text file	The file is read from the file to allow the table displaying the bookings to be updated
The price of the booking is calculated	The fixed price per hour is calculated depending on the number of hours for the booking
The customer's card is charged	The money from the customers card would be removed once the booking is complete
Edit booking	The information on the booking will be changed and updated.
Search for booking by: – **Name** – **Date** – **Room** – **ID**	A search (linear/binary) is performed based on the filter to find the booking.
Creating receipt	The payment information will be written to a file

Outputs	Description
Confirmation email	An email will be sent to the customer
Updated table	The table of the list of bookings on screen will be updated including new updates
Outcome of search	The customer that matches search criteria is displayed
The updated booking	Th booking information would update.
Receipt/Record of the payment for the booking	A file containing the payment information will updated

Customer File

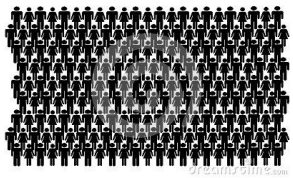
Inputs	Description	Example
Customer Address	The customer's address is entered	
Customer Email	The customer's email address is entered	
Customer Name	The name of the customer for the booking will be entered	
Customer Phone Number	The customers phone number is entered	
Payment information	The customers payment details are entered	

Processes	Description
The customer information is stored as a record	The data about the customer is stored as a record so can be stored and processed as one unit
The record is written to a file	The customer data is stored and saved in a file containing all the customers
Search for a customer by: – **Name** – **ID** – **Address**	Can search for a specific customer, using multiple filters, more than one if needed

Outputs	Description
Customer file	A text file holding customer information is ready to be used(read/written)
Search return value	The value of the search is displayed to the user

2.14 Stakeholders (Involvement)

Boss	Description
	Managers make sure that the business is running smoothly and that bookings are getting filled up to meet certain quotas. The manager has no day to day impact on running the system.

Staff	Description
	Staff are the ones who make the bookings on the system when a customer rings or emails. They will check the system for a free booking depending on the preference of the customer and give them a slot. They can make multiple bookings at once for the near future. They accept payments on the day of booking and taken through cash in hand

Customers	Description
	Customers ring in or email to make the booking with a preferred time. The booking is confirmed to them over the phone or email and the customer would pay on the day of booking. They then show up at their booking and pay for the booking with cash in hand. If they ant to make another booking they can do so in person after their booking or again by phone or email.

2.15 Limitations

Limitation	Consideration
Poor communication - Customers cannot see available bookings	Currently customers would have to ring in or email to find out any available bookings they want. This is **an issue with communication** and can lead to unhappy customers as they are wasting time if they ring in and no booking is available. This makes the current **system inefficient** and doesn't maximise the facilities available.
Poor communication – customers not notified on new bookings	If someone cancels a booking, another customer is not notified, which again **shows miscommunication** especially if they have previously shown interest in a certain slot or date. **This lack of transparency** could drive customers away and certainly would lead **to a loss of money** as bookings would remain un-booked.
No payment system	The payments are made cash in hand, which **could be lost or misplaced**. This can lead to **issues on organisation** and could potentially cause them to lose money. The money is also unaccounted for, as there is no record or receipt of payment, shows a **lack of structure and consistency of** the system
Manual bookings	Currently **staff make all the bookings**, which customers contact them to. Rather than having customers make their bookings separately, staff are on hand always to do this, which if multiple people ring in at the same time could cause **some people to be unanswered**. Therefore, the current system **can't handle large amounts of requests** for bookings which again will lead to unhappy customers and loss of money.
Poor record keeping/ data not stored	Currently there is **a lack of records of all the bookings made** along with the customer's information. The system does not issue receipts or create confirmation of bookings made therefore there is no external record of the bookings. Although the booking is on the system with one person's name (the name of the customer who contacted them to book) **all others who attend are not recorded**. This shows a weakness in the system as they may need this information if they wish to contact the other customers, who's record they do not have. Also, if another person of the same group calls to book their slot, they may have to go through the sign-up process again rather than having them already on the system linked with that group of people.

2.2 Research into Existing Solutions

There are many systems like what I am creating that already exists but used for other purposes. The feature from these are useful to me as I can see which features have been proven effective and those that may require work.

Planyo - It's a booking system that is tailored to the type of business required. This allows a very versatile booking system that has a large variety of feature available to the business that uses it.

Features:

- Embedded calendar – allows a calendar preview to check availability of bookings.
- Bookings in different languages (Up to 30) – allows a range of languages to be used to book on to the system
- Updates on system in Realtime – updates on each hour of each day
- Third party permissions – allows the system to be embedded into external applications such as Facebook.
- Printable invoices- all confirmations/receipts and booking statuses can be printed.
- Notifications by email and SMS – automatic emails/texts are sent out for confirmations or important updates
- Allows customers to manage their own bookings – customers can view/add/edit/remove their bookings.
- Varying price models – prices set per hour/day, based off activity, daily prices, deposits.
- Cloud based integrations and extensions – other software integration and storage of data to cloud

Useful features

Feature/Facility to include
Embedded calendar – This would be useful as it would provide a visual and easy interface to use. The bookings on each date can be displayed effectively and clearly and could be clicked on to view the daily bookings
Updates on system in Realtime – This will allow the customers to see whenever changes have been made to the bookings straight away which will allow them to have accurate and up to date data for them to make the bookings at their convenience.
Printable invoices – This would help keep hard copies of important data, to archive and store for security purposes. This will also help the current issue they system has with poor record keeping and tracking of customer information which will help improve the organisation of the system to reduce errors and loss of data.
Notifications by email and SMS – This is a feature that I had already planned on implementing into my system. This will improve communication between staff and the customers on any updates on their bookings or if there are any new bookings available.
Allows customers to manage their own bookings – Part of this would be useful allowing customers to add/delete and view their bookings. However, editing bookings would only be available to staff and staff can also override a customer's booking.

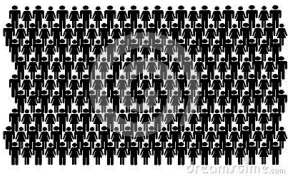
Considered features

Feature/Facility to consider
Bookings in different languages – this could be useful for a much larger scale system. As my system is small scale and centred for sports hall bookings only it is not a requirement for it to allow different languages. Tis can also be another limitation of my planned system. Also, this system would be used by majority local people therefore may not be efficient in implementing this feature into the system.

2.3 New System

2.31 Stakeholders (Requirements)

Boss	Description
	Manager should still ensure everything is running smoothly and bookings are being filled. They should also be more involved with the day to day running, taking regular feedback from the staff(Either directly or through a proxy) to maintain the standards of the booking system, and to help improve where necessary.

Staff	Description
	Staff would maintain the system. They would log on to the system to view bookings and if necessary add/edit/search for bookings. A confirmation message is sent to the customer via email/text. Block bookings to be made on the system by staff, after authorisation. The searches would include filters for date, name, room etc.

Customers	Description
	Customers log into the app and choose their booking choice depending on a list of available slots. They will also enter payment details to pay their proportion of the booking fee. The customer receives a confirmation email/text on their booking. If they wish to cancel a booking, they can do so on the app which will send a cancel request on the Centre's system for staff to accept. They would have to go in to book out the same slot for several weeks (block bookings).

2.32 Specification

For my new system I will try to improve the efficiency of the current system:

Payments – payments will no longer be made via cash in hand instead, I will create a payment system by card, in which in each booking can have a group of accounts linked to it, each being able to pay a small amount of the total booking fee. This is done so multiple people who attend the booking can pay easily and not think too much about who pays or how they pay. The payments details of each person would be saved and stored securely to be used again for future bookings improving the efficiency of the system, and in the case of a different person attending the booking they can easily link their accounts too.

Bookings - the bookings will be able to be made on an app for the user as well as on the system for staff. Customers will be able to login and see the available slots for them to select. Once selected it would link to the main system, run by staff, to be authorised by their system for which a confirmation could then be sent out to the user on their booking long with information on its date, time, room, and cost. This is the same for staff too. They will login with their username and password to access the system to view/add/remove/edit bookings. They can also search for bookings using a range of filters and have access to the customers information.

The system will also keep a track of all elements of the system. I will keep a log of all customer information along with all bookings associated to their name/account. There will also be a separate file keeping a track of all the bookings, with its relevant information such as date, time, room and names associated. The payment details of all customers will be stored as well separately and securely

This will be done by creating a graphical user interface to allow both staff and customers to easily navigate and use the system in a simple and efficient way, to allow the maximisation of the facilities at the Centre. These elements together will help mould a more efficient version of the current system and try to resolve some of its issues and limitations that it currently has.

2.33 Methods to be used

Method	Technical Justification
Searches	I will have many search filters that will be done using linear and binary searches as the data would be stored in order. The type of search will depend on the filter and data required. I will use binary search when the data is sorted using ID as this will produce a result faster than using a linear search as the data can be found using midpoints to eliminate parts of the array. I will use linear searches if the array is small and unordered as it maybe longer to try find midpoints in this case a linear search would be preferable.
Sorts	I will use bubble sorts to sort and display the data for various filters, such as by ID, name, date etc. I will use this to quickly and efficiently sort data so that it can be displayed to the user based on the filter they used. This would be used to temporarily sort the arrays to perform searches on them, but they would not be changed inside the text files.
Reading from a file	I will use a file reader in java to read from text files, containing the data required for the bookings. This will be used to display the current bookings and would also be useful to access/search for a customer's details. This would be read from the file and stored into an array in my code so that I can use it in various other methods.
Writing to a file	I will use a file writer in java to write to files that contain booking information and would update them where necessary. This would also be used to update or add details on customers. This would be stored in my code as an array and to save the data, it would be written back to the file.
Validation	I will use validation for the usernames and passwords for both staff and customers when they login to access the system. They will also be used on any other important inputs made into the system such as customer details. I will use a range of checks such as presence, format range and length checks.
Verification	I will use verification techniques for any logins which will check the input with data stored in a file with a list of correct logins and will accept them where necessary. To do this I may use double entry verification to uphold security on the system.
Graphical User Interface	In java I will create a GUI using panels and tabbed panes. I will use software called JGUID which help make it easier to create GUIs and will help me to create a simple and user-friendly interface, which is easy to navigate. With this I will use java swing and action listeners to keep my system visual and object oriented. This is preferred for my system over command line interface as this will require less skill to run and maintain for both staff and customers therefore making it as user friendly as possible and making it efficient to use, preventing the risk of errors in the booking process from either party.
Data structures	I will use a range of data structure throughout my programming ranging from integers to Booleans as well as non-primitive data types created when calling objects from one file into another along with its associated attributes.
Arrays	To store all my data into text file externally I will need to create several arrays for customer information, bookings and logins. This will help me store the data, keeping it organised so they can be used for different processes within the system.

2.34 Objectives

#	Objective	Success Criteria
#	What should it do?	How will you know it works?
1	Security – verify staff logins	successfully verify login details for staff to access their bookings.
2	Read from a text file – customer logins	Read from the customer login file to access the logins
3	Security - Verify customer logins	successfully verify login details for customers to access their bookings.
4	Read from a text file – staff logins	Read from the staff login file to access the logins
5	Read from a text file – booking file	Successfully read the data from the booking file
6	View bookings – display array data into a table	View all records of booking data in table format
7	Sort/Filter bookings by date	Be able to view all bookings, (filtered for a specific date) including past bookings.
8	Sort/Filter bookings by name	Be able to view all bookings, (filtered for a specific name) including past bookings.
9	Sort/Filter customers/members lists by name	List of members sorted alphabetically
10	Add bookings to the database	Bookings successfully added to a table with time and dates. Also, with customer info
11	Write to a file – booking list	List of bookings is written to the file with customer whose booked it
12	Write to a file – customer info	Customer information is written and stored in a file when they create an account
13	Write to file –customer history	History of a customer's bookings stored with time and dates
14	Write to a file – list of customers	Store regularly attending customers on a customer's list
15	Calculations to decide price	Price calculated depending on booking and duration of booking

16	Calculations to apply discount on customers fee if required	Discounts can be calculated on prices for members
17	Amend booking list	Booking list is amended before writing to file
18	Update/ edit booking database	The database can be updated if customers cancel or another is added
19	Delete bookings from the database	Bookings for a specific time removed completely
20	Searching for specific customer details	Staff can access either customer information required or any of their bookings made
21	Search by dates of booking	Be able to view all bookings, (filtered for a specific date) including past bookings.

Entities

- Customer
- Staff
- Bookings
- Room/hall