

INVESTIGATION

Stakeholders

Businesses have stakeholders which, by definition are a person who for various reason have a concern or interest in the company. Handy Man Hire has stakeholders that are financially and passionately invested in the company. Stakeholders have key roles within the company which makes them important for the investigation as they can provide information on different features of the company and can propose requirements and improvements for the new system to have. For Handy Man Hire, this would include:

- Owner/Manager - They oversee all the employees and all the work they do; keeping track of work hours and weekly wage to make sure it is correct. They service tools and equipment and fill the service checks appropriately. As a manager they would also make sure that equipment isn't overused. A requirement for the proposed project that they would want is for it to be easy to find out when an equipment's servicing is required. Another requirement would be an algorithm to calculate workers wage automatically.
- Secretary - The secretary is responsible for sorting all held data (customer data, staff data, etc.). They would also keep track of bookings and invoices, checking whether the data is correct and checking that services are paid for by the customers. A requirement for them for the proposed project would be to have a well organised system for all data and an efficient search function.
- Handy Workers – When the workers enter their workspace at the start of each day, they collect their booking data for that day from “booking cards” and attend to the bookings as required. When they complete the job, they fill in notes in on the booking card place the booking cards to the “complete” section. The workers must also fill out a staff data form when they join the company. A requirement for the proposed project that they would want is that the booking data is well organised and easy to find and access.
- Customers – The customers are responsible for filling out a customer form when they first hire from the company. A requirement for the proposed project that they would want is for it to be easier to make bookings and keep track of what they've paid for.

Interviews

The first step to my investigation of the current system at Handy Man Hiring is to carry out interviews with the stakeholders of the company. This will allow me to find out and understand what it is really like to use this system on a daily basis and, furthermore, identify any flaws and major issues with great detail so that the new system can resolve of these. In addition, thanks to the settings of an interview I can respond to the answers of my questions and make development off their responses.

For my interviews I have selected the owner/manager, Patrick Stewards, and his most senior worker, Steven Barington, because I think that they will provide me with the best insight on the current system since they use it on a daily basis and they would have the most experience using it. It is important that I have my questions prepared beforehand as to ensure that I can understand the system thoroughly. I have prepared two sets of questions, one for the manager and one for the worker, as they use different aspects of the system.

The questions that I have prepared for the manager are:

- What data do you collect from your workers and customers?
- How do you store and back up data?
- How do you keep your data secure?
- Who has access to what data?
- How often is customer or worker data updated?
- Have you ever had complaints about the current system?
- Are there any specific issues that you have with the current system?
- Would you say that you would benefit from a computerised system?

The questions that I have prepared for the worker are:

- Do you feel confident storing your data on the current system?
- How efficient is the current system (e.g. With finding bookings)?
- Have customers ever complained about the system?
- Are there any specific issues that you have with the current system?
- Would you say that you would benefit from a computerised system?

Interview 1

Name of interviewer: Anton

Name of owner/manager: Patrick Stewards

Anton: Good morning Patrick, my name is Anton. Thank you for agreeing to meet me so that we can discuss your business. You may be aware that this interview is quite essential for me to collect as much detailed information as possible on your current system so that it can be well analysed in order to make the best improvements and developments for the new system. Is it alright if we start right away?

Patrick: Good morning, yeah no problem and you may go right ahead.

Anton: Good. Before we begin with questions on your system, I would like to know more about your business. Can you tell me what kinds of services does your business provide to customers and any other relevant information?

Patrick: Well Anton, this business provides hiring services to customers ranging from tiling, to plumbing, to soldering. Our workers are often specialists in certain fields so if a customer has a more difficult request, then that's who we send. The pricing of our services depends on the amount of time each job takes, the tools it requires and level of difficulty it puts forward. We also occasionally provide 2 workers, however only when required. After every service, the worker who completed the job must hand in their report of the job.

Anton: And what information do you store on these reports?

Patrick: They include things such as booking ID, customer ID, staff IDs, the address, the time taken and any other relevant notes that the workers take. These reports allow us to keep track of the jobs, but they can also be used to confirm data, so for example, if a customer makes a complaint that we charged

too much for the job then we can check the report cards to see whether the price we charged is correct according to the time the job took, etc.

Anton: That's very useful! Do you often get such complaints, and do you keep a record of them?

Patrick: Not significantly often but we do get them from time to time, mainly about payments and invoices. Whenever we do get complaints its placed in the "notes" section of the job reports.

Anton: What specifically do these customers complain about the payments and invoices?

Patrick: Well recently, for example, a customer called and was claiming that she was certain that she had fully paid for our services and she demanded for us to double-check that our data is correct. The payment log said that she hadn't paid for the booking, however, when we checked our transfers it showed that the money had come through so clearly the worker that was responsible did not remember to fill in the form after she made the payment.

Anton: Ah I see, I've made a note of this and I think that a good solution to this would be to automate the form to indicate that the payment has been once it has been transferred. So far you've mentioned booking reports and some sort of payment log. Could you tell me some more about what files you have and how you store them?

Patrick: All of our files are stored in a back room inside filing cabinets. We have 5 cabinets, 1 for each of the different files that we collect, however we are gradually running out of room. The files we collect are; customer data, staff data, booking data, invoice data and equipment service data.

Anton: Do you keep spare copies of these?

Patrick: No, we do not. As I said, we're running out of space.

Anton: Hmm okay. Would you say that these files are safe and secure?

Patrick: Well, as you know, the filing cabinets are stored in a back room which is secured with a lock. In addition, the cabinets themselves have locks on them.

Anton: And who can access these cabinets?

Patrick: Only the secretary and I have access to the cabinet room itself. We have one set of keys between us that is kept in the secretary's desk as she often needs to have access to the data. At the end of each day, I am responsible for making sure the cabinets and the cabinet room is locked and then I head upstairs and lock the key set in my office.

Anton: Sounds pretty safe but maybe not completely. For example, someone could manage to get in the filing room then just take the cabinets and deal with their locks later. A computerised system will be far more secure. My next question is do the workers ever interact with the files?

Patrick: The only sort of interaction they have is when they first sign up for the job they have to fill a registration form, but they also interact with the booking files. They don't use the filing cabinets, instead each day they have booking cards hung up on a string and then they have a "complete" section where they put completed jobs.

Anton: Right, okay. I understand that you have a registration form for both customers and staff?

Patrick: *nods*

Anton: And what data is it that you collect from them?

Patrick: Well to begin, the customer details file consists of basic information such as customer ID, title, first name, surname, full address, postcode, town, email address and phone number. The staff details consist of exactly the same information, however, it additionally consists of job title, hourly wage and average hours worked per week. Also instead of having customer ID they have staff ID.

Anton: Hmm, okay. I understand that some of the files are linked?

Patrick: The customer details are linked to are linked to the booking file through the customer ID. The booking file is also connected to 2 other files, the staff file and the invoice file. On each booking, there are all the staff IDs who took part, which links to the staff file, there's also the address, the time taken and any other relevant notes the worker takes. The booking file is then linked to the invoice file via the booking ID. Invoices can have multiple booking IDs depending on how many bookings were made by that customer for a certain job, which depends on how much time it will take.

Anton: I see, I see. Now I've noticed that you haven't mentioned anything about equipment ID or anything of that sort. Is this something that you would like on the new system? I really do recommend this as it's a much better way of managing and controlling stock.

Patrick: Well, seeming as you recommend it then yes, please. I've never really considered something like this but, thinking about it now, I can see how it'll be useful.

Anton: Good, I'll make sure to include that then. My next question is also related to stored data, how often is it changed and, if so, how is it changed?

Patrick: The only data that usually changes is address, phone number or email address and we simply just tippex it out. The problem with it is that it can be very time consuming to find the customer or staff member whose data is to be changed, we sometimes have to look through the entire cabinet just to find someone's data. It doesn't help either that the data is not in alphabetical order which makes it 10 times harder to find anything.

Anton: And why is it not alphabetically ordered?

Patrick: Well, the reason for that is simply because it would take a lot of time to organise, time which we simply do not have. There are at least 600-700 customer details, some of which have multiple pages of documents, which would have to be sorted through and organised so, as you can imagine, that would be an incredibly difficult task.

Anton: Is it organised in any way?

Patrick: The data is vaguely organised in date order, however that's only due to the fact that new records are simply placed at the front of the stack. There isn't any annotation to indicate the dates and also it's not like we store data on when the files were created which makes it even harder to search through. Furthermore, it's not only the customer data that is not alphabetically organised but also the bookings and the invoices. It's absolutely horrendous. Luckily there isn't that many staff details so at least those are not a problem.

Anton: Oh, dear me. Well don't you worry, I'll make sure that this is a priority in the new system. We can give it a search mechanism which will make searching for any data far more efficient.

Patrick: Yes that would be great, thank you! I think that having a computerised system will be far better.

Anton: Well that actually links to my next question, are there any other specific or significant issues that you have with your current system?

Patrick: Yes, very much so! There's quite a few. Firstly, documents getting lost or misplaced is quite a frequent occurrence. We've had many customer details, booking details and even invoices disappear. It's not that much of an issue if the customer details themselves get lost because we can just get the customer to re-enter them, the issue is that on the back of the customer details sheet is a list of their bookings and whether or not they have paid for them so whenever those get lost there is hassle to get the data re-entered correctly. We have to check with the customer and all the workers from the bookings to try get the dates and all that correct, we also have to check bank transfers from the customer to confirm what has been paid for but then we have an even bigger problem if they paid by cash. It's just so much of a headache caused by one missing piece of paper.

Anton: Well it seems to me that your business would certainly benefit from a computerised system. Thank you for your time and answering my questions.

Patrick: It's been my pleasure.

Anton: Goodbye.

Patrick: Bye.

Analysis of Interview 1

After speaking to Mr Stewards, I now have more knowledge and a better understanding on how Handy Man Hire functions systematically and stores its data. I have made notes of what data they collect from their workers and customers, along with how they keep it secured. I learnt of major issues with the system such as that they are unable to store spare copies of the stored data due to lack of room, loss or often misplacement of data, and the current data that is held being severely unorganised. I have also suggested to Patrick to implement a new stock control system to make it easier to manage stock and equipment.

Personally, I feel like this interview went well however there is still some more information about the system and company that I would like to know. In my next interview with Steven Barington, one of the workers, I am going to get a more in depth view of the booking system from a workers viewpoint. I will also include some similar questions to that of my interview with Mr Stewards, as a way of getting multiple opinions and views. I have put the aims of the information I want to gather below:

- How does the booking process work (from the first step as a customer)?
- How does the payroll system work?
- Does the efficiency of the system function well with storing data?
- Steven's opinion on issues with the current system and whether or not a computerized system would be beneficial.

Interview 2

Name of interviewer: Anton

Name of worker: Steven Barington

Anton: Good afternoon Patrick, my name is Anton. Thank you for agreeing to be interviewed.

Steven: Good afternoon, my pleasure.

Anton: As you're probably aware, I have already interviewed Mr Stewards so now I'll be asking you some follow-up questions to help me, hopefully, further understand your current system more in depth. As a sort of warm-up question, I would like to know more about your role in the business.

Steven: Well sir, as you know, we are a handy man hiring service so we provide services like tiling, mowing and any other sort of "DIY" services. My role in the business is to complete whatever services are booking.

Anton: Could you take me through this booking process? Like from the very first step where the customer must place the booking.

Steven: Yeah, of course. When a customer first contacts the company, they must fill in a customer registration form which can be done either over the phone or in person. If they have already registered, then they can straight away place an order for whatever service they want after providing their customer ID or full name. However, with providing a full name, if someone has an identical name then they must provide their email/phone number. We provide a broad range of services and, with each of us being a specialist in a certain area, customers can request specific workers for their bookings. This is noted in the "notes" section of the booking cards.

Anton: And what happens then? How do these bookings get to the workers?

Steven: Then these bookings are placed in a "To-complete" tray that we have in our workplace, and when the workers come in, they can look through them and complete them appropriately. And obviously not all of our bookings are made the day prior so any bookings that are not for the current day are placed in a folder for future use. After each booking is complete, it is placed in the "Complete" tray and then it is sorted by secretary to be added to the invoice, this invoice is either stored if there are more bookings for that customer or it is sent to the customer to be paid for.

Anton: Hmm okay interesting. To me it sounds like it is very easy for these bookings cards to get lost, does this ever happen?

Steven: Luckily not that often but that's only because our secretary is very thorough and rigorous with making sure the bookings are correctly in order. This, however, is extremely stressful and tedious because she has to look through the bookings folder every day to simply make sure that we don't miss any.

Anton: Ah I see, this sort of thing was also mentioned in my previous interview with your manager where important data can easily be lost. I've made a keynote of this. Now I'd like to look more in depth

into your database system. I understand that you fill in a staff registration form when you first join the business. Do you feel comfortable and confident to store your data within the system?

Steven: Yes I can confidently say that I do, I trust the owner to make sure that the cabinet room, where we store our data, is safe and secure.

Anton: Okay good, I'm glad to hear that. My next question is do customers often complain about the current system?

Steven: Yeah, they certainly do and its always because some piece of data has been lost which causes so many problems, so it's understandable why they complain. We've potentially lost a lot of money due to data being lost such as when we are unsure whether or not a customer has paid for an order, however we can't force them to pay if we ourselves are unsure if they haven't.

Anton: So, would you say that if you had a computerised system with data backups and easily access would be beneficial to you?

Steven: Yes, most definitely!

Anton: Yeah, I would've thought so haha. One last question before we conclude our interview. Could you explain to me what sort of payroll system you have in place?

Steven: Well, what happens is that the manager keeps track of all our hours worked; whether that's through the booking details or through observation. He is the one who takes care of the whole process, from calculating how much we get paid to deducting taxes and distributing the pay. Afterwards, each worker can check that their pay is correct and most of the time it is, but if not then I can guarantee that that's due to an innocent mistake by Mr Stewards.

Anton: Well, harmless or not, a computerized payroll system will be far more reliable and efficient. This concludes our interview, you have been a great help Mr Barington.

Steven: You're very welcome! Goodbye.

Anton: Goodbye.

Analysis of Interview 2

Once again, I feel like this interview went well. After speaking to Mr Barington, I now have a better understanding of the system from a workers viewpoint and he also gave me a bit of an insight of the process that a customer goes through when utilizing the system. I also now better understand the payroll system and what steps are taken on how the workers are paid. Likewise to my first interview, I have made a notes of issues with searching and organizing data so this is something that I plan to focus on.

Questionnaire

I will then be collecting information about the company's current paper-based system by producing and handing out a questionnaire for all the staff members at Handy Man Hiring. This is in order to get feedback on aspects such as security, efficiency, flaws and improvements to be made. This is important information as it would show me the general views on the current system and the key improvements that need to be made. Below is an example of my questionnaire that one of the workers has filled out:

HANDY MAN HIRING

Questionnaire

1. What is your current role within the company?
Secretary

2. What are your roles and responsibilities within the company?
Overseeing all held data and keeping track of bookings and invoices.

3. How time efficient do you think the current database system is?
 Very Efficient Efficient Inefficient Very Inefficient

4. How secure do you think the current database system is?
 Very Secure Secure Not Secure

5. Would you say your current database system is complicated?
 Yes No

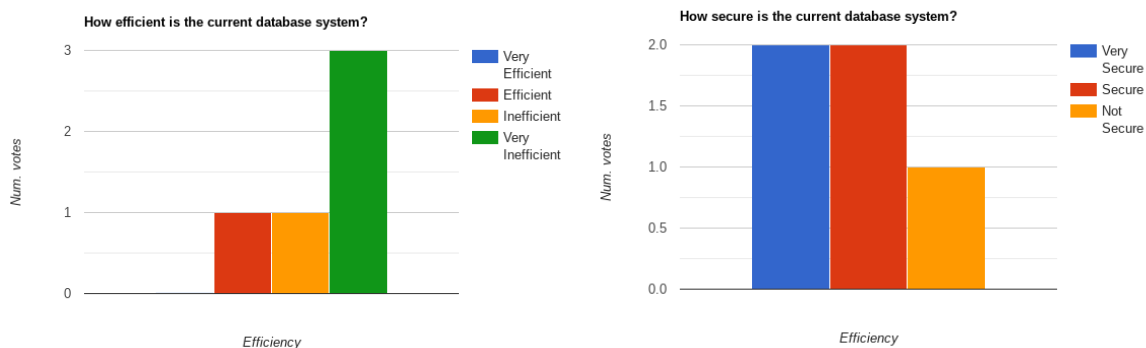
6. Do you fully understand the current database system and how it functions?
 Yes No

7. Would you like to change from a paper-based system to a computerized one?
 Yes No

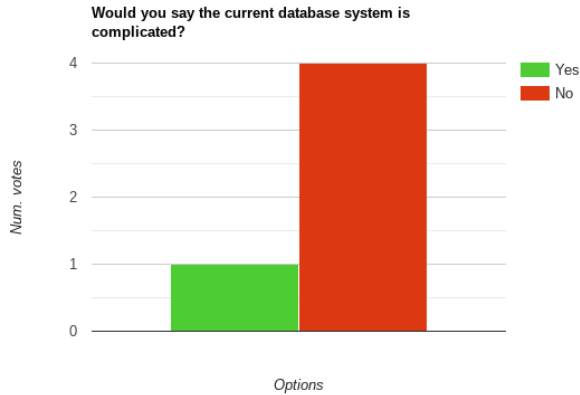
Please provide a reason for your choice below
The current system is very time-consuming, for example when finding customer details.

8. Do you think that you will require training for a computerized system?
 Yes No

Below are some graphs that I have made from the collected data:



These graphs tell me that the majority of staff think that the current system is very inefficient, however it is also clear that they think that the storage of data in the current system is quite secure. This supports what was said by the owner/manager in my first interview about how their cabinet storage room is a safe location. The first graph informs me that efficiency is a key issue which I will be putting significant focus towards to make it as efficient and time-saving as possible.



From this graph I can see that the majority of staff think that the current system is not too complicated. It will be an objective of mine to make the new system equally uncomplicated so that it is easy to understand and does not make the staff's work harder than it already is.

Current Documents

My final analysis method was to look at the current system documentation, this gave me a further understanding of what data is collected by the business and how they deal with data changes. These are examples of forms that have been filled which I looked at:

HANDY MAN HIRING

Customer Data

ID (office use only): PB117

Title: Mrs

First name: Dorelle

Surname: Evans

1st Address line: 117 London Avenue

2nd Address line (optional):

Postcode: SM19 2HF

Town: Barnwick

Phone number: 07319 669932

Email: DEvans.9@gmail.com

(Customer Data Front)

Date of service	Booking ID	Description	Paid?
07/05/21	GB07	Trimmed front & rear hedges, mowed front & rear lawn. Tools: Hedge trimmers, lawnmower. Time taken: 3 hours	Yes
09/05/21	GB18	Replaced slabs and jet washed decking Tools: Jet wash, wheel barrow, 30 = slabs	No

(Customer Data Back)

The customer and staff details are both double sided. The customer data has a list of all the bookings they've ever made, and the staff data has a list of their wages for each month.

HANDY MAN HIRING

Staff Data

Staff ID (office use only):

Title:

First name:

Surname:

1st Address line:

2nd Address line (optional):

Postcode:

Town:

Phone number:

Email:

Hourly wage (office use only):

Hours worked / week (office use only):

(Staff Data Front)

Month	Hours worked	Wage for the month
Jan	32	£ 274.88
Feb	39	£ 335.01
Mar	35	£ 300.59
Apr	29	£ 249.11

(Staff Data Back)

You can also see that many of the pages have stains and are quite dirty.

HANDY MAN HIRING

Equipment Service Check Data

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

Item Name:

Test Date:

Next Date:

HANDY MAN HIRING

Invoice Data Date:

Invoice ID:

Booking IDs:

Price:

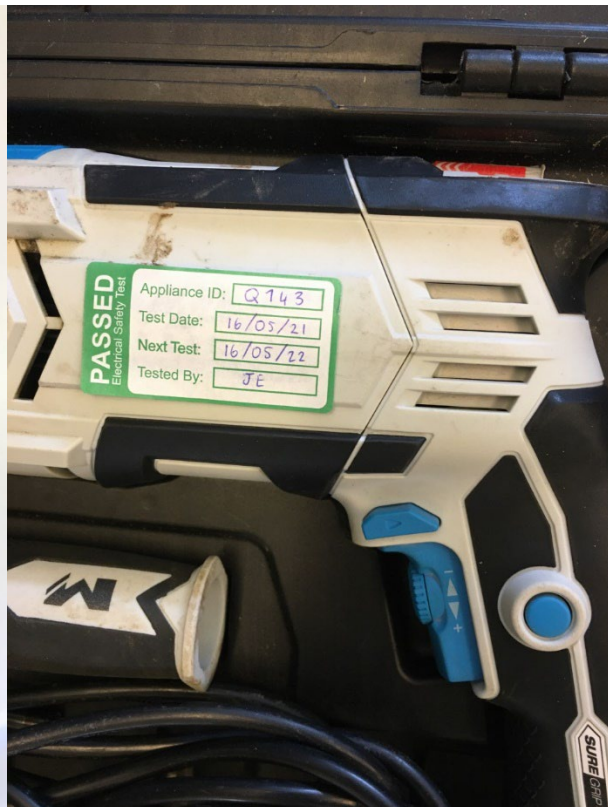
Paid?:

You can see that correcting fluid has been applied to one of the test dates and next test dates. This is an easy but messy way to change data.

HANDY MAN HIRING

Booking Data	Date:
Booking ID:	6807
Customer ID:	8818
Address:	17 London Avenue SW14 2HF
Staff ID/IDs:	DB999
Time Taken:	3 hours
Notes:	<p>7000 Trim front & rear hedges, mow front and rear lawn. If no reply, back door is open. Back door Back door open for electric.</p>

You can see here that some words have been crossed out in the notes section. This is another way of changing data, but it is once again messy.



Observation

After conducting my interviews and analysing my questionnaire results, I wanted to further my investigation by observing first-hand how the system functions and how the employees use it on a daily basis. I was permitted to go and visit the business during one of the payroll days so that I could see how they are handled and also see how processes like bookings and searching for records are performed. This allowed me to get a better representation of the existing system by getting a personal viewpoint. I was instructed to not cause any distractions to the workers, however, this aligns well with my plans as I want to get a genuine experience of how the system works.

I arrived at the company warehouse on Wednesday at 9am. I selected this time because I knew that at this time the workers would be well into their work and focusing but not yet tired and out of energy. Once I entered, I went up to Mr Stewards' office to let him know that I had arrived. He was busy calculating and dealing with his workers payrolls so I decided to stay up in the office and observe him working. Mr Stewards was taking booking cards from a file tray titled "Completed Bookings" and using these to make logs of how many hours were worked by employees. He was making a note of the staff IDs and hours worked to calculate how much they should be paid according to how many hours they've worked and their hourly wage. After this, the manager created a log sheet with the workers hours and names which was then sent off to an external accountant for the data to be processed and the workers to be paid. The issue with this way of dealing with payroll is that it is easy for the manager to make a mistake and mis pay the workers. A better method of doing this would be to have an algorithm take values such as hours worked and wage from the database and conduct all the necessary calculations, then send the data through to the manager to look over it who can then send the data to the external accountant.

Then, I went downstairs to the main part of the warehouse where all the workers were. Most of the workers at this point were preparing for the booking services they have been assigned for within that time period. For example, one of the workers had a service which was to start at 9:30. He gathered a rake, a pair of hedge trimmers, some black plastic bags and a pair of safety gloves which were all necessary as he had a garden job to do. His booking card included all the details of his job, along with the address. The only slot that was empty was the hours worked which, in my opinion, is quite a risky way of keeping track of hours worked as workers could easily lie when filling it in. Obviously, if the hours are unbelievably high then it is easy to spot, however, a much more efficient way would be to have some sort of "time-card" to scan when the workers leave and enter the warehouse and then take into consideration travel time to calculate the hours worked.

Another thing that the worker did was that he made a note of the tools used on the back of the booking card. Presumably, he could then make a note of how many consumables were used or if any break (e.g. 2 sets of nails were used/ the sledgehammer was damaged). The issue with this is that tools and equipment could easily get lost track which could lead to many issues, for example, it could interfere with stock levels, and it could be thought that the business has plenty of an item left when in reality the minimum amount has been exceeded. This was demonstrated when two of the workers were arguing over who last used the hacksaw as it went missing and it turned out to be because another worker had already taken it out for a job but the booking card that said that the hacksaw was taken went missing.

That booking card was luckily located underneath one of the toolboxes however if one was never found then this would lead to a cascade of issues. However, this did happen later in the day when a customer came into the warehouse to book a service for next week. Firstly, the secretary had to go into the cabinet room to find the customers data file. This took about 20 minutes and as these minutes passed I could see the customer getting increasingly impatient. After the 20 minutes she came out of the record room and told the lady that the file had been lost and that she would have to fill her form again. And after arguing and wasting another 5 minutes, the customer agreed to finally refill the form and not complain to the manager. However, there were still many issues that were unsolved such as changing the booking data of the customers past bookings to correlate with her new customer data like her ID or the records of her booking data and payments being lost. This incredible amount of confusion and stress could have been simply avoided if the customers data record was not lost in the first place.

This sort of disorganisation and untidiness links to many other features of the companies database system such as the struggle of editing data by using correction fluid multiple times to the point where it is hard to read the data. Or when a customer requests to amend a booking and change the date but they must wait 30 minutes just for their record to be found because the records are so difficult to search through. All these issues could be apprehended very well with an efficient and robust computerised database system so I am very glad that Mr Stewards has contacted me to assist with this.

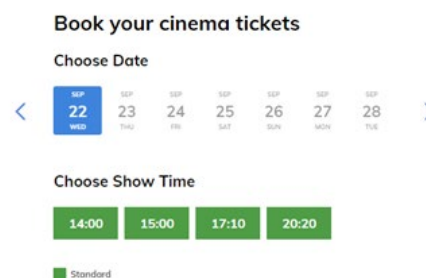
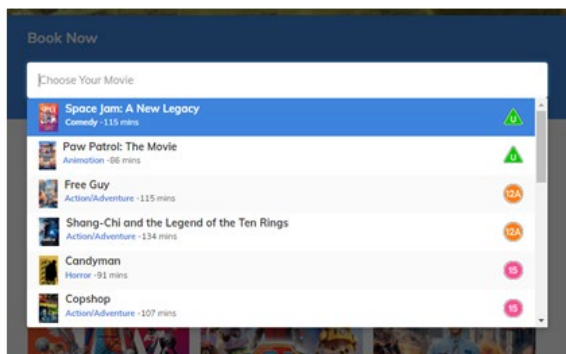
Desk-based research


I have decided to do internet research on other business (such as cinemas, restaurants and sports gyms) to observe how some of their computerized systems function such as booking systems and stock control systems.

Booking Systems


To begin, I looked at the booking system of the Reel Cinema in Port Talbot (<https://reelcinemas.co.uk/port-talbot/now/>). In doing so, I was able to find the main features and characteristics of their system and I will be integrating them into the system that I will be producing.

I have provided screenshots and annotations of the booking system below:





Venue: Port Talbot Date: 22/09/2021
 Runtime: 134 mins Time: 14:00



Shang-Chi and the Legend of the Ten Rings

Login

Register

Continue as Guest

Enter your Meerkat Movies Code to get your lowest priced ticket free

Selection	Price	Qty	Subtotal
Movie Madness <small>Standard ticket - all ages (adult/child/senior/etc. Subject to film classification)</small>	£3.50	0	
Movie MadnessWchair <small>Standard ticket - all ages (adult/child/senior/etc. Subject to film classification)</small>	£3.50	0	
Reel CEA Adult <small>(Valid Card Holders Only)</small> CEA Card Required	£0.00	0	

No tickets selected

Next

Please supply the following information

Name *

Phone Number *

Email *

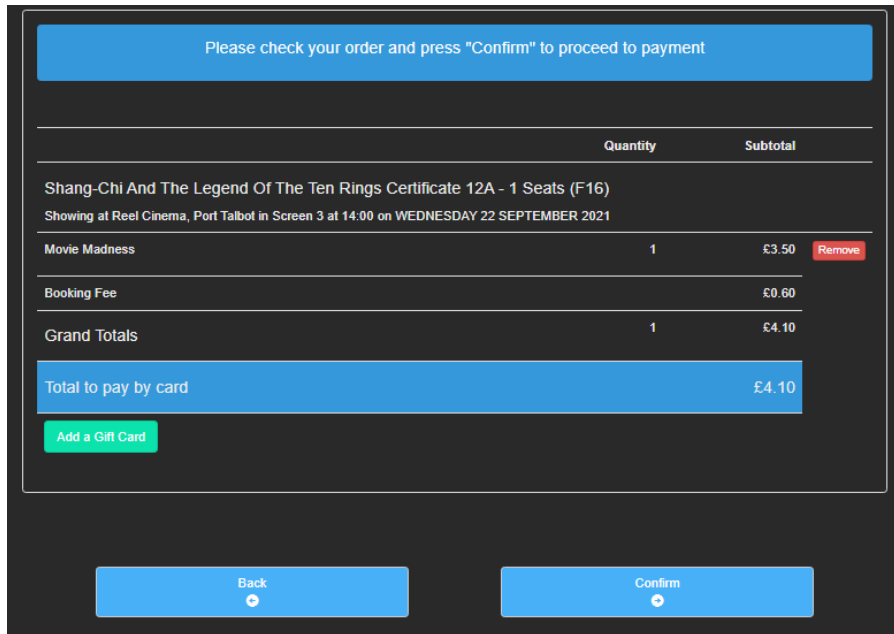
Please Re-enter Email *

I wish to be contacted regarding other services No Yes

I confirm that I have read and accepted the [Terms and Conditions](#) and [privacy policy](#) for our booking provider, Jack Roe (CS) Ltd. No Yes

Back

Proceed to Payment



The features in this booking system included:

- Drop down box to select which cinema then another to select which movie
- Shows available date and time slots for bookings for that movie
- Displays a pop up screen that allows you to either login, register or continue as a guest
- Provides a selection of prices depending on disability and whether the user is a REEL CEA card holder (typically they also depend on age)
- The system then gathers data such as name, phone number and email address as a means of contact and sending the invoice
- Finally the system asks for you to confirm your bookings details and proceed to enter payment details

This information was very useful and I will be able to utilize some of the features in the system that I shall be designing. For example, I can use the display of available date and time slots for handy man hiring bookings to show when each type service is available. Other features that I will be including are the logon screen (without the "Continue as guest" feature) and the confirmation screen feature because it will allow the customer to check the booking details are correct.

Stock Control Systems

I also conducted research on existing stock control systems. Although many of the stock control system examples were not suitable due to the fact that they had stock income from large warehouses, I was able to find plenty of appropriate features for smaller businesses. The characteristics that I found are featured below:

- Recording how many items are in stock
- Recording what/how many items arrive and add them to the stock count
- Deduct items when they are broken/ fail safety test/ are consumed
- Searching for product details (i.e. product ID, amount, cost, supplier details, next test date, etc.)
- Produce a list of items that need safety testing
- Produce a list of items in stock
- Set stock levels (minimum/maximum) and notify when nearing them so the company can re-order

Inputs from current system

Whilst I was inspecting the current documents, I was able to gather what data is stored on customers, staff, bookings, invoices and equipment (this data will be very important and must be considered when designing the new system):

Customers

- ID
- Title
- First name
- Surname
- 1st Address Line
- 2nd Address Line
- Postcode
- Town
- Phone Number
- Email

Customers (Data on the back)

- Date of services
- Booking IDs (from said services)
- Description of service
- If service has been paid

Staff

- ID
- Title
- First name

- Surname
- 1st Address Line
- 2nd Address Line
- Postcode
- Town
- Phone Number
- Email
- Hourly Wage
- Average hours worked per week

Staff (Data on the back)

- Month
- Hours worked that month
- Wage for that month

Bookings

- Date
- Booking ID
- Customer ID
- Address
- Staff ID
- Time Taken
- Job specific notes/requirements

Invoice

- Date
- Invoice ID
- Booking IDs
- Price
- Paid

Equipment

- Item ID
- Test date
- Next test date
- Tested by

All this data will be essential when designing the new system. It is important to include all of the data from the old system in the new system, this way the same information can be stored and used when needed.

Outputs from the current system

Below is a list of outputs from the current database system. I have created this list as it is very important to include all these outputs as a way of making the computerised system not have less functionality than the paper one.

Customers

- Customer data sheet (secretary and manager only)
- Customer ID and address can be fetched for bookings
- Check for unpaid bookings
- Find contact details if necessary (e.g. issue with payment or booking)

Staff

- Staff data sheet
- Staff work logs
- Staff contact details in case of emergency (or other)
- Staff ID fetched for bookings

Bookings

- Checking if a sick worker had any bookings on that day, then either postponing or finding another worker
- Looking and sorting bookings according to date (secretary)
- Organising necessary tools and equipment for bookings (workers)
- Seeing what “notes” are added on bookings for any additional instructions

Invoice

- Check for any unpaid invoices by customers
- Finding a booking ID on request (secretary and manager) if, for example, a complaint is made about a payment by a customer

Equipment

- Check for any equipment that needs testing/servicing

One of the problems that I have found from the current system outputs is that there is no way of finding what bookings a worker has done directly from the workers data, but instead it must be found within the booking data. This is something that can be improved upon in the computerised system via search functions.

Limitations of the current system

Based on my research on the current database system, I have gathered enough information to report on its functional limitations and problems.

The first and most obvious issue that I encountered from the paper-based system is that it takes an unbelievable amount of time to search for records, especially customer and booking records. I noticed this lack of efficiency during my system observation, which was also mentioned during my interview with the manager. He discussed how difficult it is to search for records because of the large number of documents held alongside the manner in which the records are ordered. They are only somewhat organised by date order, but this is only because of the way that they are placed within the file cabinets. There was no indication of the dates when they were made so there is no way to quickly search through the files without going through each one individually. For example, if we were to search for a customer's file by the name of Anne Rose that was created a year ago, instead of being able to look in the "R" section, we would have to find the files from last year; however, there is no clear indication of where within the files that is.

Secondly, an issue that stands out to me from the system is that of the payroll. It relies strongly on the booking system which is a significant vulnerability since human error can easily cause mistakes when dealing with paper documents. If any errors do occur, then this will result in workers getting underpaid/overpaid. In addition, the manager is in charge of tracking hours and then calculating the payroll, including tax deductions. This method of calculation could potentially lead to legality problems if the manager performs incorrect tax deduction calculations.

On the note of bookings, it was mentioned in my interview with the worker Steven Barington that the company secretary has to work incredibly difficult to keep the current bookings in order for the workers to pick up. The issues with this are that if the secretary makes a mistake, it would result in a potential chain of problems like bookings not being completed at the right time or even not being completed. This could put the company in a bad light if bookings have frequent issues.

Furthermore, a massive issue with paper-based systems is storage space, and this system in particular also has a big problem with backing up data. The Handy Man Hire file cabinet room has a limited capacity, so they cannot store copies of data for their records. This is very dangerous because if there is any damage to the current documents or they get destroyed, those documents will permanently be gone with no way of getting restored. This damage can happen in many forms, such as fires, floods, malicious damage or accidental damage, which can cause significant losses to the company.

Something that the current database system is missing is a stock control system. A stock control system uses equipment IDs to identify and keep track of stock, allowing easier management. A lack of one of these systems makes it much more challenging to know what equipment the company possess. This does not cause any major problems for the company, however, many processes are much more efficient and easy with such a system.

Finally, another major problem that I encountered during my investigation was the difficulty of editing and changing record data. You either have to use correction fluid to replace the data (although this can get messy) or create an entirely new data file. The risk of the second method is if the original data doesn't get copied correctly onto the new record, which would thus result in data getting lost, leading to

more confusion than necessary. Furthermore, another issue linked to editing data is the amount of time spent trying to find the needed records. This is why it is essential to have an improved system in place and save the effort and time consumption of manual searching.

Specification for the new system

Below is a specification that I have created for the design of the new system based on my research. The specification includes what data can be inputted and outputted, also the validation of inputs and security features.

The data inputted will include data from customer details, staff details, bookings, invoices and equipment data. This data is listed below:

1. Logon screen
 - ID
 - Password
2. Customer details
 - ID
 - Title
 - First name
 - Surname
 - DoB
 - 1st Address Line
 - 2nd Address Line
 - Postcode
 - Town
 - Phone Number
 - Email
 - Password

The manager asked me to add in a “Date of birth” section to make discounts possible for young people and pensioners.

3. Invoice details

He has also requested that I optimise the way that the log of the customers bookings and invoices is stored. Instead of having just booking IDs and whether they have been paid, I will store the booking IDs with their corresponding invoice IDs and will also have a way to check whether they have both been paid for. The data that will be inputted will be:

- Invoice ID
- Booking ID
- Bookings dates
- Booking prices
- Bookings paid?
- Total invoice price

- Invoice paid?

I will also be adding a function for customers to pay for their bookings/invoices by card. However, these details will not be saved onto the system, only inputted.

- Cardholder name
- Sort code
- Expire date
- Account number

4. Staff details

- ID
- Title
- First name
- Surname
- DoB
- 1st Address Line
- 2nd Address Line
- Postcode
- Town
- Phone Number
- Email
- Hourly Wage
- Speciality

After consulting the manager, I have removed average hours worked per week and added a date of birth. I added the date of birth after his request so he can see who the more senior workers are and also to be aware of any upcoming retirements. I have also added “speciality” so that customers can book specific workers if they require a specialist.

5. Payroll

I have removed average hours worked because the manager has told me that instead he would like to improve the staff work log on how many hours they work each month (like the current database has on the back of the staff details). I will be including:

- Payroll ID
- Staff ID
- Month
- ID of bookings from the month
- Total hours worked that month
- Wage for the month

6. Booking details

- Date

- Booking ID
- Customer ID
- Address
- Staff ID
- Time taken
- Tools for job
- Job specific notes/requirements

I have added “tools for job” because it makes it easier to view rather than looking through the notes. Also, with the “time taken” the workers will be handed time-cards to scan every time they leave and return to the warehouse (before and after a job) making this section of the booking automatically filled rather than relying on the workers words.

7. Equipment details

- Item ID
- Last test date
- Next test date
- Tested by _____
- Amount in stock
- Minimum stock level
- Maximum stock level

Here is a list of all the data that will be outputted:

1. Customer details

- Display all details for certain customer (admin)
- Editing details (admin)
- Customer ID and address can be fetched for bookings
- List of unpaid bookings/invoices for a customer
- Finding contact details for a customer if necessary (e.g. issue with payment or booking)

2. Staff details

- Display all details for certain worker (admin)
- Editing details (admin)
- Staff contact details in case of emergency (or other)
- Staff ID fetched for bookings

3. Payroll details

- Staff work logs
- Staff's wage for a month

4. Booking details

- Checking if a sick worker had any bookings on that day, then either postponing or finding another worker
- Checking the “notes” section for any additional information
- What workers are available for booking
- Cancelled/postponed bookings

5. Equipment details

- List of equipment that needs testing
- List of stock close to minimum/maximum stock level
- List of tools being used on that day/week for bookings

A lot of the data, especially the customer data, will only be processed by admin (the secretary and manager) and this is why it is important that the appropriate security measures are in place. When a user first access the system, they will be prompted with a logon screen. If a customer logs in, it will take them to a menu where they can make a booking, pay for bookings (payment details not saved on system), cancel a booking, edit a booking, and view and edit their own data. If a worker logs in then they will have limited access too the database as they will only be able to access their booking data, stock data and their personal staff data. They will be responsible for finding the bookings that are due them. Finally, when the secretary and manager log in they will have access to all of the data on the system, this includes staff, customers, bookings, invoices and equipment. This is because they are admin and are responsible for nearly all of the processes that occur within the database system like keeping track of stock, checking bookings and managing payment.

Within the system, data validations will be frequent in order to prevent any incorrect data getting saved into the databases which also subsequently prevents any issues with the data protection act. These validations will include presence, length, range, list and format checks which will be applied to data inputs. For example, a list check would be applied when a customer is choosing what type of job they want done for a booking and a length check would be applied to a phone number that is entered.

Objectives and success criteria

This list of objectives and success criteria will be a way of measuring how successful the new system is. Below I have made a list for functions that I think are essential for the new system:

Functions:

- Log in screen
- Forgot password
- Adding new customer and/or staff member (admin)
- Adding new equipment (admin)
- Editing customer or staff details (admin)
- Editing booking details (admin)
- Editing stock details/levels (staff)
- Searching for a customer or staff member (admin)
- Searching for booking/invoice details
- Searching for tools and equipment (i.e. stock levels)
- Searching for unpaid bookings/invoices (admin)
- Searching for workers logs (admin and the workers who's details those are)
- Delete a customer or staff member (admin)

- Cancelling/postponing bookings
- Placing bookings for customers by searching for available booking slots
- Customers can pay for bookings/invoices
- Calculating payroll
- Showing when stock is nearing reorder levels
- Logging out

Justification of the solution

For Handy Man Hiring's new computerised system, I will be using Visual Basic to programme and design it as I feel like it is the most suitable for many reasons which I have listed below.

Firstly, Visual Basic uses a GUI (Graphical User Interface) which includes menus, buttons, textboxes, dropdown lists and many more. This is most suitable for the workers of the company because (thanks to my questionnaire) I know that they are not all knowledgeable with computers so a simple GUI system is much more appropriate than a command line interface.

Secondly, the current system uses multiple data types such as strings, dates, integers and reals. It is essential that the new system will be able to handle these various data types and that is another reason why VB is a suitable solution. Furthermore, making sure that the data inputs are correct is very important as a way of making sure the system is robust and won't allow any incorrect data to be stored. This is why the new system that I create must be able to validate data which is why Visual Basic is excellent as it is able to perform validations such as presence checks, range checks, length checks and even format checks. This will provide a strong support to prevent any data errors in files like the customer details, booking details, invoice details and many more.

In addition, Visual Basic is able to use both serial and random data access and these can be used in multiple functions within the system. Serial access will be used when saving data into text files and random access will be used when trying to access a file within a large number of records, this is because with random access we won't have to go through each file individually.

In many instances within the system, both global and local variables will be necessary. Global variables such as booking IDs, customer IDs (or other primary key variables) will be referenced multiple times by the system in many different forms, whilst local variables that will not leave their forms will also be used. This is why Visual Basic is once again very suitable as it allows the use of both these variables.

My final reason for why VB is the most appropriate is because it is able to handle data structures such as arrays and records. Records are essential in the programme because they can handle multiple data types, this is utilised by files such as customer details and staff details. Arrays are also essential for the system because they are used to store data such as worker's pays and IDs, these can then be searched through using a loop function to find specific data efficiently.