

## Methods of Investigation

### Structured Interview:

For my main method of investigation, I will conduct a structured interview with Stuart Watson. I have chosen this method as it is a useful way to collect all the information I need on the system. Since it will be face to face, I can ask for immediate feedback if any answers given by Stuart are unclear this helps to improve my understanding on the system and my project as a whole. However, an interview can be a time-consuming task for both myself and Stuart so I will aim to make the interview concise but contain all the relevant information I need to learn about the system.

### Collection of documents:

Another method of investigation I have chosen is the collection of documents. I have chosen this as it allows me to get a deeper knowledge on the information Stuart collects on both the employers, the customer and the information kept before and after a booking is complete and what the most useful way I can store and retrieve this within the new system that I am developing for Stuart. However, some information will be protected due to laws and regulations such as GDPR so I will be careful to make sure I only use the appropriate data and instead produce a document with imitation data while also presenting the information in a way that is the exact same as Stuart.

### Observation of the system:

Furthermore, a crucial method of investigation I have chosen to use is observing the system. I have chosen this method as I believe it is the best way to understand the system as I can see how Stuart collects information to help create the new system in a way that is beneficial to Stuart and will feel custom to him and his needs. It's a great way to visualise how to convert the way Stuart works into a digitalised form without losing the way Stuart runs his company currently. Similarly to the interview, observing the system can be time consuming and may not be convenient for Stuart so I will try to find a time that works best for him so that I can make sure I completely understand how the current system works to help improve the workings of the new system.

### Short questionnaire:

For my final method of investigation, I have chosen to use a short questionnaire designed for the customers. I have chosen this method as it will provide a great insight into how the system can be produced with not only Stuart in mind but the customers also. I decided that a short questionnaire would be more fitting for customers as it means they can do it at their own leisure without interrupting their days and allows them to feel more comfortable in their opinions if they don't have to voice them to the company. However, a short questionnaire may lead to some questions not being answered in the format that would benefit me the most so to reduce this I will try to remove any ambiguity in the questions it help make it clearer for the customers to understand.

## Structured Interview

### Staff:

1 - What information do you keep about each employer?

Name, phone number, address

2 - How is information for each employer stored?

Diary

3 - Who initially collects and stores the employee information?

Stuart

4 - How do you add employee data?

- Write in diary

5 - How do you delete employees?

(Cross) out / tear page out

6 - How do you change / update employee data?

Write in diary

7 - Who oversees editing employee information?

Stuart

8 - Who can access employee information?

Stuart

9 - What data do you output for the employees? - E.g. Do you need to show information for each employee in a list?

Yes for ease of access

Name  
Phone  
Address

10 - If so, who would this benefit?

Stuart

11 - Do you validate the employee information in anyway?

Visually check

12 - Do you back up the data in anyway?

Yes Repeated twice

In array and on quote

so multiple copies

13 - Do you have any issues or anything you would like to change about the staff area of your current system?

finding employee customer information

14 - Is there anything you like and wish to be kept the same or as similar as possible in the staff section?

Nothing important that we wishes to be the same

Customers:

- 1 - In a week, how many customers do you speak to and take contact information?

maximum. 5 in a week

- 2 - How is information for each customer stored?

written in diary

- 3 - How do you currently store the information about each customer?

written in diary

stored phone numbers

messages / messenger

- 4 - Who initially collects and stores the customer information?

Employees

- 5 - How do you add customer data?

write in diary

- 6 - How do you delete customers?

Cross out or tear page out

Delete message

- 7 - How do you change / update customer data?

write in diary.

8 - Who oversees editing customer information?

All employees

9 - Who can access customer information?

Employees

10 - Would it be convenient to be able to search for customer details on the system?

Yes - keeps more organised

11 - If so, who would this benefit?

All employees

12 - What data do you output for customers? - E.g. Do you need to show contact details for each customer in a list?

Phone number

Address

Name

Yes to help write quotes/invoices

13 - If so, who would this benefit?

Employees

14 - Do you validate the customer information in anyway?

Visual check Yes.

15 - Is customer information backed up?

Yes, double entry.

Wrote in diary,  
and quote.

- 16 - Do you have any issues or anything you would like to change about the customer area of your current system?

No.

- 17 - Is there anything you like and wish to be kept the same or as similar as possible in the customer section?

Being able to search  
for customers by last  
name line on  
his phone.

Quotes:

- 1 - On average how many quotes are entered per week?

Max. 5

- 2 - What information do you collect when writing down a quote?

Customer info.

what the job entails

what paints need using

- 3 - How is information for each quote stored?

Written in diary

- 4 - Who initially collects and stores the details for the quote?

All.

- 5 - How do you add a quote to the system?

Write in diary

- 6 - How do you remove a quote to the system?

Cross out in diary

- 7 - How do you change / update a quote on the system?

write in diary.

8 - Who oversees editing any quote information?

All employees

Dependent on who's job it is

9 - Who can access information about an individual quote?

All employees

10 - Would it be convenient to be able to search for an individual quote on the system?

Yes  $\Rightarrow$  help more organised

11 - If so, who would this benefit?

All employees

12 - What data do you output for quotes?

Number of days

Materials needed

Date quote produced

work to be done

Customer info.

Estimated price

13 - How do you calculate the price of the job for a quote?

Use current prices of materials, number of days,

price per day  $\Rightarrow$  160-180

nearby

shelfield

+

further

14 - Who does this calculation?

Manager All employees

Dependent on who's job it is

15 - Do you validate the quote information in anyway?

No.

16 - Are the quotes backed up at all?

No -

17 - Do you have any issues or anything you would like to change about the quotes area of your current system?

No -

18 - Is there anything you like and wish to be kept the same or as similar as possible in the quotes section?

No .

quantity  
what it is  
feature type

Stock:

- 1 - What information do you collect about the stock?

white:

50L of white at one time.

10L of gloss, undercoat, silk ~~satin~~

20L magnolia

15L of satin, 20L of marshene

20L Timeless now

- 2 - How is information for stock stored?

- Isn't,  $\Rightarrow$  just looks at what we have.

- 3 - Who initially collects and stores the data on the stock?

Smart

- 4 - How do you add stock information?

Doesn't  
store  
it

- 5 - How do you delete stock?

Doesn't  
store  
it

- 6 - How do you change / update stock data?

Doesn't  
store  
it

- 7 - Who oversees editing stock data?

Stuart

8 - Who can access stock data?

All  
employees)

9 - Would it be convenient to be able to search for stock information on the system?

Yes to see ~~the~~ amount of stock  
for a job

10 - If so, who would this benefit?

All employees)

11 - What data do you output for stock? - E.g. Do you need to show the stock quantities for stock  
in a list?

✓  
Quantity  
Type  
Colour

✗

12 - If so, who would this benefit?

All.

13 - Would it be useful to sort stock by low to high quantity?

Yes  $\Rightarrow$  helpful to know  
what we will need  
to buy prior to jobs

14 - If so, who would this benefit?

All.

15 - Do you validate the stock information in anyway?

No.

16 - Is stock information backed up?

No.

17 - Do you have any issues or anything you would like to change about the stock area of your current system?

Re: Allow a message  
to tell him what is  
low stock.

18 - Is there anything you like and wish to be kept the same or as similar as possible in the stock section?

Ans Same stock.

**Scheduling:**

- 1 - How far in advance would be appropriate for viewing the schedule?

1-2 months in advance

- 2 - What information do you collect for entering information in a schedule?

Customer name.

- 3 - How is information for the schedule stored?

Diary.

- 4 - Who initially collects and stores the information for the schedule?

All

- 5 - How do you add a job into the schedule?

Write in diary.

- 6 - How do you delete a job from the schedule?

Cross out / Tear page out

- 7 - How do you change / update a job that is already scheduled?

Write in diary.

8 - Who oversees editing the schedule?

Mr. Stuart

9 - Is there any security on who can change the schedule?

Yes only Stuart is able to change  
schedule but paper so not secure

10 - Who can access schedule information?

Mr. H

11 - Do you validate the schedule information in anyway?

No

12 - Is the schedule backed up?

No - 1 day.

13 - Do you have any issues or anything you would like to change about the scheduling of your current system?

More security

14 - Is there anything you like and wish to be kept the same or as similar as possible in the scheduling?

No.

Invoices:

- 1 - In a week, how many invoices do you produce?

4-8 in a month.

- 2 - What information do you collect for an invoice?

Customer info

Same info as quote.

- 3 - How is an invoice stored on the system?

Isn't all paper based  
and sent to customer  
on paper

- 4 - Who initially collects and stores the data for an invoice?

by  
employees

- 5 - How do you add a new invoice?

write it  
down

- 6 - How do you delete an old invoice?

Tear it out.

7

- How do you change / update invoice information?

Write on invoice.

8 - Who oversees editing invoice information?

All employees

9 - Who can access <sup>invoice</sup> ~~customer~~ information?

All employees

10 - How do you calculate the price of a booking once its complete?

Price of materials

Number of days.

11 - Who does the calculation?

Stuart

All

12 - Would it be convenient to be able to search for specific invoices on the system?

Yes.

13 - If so, who would this benefit?

All

14 - Would it be suitable to search for unpaid invoices?

Yes → more organised

than checking through diary.

15 - If so, who would this benefit?

All

16 - What data do you output for an invoice?

|               |                |
|---------------|----------------|
| Customer info | Company info   |
| Date of work  | Description of |
| Price of job  | what be done.  |

17 - Do you validate the invoices in anyway?

No.

18 - Do you have any issues or anything you would like to change about the invoicing area of your current system?

Organisation of paid / unpaid invoice).

19 - Is there anything you like and wish to be kept the same or as similar as possible in the invoicing section?

How invoices  
are displayed.

Short Questionnaire – Customers

1. How easy do you feel it is to make a booking with Stuart?

- Very easy
- Could be easier
- Difficult

2. How far in advance do you like to book?

- 1-3 Weeks
- A few months
- A year

3. On average, how many rooms do you book Stuart for?

- 1 room
- 2-3 rooms
- 4+ rooms

4. How would you wish to receive any updates and invoices?

- Email
- Paper
- Text Message

5. How clear do you think it is to understand how the pricing of the job is worked out?

- Very clear
- Somewhat clear
- Unclear

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Short Questionnaire – Customers

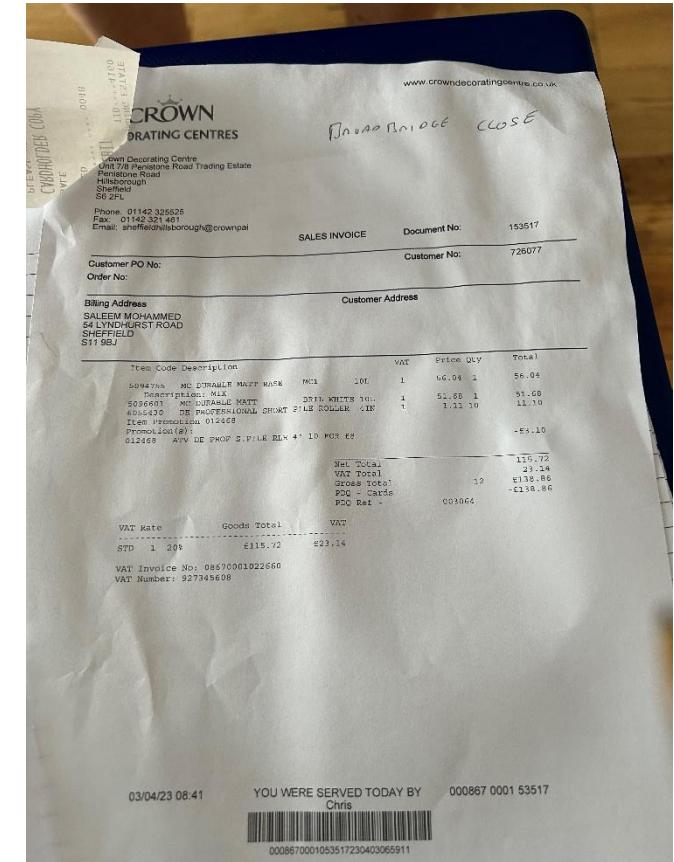
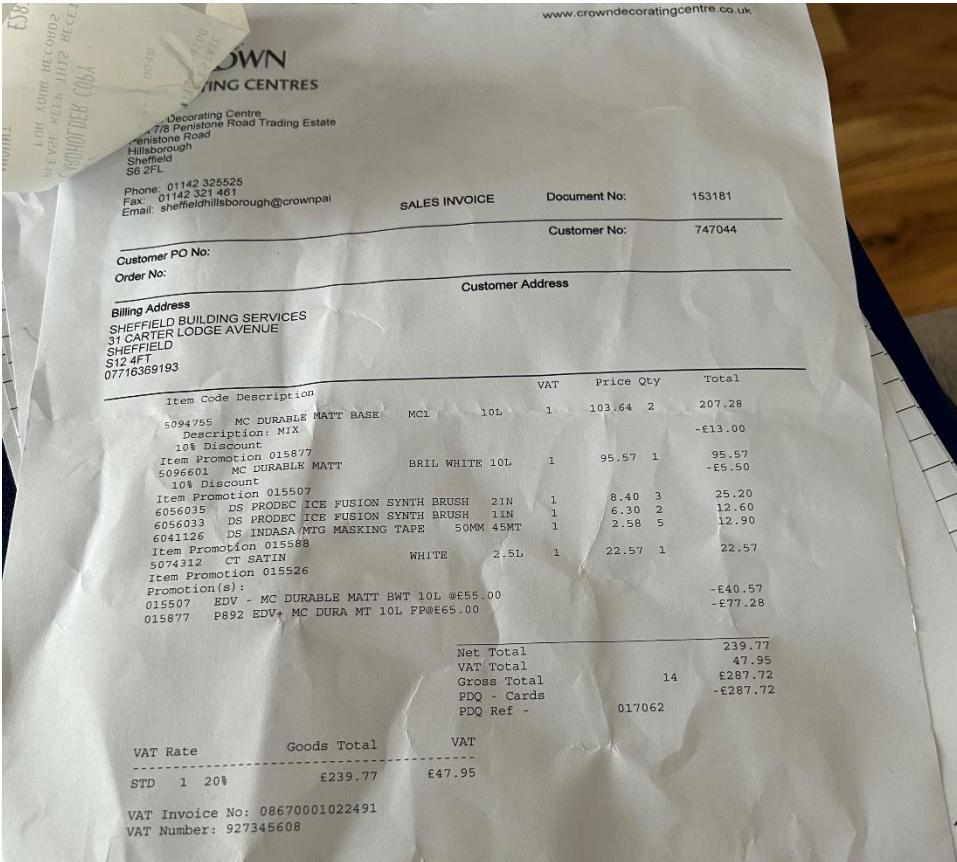
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  - Very clear
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  - Unclear

# Collection of documents

# Stock

Stuart keeps all stock information and prices organised in a paper based system. He uses the most recent prices from materials bought to estimate the price of the job.



# Quotes

When a customer contacts Stuart for a quote everything is paper based. The quote sheet contains information such as the date the quote was given, customer details, and the work to be done. He then works out an estimated cost for the job at the bottom of the paper taking into account materials to be used and labour prices.

STUART WATSON DECORATING LTD  
Professional Service  
Competitive Prices

54, Broadbridge Close  
Kiveton Park  
Sheffield  
S26 6SN  
Tel: 07732 612804

**QUOTE**

DATE:- 28/3/23

**CUSTOMER DETAILS**

|                       |
|-----------------------|
| Amy                   |
| 505, Low Edges Cross, |
| Flat No 4.            |
| S8 7LN.               |

DATE to do the  
Job will Be  
→ AUG

**WORK UNDERTAKEN:** To do :-

|   |
|---|
| Bedroom. To decorate,<br>Stripping of wallpaper and to fill down and<br>unlined walls to be papered - lining of the wall. |
| Painting of Ceiling and other walls - Satin White<br>to be used on woodwork then paper<br>the one wall. ( 3 days work)    |

{ Price depending on  
Materials cost }

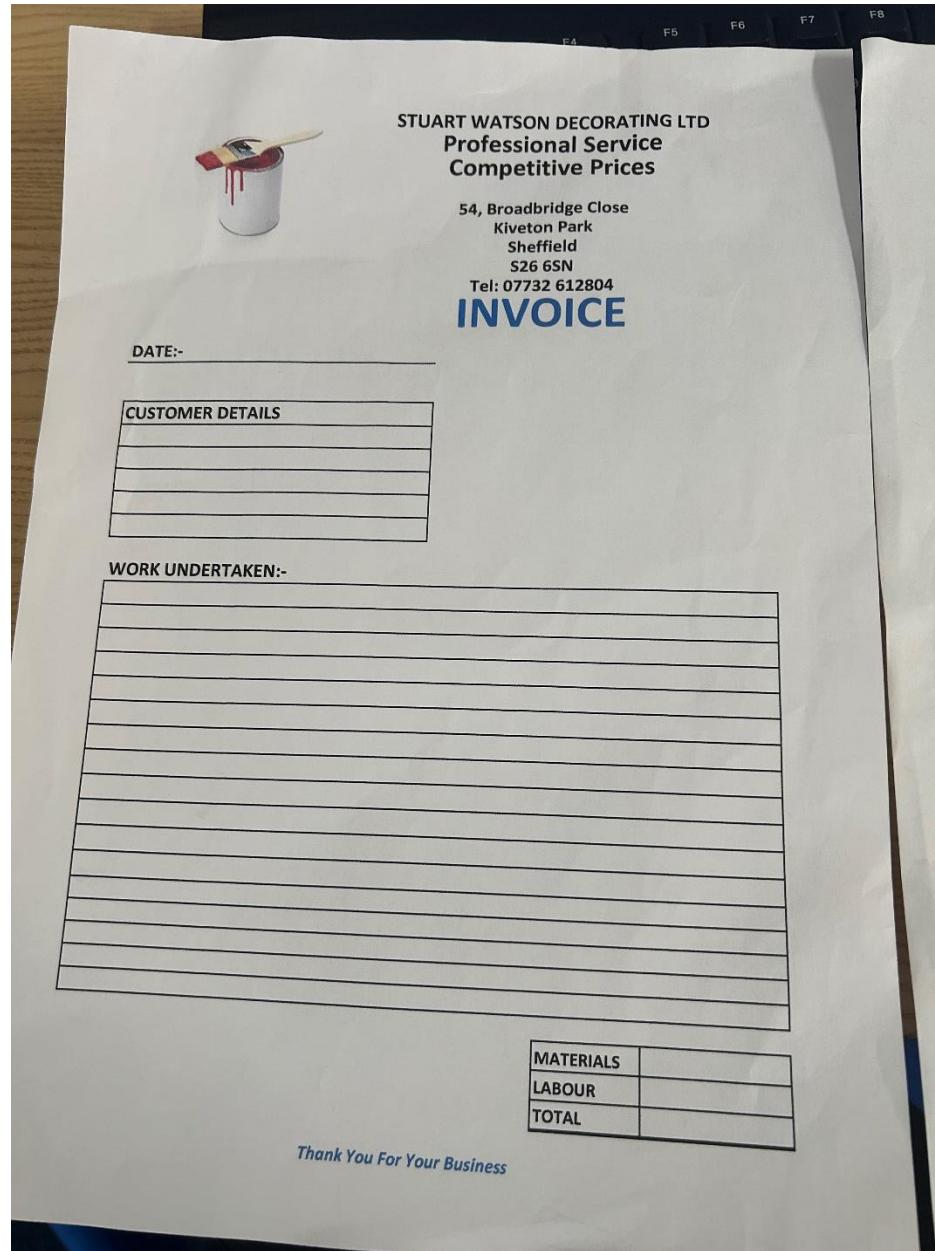
|           |       |
|-----------|-------|
| MATERIALS | £ 95  |
| LABOUR    | £ 480 |
| TOTAL     | £ 575 |

Thank You For Your Business

*Stuart Watson*

# Invoices

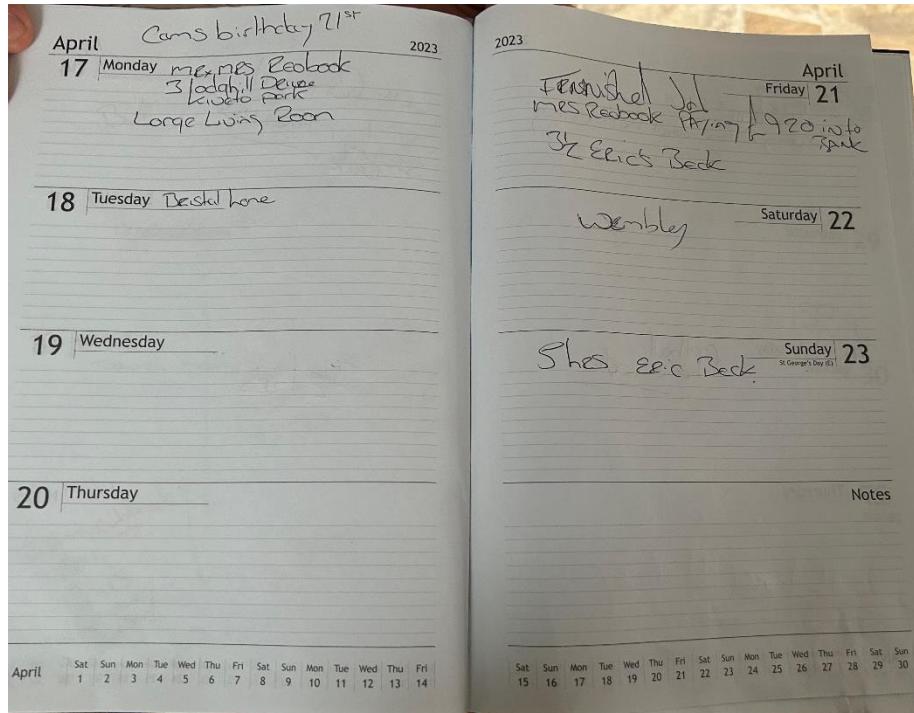
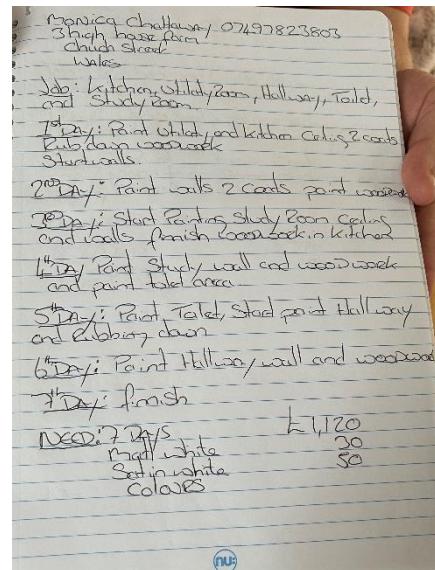
Once a job is complete Stuart creates an invoice for the customer which is also paper based this contains the dates for the duration of the job, customer details, a detailed description on the work undertaken and again in the bottom a breakdown of the cost of the job including the price of materials and the labour cost.



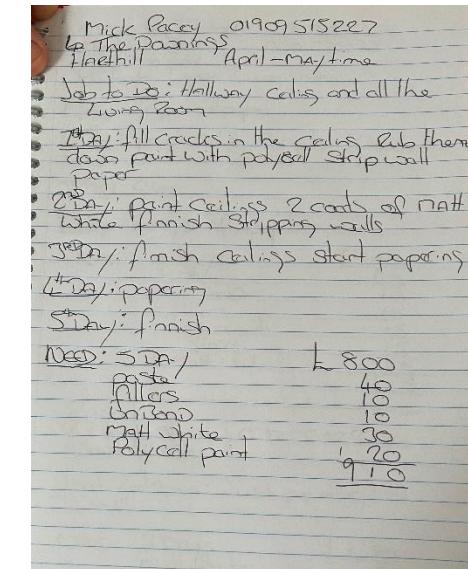
# Scheduling

Stuart uses a paper based diary to schedule work. In the schedule he writes down customer information such as name and address and a basic description of what the job entails. He also uses the schedule to write in days where he's on holiday or not working to make sure he doesn't book work.

Stuart uses multiple diaries to organise his work, he has a diary that organises his work day by day to make sure the job is completed within the timescale.



The document to the left shows a day by day schedule of a painting job.



This document shows a day by day schedule of a decorating job.

### Observation of the System

When I visited Stuart's company to observe the system, I found that everything was entirely paper based. All bookings were written in a diary and were ordered by date, after seeing the system I noted that there was no form of backing up any information. Mr Watson takes very limited customer information for a booking, all he took was the name, address, and the information on the booking; number of rooms, and what the customer required, this all then wrote down in the diary. Furthermore, after observing the system I discovered that customers can only book with Stuart via telephone and SMS messages. Once Stuart received the information, he needed to understand the booking he wrote down any extra requirements for stock he would need for the job so he could make sure he had bought it before the start date of the job.

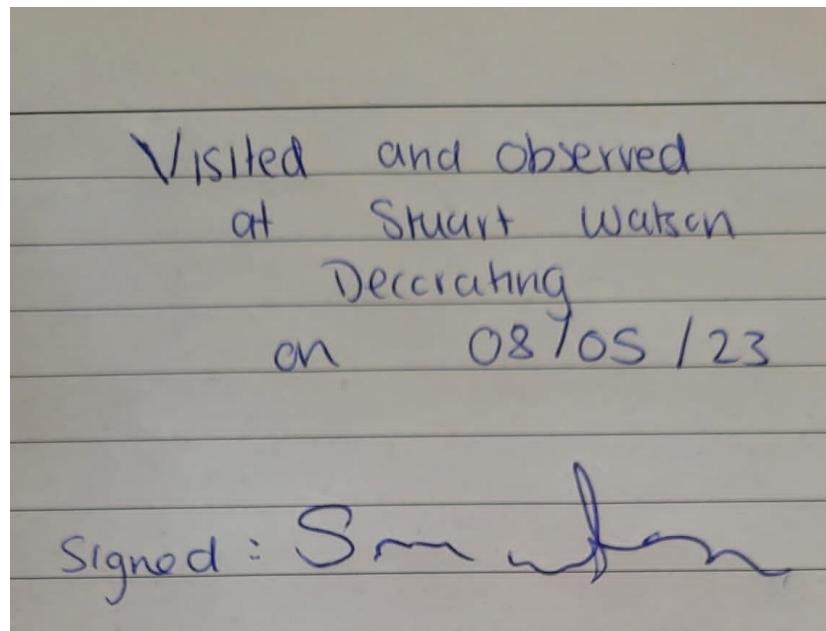
When Stuart is contacted for a quote, he takes a small notepad with him where he writes down all the information of the job such as which materials he needs, measurements for the room or rooms, and when the customer would like it doing.

Then once he gets back, he looks at his schedule to see if the dates the customer want can be done if so, he writes in the customer information and the basic details of the job.

To calculate the price of a quote Stuart takes into account the price of the materials at that time, his average rate of pay which I found to be between £160-180 a day depending on whether it was a local job or if he had to travel further such as into Sheffield or beyond.

Once he has contacted the customer and they have accepted the quote he then writes down a day-by-day description of what he will do and what equipment will be needed for each day, he then checks with the stock he currently has in the garage to see what he needs to go and buy.

After the job is complete Stuart then creates a paper-based quote which contains the up-to-date price including the price of materials, labour costs and the number of days worked. He also writes down the contact information such as name, address, and telephone number.

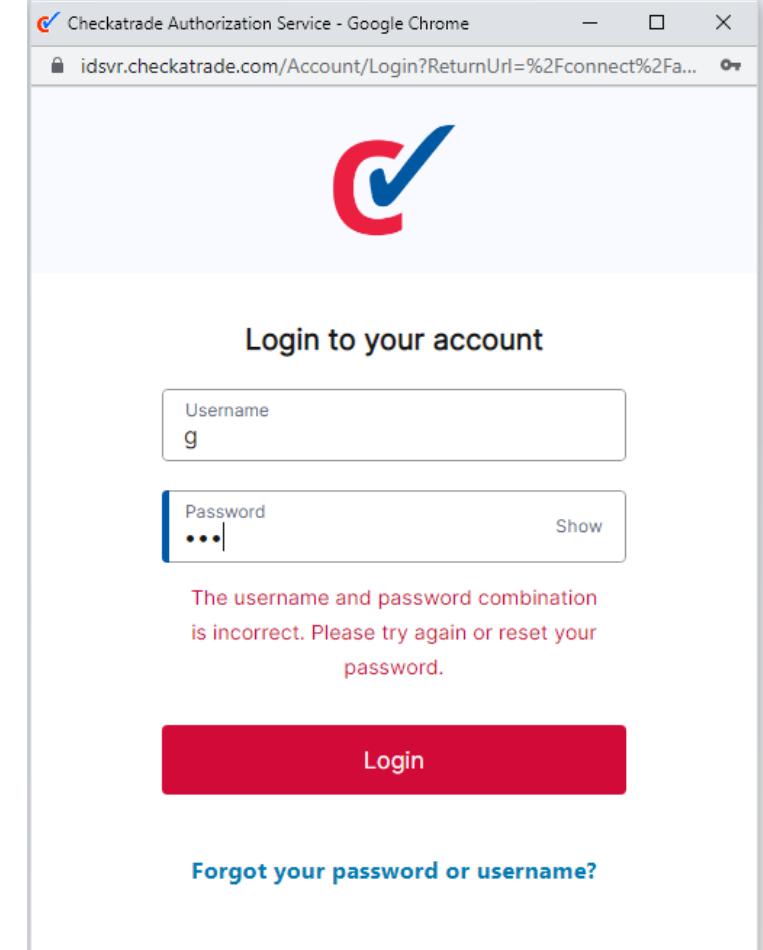


# Desk Based Research

# Staff

In the new system I will use similar password checks for when the staff log on but also for when a new account is created a specific criteria will have to be met. This will help to improve security throughout the company.

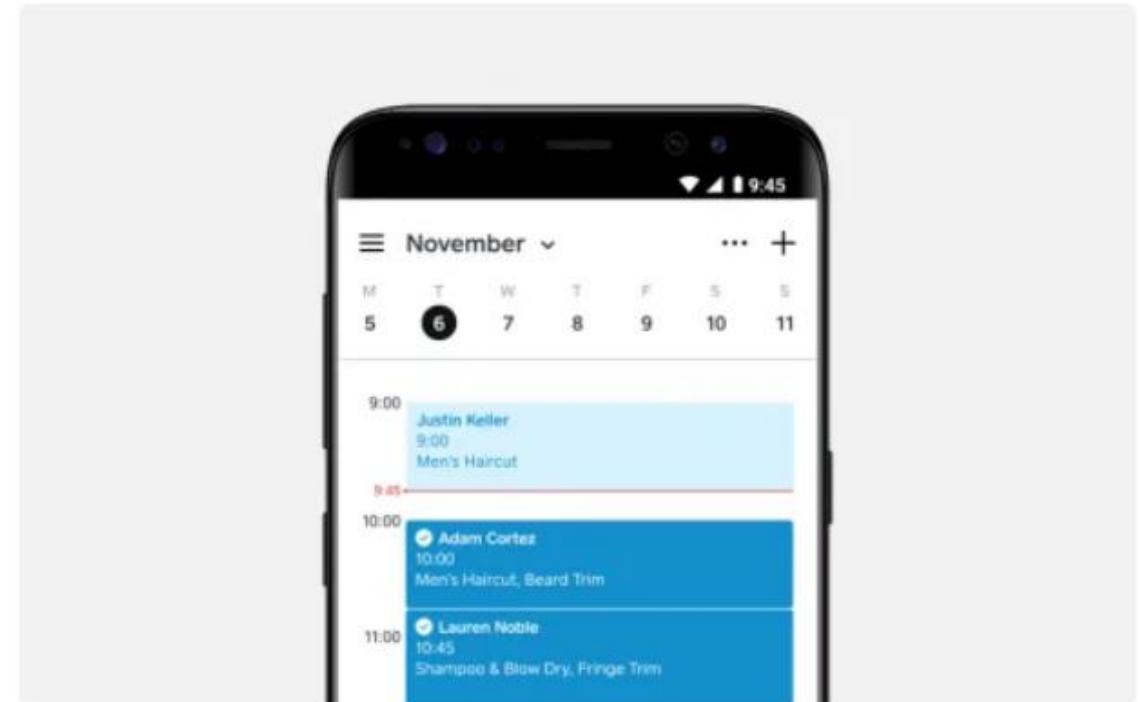
Website used: <https://membersapp.checkatrade.com/login>  
Date visited: 24/04/2023



The screenshot shows a Google Chrome browser window with the title "Checkatrade Authorization Service - Google Chrome". The URL in the address bar is "idsrv.checkatrade.com/Account/Login?ReturnUrl=%2Fconnect%2Fa...". The page features a large red "C" logo with a blue checkmark. Below it is the text "Login to your account". There are two input fields: "Username" containing "g" and "Password" containing three dots (...). To the right of the password field is a "Show" link. A red error message at the bottom states: "The username and password combination is incorrect. Please try again or reset your password." A large red "Login" button is at the bottom, and a "Forgot your password or username?" link is at the bottom right.

# Staff

For my system I will use a very similar feature to allow the staff to access their own schedules without seeing all the other members of staff on the same calendar to make it easier to read and clearer for the employee.



## Individual employee accounts

Allow your employees to log in to view and manage their calendars themselves.

Website used: [Scheduling Software Features - Square Appointments \(squareup.com\)](https://squareup.com)

Date visited: 01/08/2023

# Customers

During my research I found this website which clearly demonstrates how I would like customer information to be views on my system as it is easy to read and shows all important information for the customer.

The image shows a desktop application window and a smartphone side-by-side. The desktop window has a dark header with 'Messages', 'View App', and 'Help' buttons. Below the header are tabs: 'Businesses' (gray), 'FIELDS' (light gray), 'RECORDS' (purple, selected), and 'TASKS' (light gray). Underneath the tabs, it says 'Showing 1-8 of 8' with 'add filter' and 'export' links, and a '25 per page' dropdown. A 'Settings' button is also present. The main area is a table with columns: Name, Logo, Address, Phone, and Category. There are four entries:

|                          | Name                       | Logo | Address                                      | Phone        | Category      |
|--------------------------|----------------------------|------|--|--------------|---------------|
| <input type="checkbox"/> | Triple Crown Landscaping   |      | 3124 South Street<br>Pecos, TX 79772         | 432-722-2708 | Service       |
| <input type="checkbox"/> | Shamrock Coffee Company    |      | 4923 Holden Street<br>San Diego, CA 92121    | 619-205-6584 | Food & Drink  |
| <input type="checkbox"/> | Pearl Architectural Design |      | 4913 Gnatty Creek Road<br>Westbury, NY 11590 | 516-334-3077 | Home & Garden |
| <input type="checkbox"/> | Greener Cleaners           |      | 4435 Crummit Lane<br>Syracuse, NE 68446      | 402-269-1382 | Service       |

At the bottom are buttons for 'Add Business', 'Edit', and 'Delete'. To the right of the desktop window is a smartphone displaying a mobile version of the same application. The phone screen shows a header 'My Local Businesses' and 'List Businesses' with categories 'Food & Drink', 'Entertainment', and 'Health & Beauty'. Below the categories is the 'SHAMROCK COFFEE COMPANY' logo with the phone number '619-205-6584' and the website 'http://shamrockcoffee.biz'.

Website used: [Online Database Software: Use Knack For Custom Online Databases & Systems](#)  
Date visited: 01/08/2023

# Quotes

From my research I have found this feature which helps to create a quote. I will use something similar to this to do the calculation of the price for quotes for Stuart as it is a user-friendly interface which makes pricing a quote easier for any of the employees.

Website used: [Checkatrade: Book A Guaranteed Tradesperson](#)

Date visited: 24/04/2023

Where do you need your painting done?

Inside

Outside

Both



When would you like the job to start?

I'm flexible on the start date

It's urgent (within 48 hours)

Within 2 weeks

Within 1 month

I'm budgeting / researching



How many rooms do you need painted/decorated?

A small area



1



2



3



4+



# Quotes / Validation

Similar to this feature, I will use a presence check to ensure the employee has included the information on the quote to be able to refer back and understand what happened when the information was taken and what needs to be done to ensure the quote is booked.

## Tell us about your painting and decorating job

Please include any additional information you think the tradesperson should know about the job, i.e. The current state of your walls or woodwork, whether you need a staircase/landing decorating, etc.

Example: I have 2 bedrooms which need wallpaper removing and then painting, as well as 2 doors and door frames which will need painting.

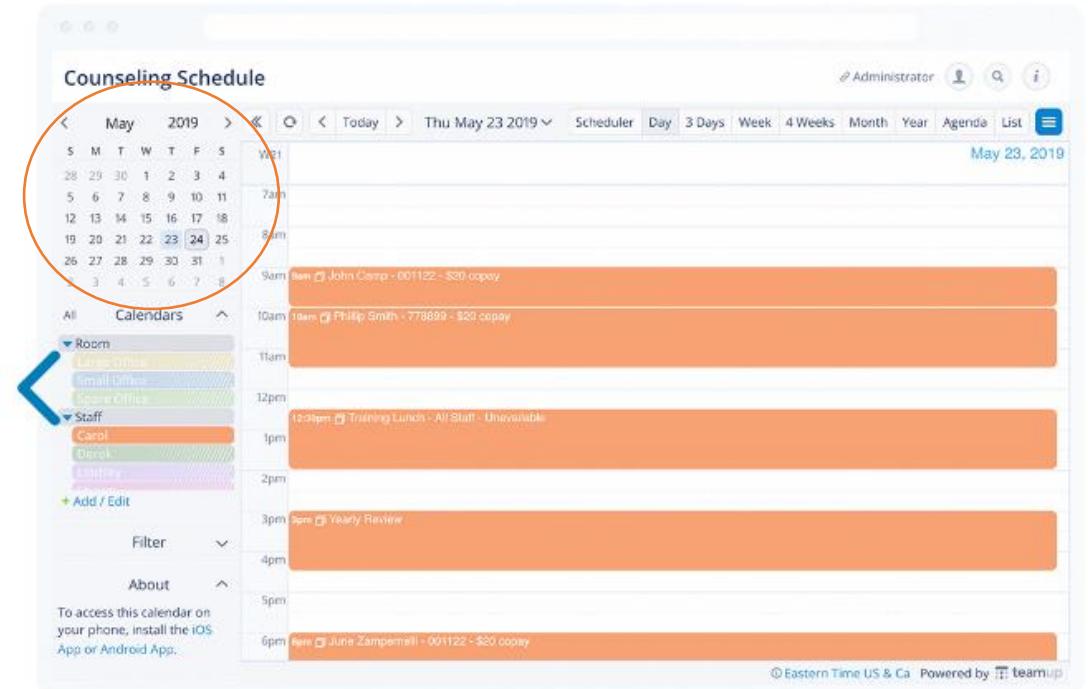
Enter 25 more characters

The job description field is required.

Continue

# Validation

For my system I will use date validation like what is used on the calendar for when the employees are entering bookings or holidays onto the system to ensure the information entered is as correct as it can be to help reduce mix ups and errors for the company.



Website used: <https://www.teamup.com/>  
Date visited: 24/04/2023

# Validation

These validation techniques help to reduce errors for the staff when they are entering information for a quote, it helps to check that they have wrote down the right post code by using a format check similar to that used in the top photo. The bottom feature will help the staff to make sure all information was retrieved from the customer and that it was all entered accurately onto the system.

Website used: [Checkatrade: Book A Guaranteed Tradesperson](#)

Date visited: 24/04/2023

## What is your postcode?

It will help us to find the closest tradesperson to you.

A screenshot of a web form for entering a postcode. The input field contains "s2 bbb". To the right of the input field is a blue circular icon with a white circle inside. To the right of the icon is a red button with the word "Search" in white. Below the input field, a red error message says "Please enter valid postcode".

## Your Details

Tell us about you

A screenshot of a user details form. It consists of four input fields, each with a red border. The first field is labeled "Name". The second field is labeled "Email". The third field is labeled "Phone Number". The fourth field is labeled "Postcode (of your project)".

# Scheduling

From this website I found unique icons which were used to show different events on the schedule. This is helpful to determine when the employees are working and when they have planned in holidays therefore, I will use this for my project.

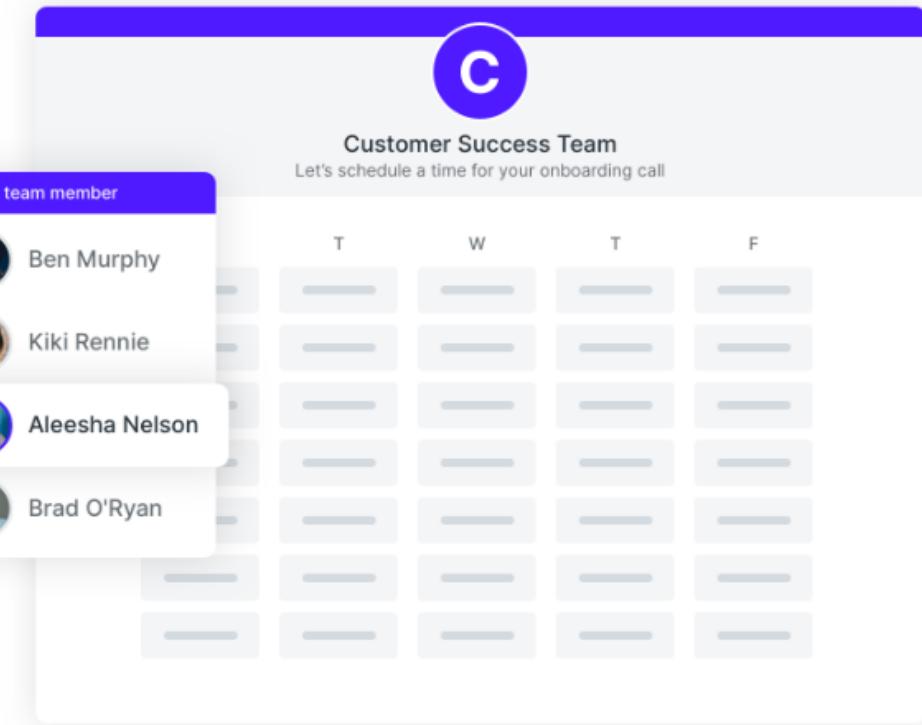
| August  |    |    |    |    |    |    | September |    |    |    |    |    |    |
|---------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|
| M       | T  | W  | T  | F  | S  | S  | M         | T  | W  | T  | F  | S  | S  |
|         |    |    |    |    | 1  |    |           | 1  | 2  | 3  | 4  | 5  |    |
| 2       | 3  | 4  | 5  | 6  | 7  | 8  | 6         | 7  | 8  | 9  | 10 | 11 | 12 |
| 9       | 10 | 11 | 12 | 13 | 14 | 15 | 13        | 14 | 15 | 16 | 17 | 18 | 19 |
| 21      | 22 |    |    |    |    |    | 20        | 21 | 22 | 23 | 24 | 25 | 26 |
| 23      | 24 | 25 | 26 | 27 | 28 | 29 | 27        | 28 | 29 | 30 |    |    |    |
| 30      | 31 |    |    |    |    |    |           |    |    |    |    |    |    |
| October |    |    |    |    |    |    | November  |    |    |    |    |    |    |
| M       | T  | W  | T  | F  | S  | S  | M         | T  | W  | T  | F  | S  | S  |
|         |    |    | 1  | 2  | 3  | 4  |           | 1  | 2  | 3  | 4  | 5  | 1  |
| 5       | 6  | 7  | 8  | 9  | 10 | 11 | 2         | 3  | 4  | 5  | 6  | 7  | 8  |
| 12      | 13 | 14 | 15 | 16 | 17 | 18 | 9         | 10 | 11 | 12 | 13 | 14 | 15 |
| 19      | 20 | 21 | 22 | 23 | 24 | 25 | 16        | 17 | 18 | 19 | 20 | 21 | 22 |
| 26      | 27 | 28 | 29 | 30 | 31 |    | 23        | 24 | 25 | 26 | 27 | 28 | 29 |
|         |    |    |    |    |    |    | 30        |    |    |    |    |    |    |

Website used: <https://timetastic.co.uk/>

Date visited: 08/05/2023

# Scheduling

Similar to what I found on this website for the schedule I will first display the option to view each staff members individual calendar. This will help Stuart and the other staff members clearly see who is working when without mixing up the job as they will each have their own timetable.

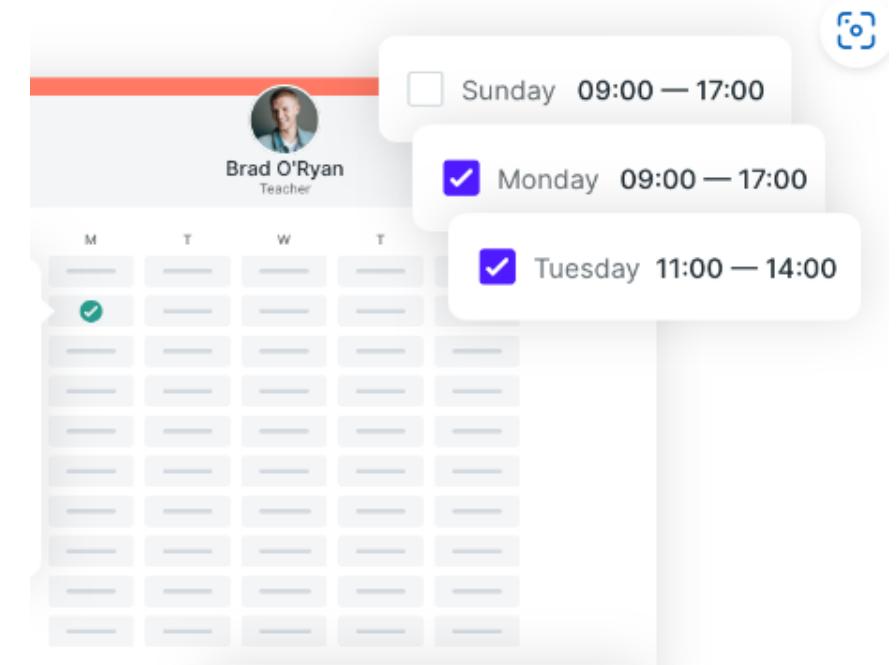


Website used: [Powerful scheduling tool for teams - YouCanBookMe](#)

Date visited: 11/07/2023

# Scheduling

From this website the use of being able to add to the schedule in different hour blocks will be very useful for the system as different jobs require different amounts of time since if one job only needs finishing for two hours in the morning the schedule then allows other bookings to be made later on in the same day.



Website used: [Powerful scheduling tool for teams - YouCanBookMe](#)

Date visited: 11/07/2023

# Stock

I have chosen to use this as it shows an easy-to-read breakdown of information which I think will be useful for this system to help clearly show to the employees what stock is there and what they will need before a job starts with all the relevant information for each item.

| REORDER | ITEM NO. | NAME   | MANUFACTURER | DESCRIPTION        | COST PER ITEM | STOCK QUANTITY | INVENTORY VALUE | REORDER LEVEL | DAYS PER REORDER | ITEM REORDER QUANTITY | ITEM DISCONTINUED? |
|---------|----------|--------|--------------|--------------------|---------------|----------------|-----------------|---------------|------------------|-----------------------|--------------------|
| OK      | A123     | Item A | Cole         | Item A description | \$10.00       | 200            | \$2000.00       | 50            | 14               | 100                   | Yes                |
| Reorder | B123     | Item B | Cole         | Item B description | \$20.00       | 100            | \$2000.00       | 50            | 30               | 20                    | No                 |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |
| OK      |          |        |              |                    |               |                | \$0.00          |               |                  |                       |                    |

Website used: [Free Inventory List Templates | Smartsheet](#)

Date visited: 08/05/2023

# Stock

While doing my research I have found this feature that clearly shows specific information about each item of stock. For my project I will use key fields similar to those shown on the left so Stuart and the other decorators will know exactly what stock they have at that moment in time.

|                     |                                     |
|---------------------|-------------------------------------|
| Size                | <b>5L</b>                           |
| Application Methods | <b>Airless Spray, Brush, Roller</b> |
| Coverage            | <b>Up to 10sq/m per litre</b>       |
| VOC level           | <b>Low</b>                          |
| Thinning            | <b>Water</b>                        |
| Touch dry           | <b>1-4 hours</b>                    |
| Recoatable          | <b>4-8 hours</b>                    |
| Suitable for...     | <b>Exterior use</b>                 |
| Scrubability        | <b>Washable</b>                     |
| Lifespan            | <b>Up to 10 years</b>               |
| Colour type         | <b>Tinted</b>                       |
| Finish              | <b>Matt</b>                         |
| Cleanup             | <b>Water &amp; Detergent</b>        |
| Base                | <b>Water-Based</b>                  |

Website used: <https://www.brewers.co.uk/product/AA0646015F>  
Date Visited: 16/05/2023

# Stock

Similar to this feature I will have automation for stock levels. A message will be automatically produced when stock levels fall beneath a certain quantity to alert the company so they can buy more ready for upcoming jobs helping reduce stress within the stock management.

## Sales Automation

Set up a series of automated, personalized emails and follow-up tasks to make sure you stay top of mind throughout the sales process.

# Invoices

This invoice calculator shows you a breakdown of the cost and what tax has been applied. For my project I think this would be useful as when Stuart is calculating the price of a job it will help show to the customer how the price is worked out in a simple way which will help reduce confusion.

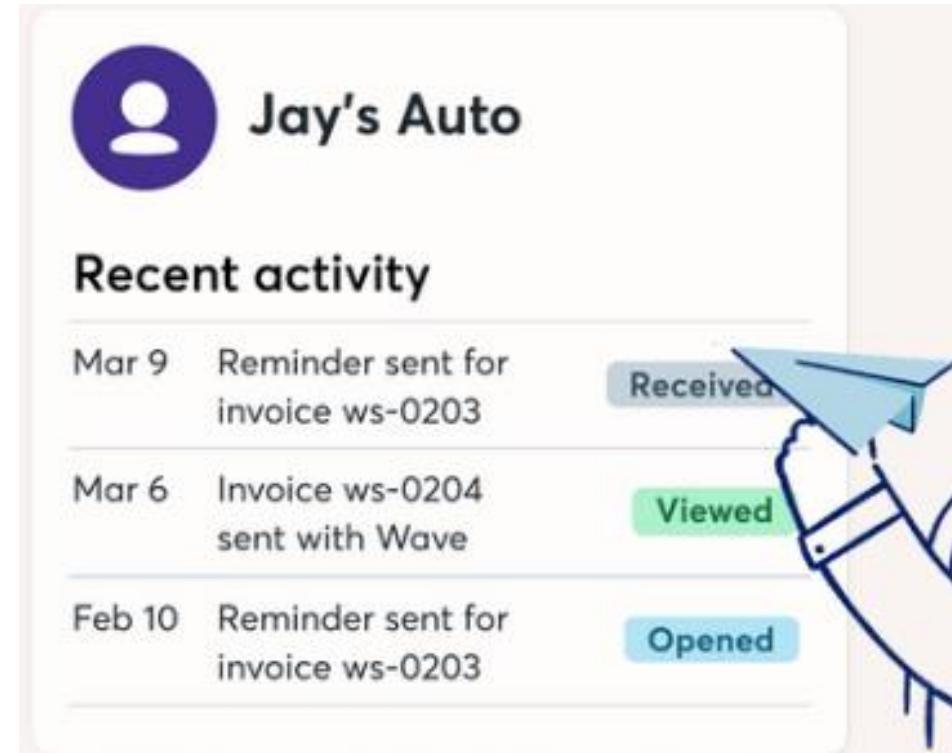
|                                      |                |
|--------------------------------------|----------------|
| <b>Subtotal</b>                      | <b>250.00</b>  |
| <b>20.0%</b>                         | <b>50.00</b>   |
| <b>TOTAL GBP</b> <small>Edit</small> | <b>£300.00</b> |

Website: [100 - New Invoice - Invoice Home](#)

Date visited: 08/05/2023

# Invoices

For my system I will use a similar feature to alert the staff of an invoice when it has been paid or currently still waiting to be paid through a search that will be a choice on the user interface this will help Stuart to keep his finances more organised.



Website: [Best Free Invoice Software for Small Businesses - Wave Financial \(waveapps.com\)](https://waveapps.com)

Date visited: 11/07/2023

## Investigation Write Up

Stakeholders    Inputs    Processes    Outputs

Staff:

The **owner** of the company, Stuart holds information in a specific diary about each employee including: **Name, Address, Phone number and national insurance number**. The **owner** of the company is the only one which can collect this information off the newest employees, and it is presented in a **list**. When a staff member alerts Stuart to any changes in their information Stuart is the one to write it down in the diary underneath their name. However, when a staff member tells Stuart they are leaving, the **owner** disposes of the private information by taking out the page and shredding it so all information is removed in a secure manner. When I observed the system, I could see the only way **Stuart** could validate any data was to visually check it by reading it multiple times. Since it is a paper-based system the only way to back up the data is by rewriting it on quotes and invoices so there are multiple copies of information such as employee **telephone and name**. The current problems are that the **owner** must **search** through the diary to find specific **employee information** which is time consuming for him. When I observed the system, I saw that **staff** also had to check that the **contact information** was correct every time a quote or invoice was written.

When Stuart was writing down any staff information such as **national insurance number** there was no validation to check the format or that it had been entered correctly meaning there is a higher chance the information could be wrong. During my desk-based research, I have found a way to help tackle this problem by alerting Stuart when information entered is not in a specific format. Furthermore, since it is only a diary, there is no security on who can access the information so any of the other **employees** could potentially access sensitive information causing a privacy problem.

Another issue is that currently all **staff** use a diary (as shown in the collection of documents) which is not very secure for them meaning if lost or stolen anyone would have easy access to the information within. To help resolve this problem the new system will use security so that each member of staff has their own unique login to reduce the risk of information being stolen. Within the desk-based research I found validation that checks whether a password is correct before allowing the user to enter I will use this for the new system however to make it easier for the staff to use I will provide relevant error messages to help the employees decipher what they may have typed incorrectly.

Customers:

When I observed the system, it was clear that when a **customer** contacted one of the employees, they wrote it down in a particular diary under the date that the **employee** responded, the company then took essential information from the customer including **Name, Address, Phone number and a basic description on what the job entailed**. This was presented in a list format starting with the name, then the address underneath and finally the **small** description. However, I also found **customer information** could be found on **Stuart's** work mobile in his messages as this is another way that customers contact him. If a customer was no longer using the company one of the **employees** will shred the page from the diary or if it is on the works phone, they will delete the message to make sure none of the employees go to the job by accident and, so they are not withholding the customers contact details. When an **employee** is searching for a customer and their **personal information**, they must **search** through the diary until they find who they are looking for to help write quotes and invoices. When I observed the system, I noticed that the only form of validation is proof reading and visual checks as the **staff** write it down. Furthermore, since the company is paper based the only form of backing up is double entry since the customer information is originally wrote down in the diary and then repeated again on quotes and invoices.

An issue I found within the company is that customer information was not well organised since there was no way for Stuart to tell if the contact details were stored on his phone or in the diary meaning it was a time-consuming task to find the relevant information. Therefore, during my interview I found that the **owner** wished to have a more convenient **search** to find the **customer information** to help improve the efficiency of the system.

Quotes:

All of the **employees** are permitted to add a quote into the system by writing it down in a diary in an ordered **list**. When they are adding the new quote they take the **customer information, a job description and an estimated idea on what stock will be needed**. During my time observing the system I found that the only way to change quote information was to cross out the original and rewrite the new information leaving the diary very unorganised this was the same for deleting a quote it was either crossed out or if possible, the page would be removed. **Searching** for a **quote** was done by any of the **staff** meaning they could each find each other's quotes as well as their own since all quotes are in one diary. When producing a quote for the customer the **calculation** is done by the **employee** taking on the job however the **calculation** was identical for all quotes. The **employees** consider the number of days required to complete the job, the current prices for the materials required referring to the most current prices of stock on an invoice, and mileage. The mileage was dependent on the addresses since jobs nearer to the company in Kiveton Park and the surrounding villages was approximately £160 a day however jobs based in and around the centre of Sheffield and further would be **calculated** on an average of £180 a day. I also found

once a quote was produced there was no form of back-up to keep the information secure since it was only on a single piece of paper.

During my desk based research I found a quote calculation tool that was option driven to help form a quote quickly I think this will help the business, as a problem that was discovered is each time an employee calculates a quote they have to go through all the steps of the calculation manually which could be a time consuming task for them therefore, the quote tool I found will help speed up the process and help create an ease of use with the option driven choices.

When I observed the system, I found that each time an employee wrote a quote they had to repeat and write down all the customer information again which created a higher risk of information being incorrect since there is no validation. To help resolve this problem in the new system I will try to reduce the amount of times customer information has to be entered but also introduce validation techniques similar to those found in the desk-based research to help reduce the chance of information being incorrect.

#### Stock:

Information stored about the stock is very minimal as instead of storing it in a paper-based way or on a computer all employees are able to look to see what they have and what will be required for the new job. When I visited the company, I found they searched for specific characteristics when looking for stock, the employees looked at: quantity, colour, volume of the can and the type of paint. Any prices of materials that need to be used for calculations are based off the most recent orders by using the invoices (which can be seen in the collection of documents). However, only Stuart has access to these invoices since they are in a secure cabinet. Since no information is stored on stock at one time there is no form of validation or backing up. In addition to this, the old invoices were also not backed up when I visited the company, there was only one copy of each.

A substantial problem with stock is that there is currently no system on the storage of stock. This means that if an employee wishes to find stock, they must physically search through to see if they have any. Furthermore, it means there is less organisation on the purchasing of stock since at the moment staff will just purchase what they need meaning there is frequent trips to the wholesalers which is time-consuming but also costing more money. During the interview with Stuart, the owner, he wished to have a more organised way to store stock and be able to quickly find low stock which could be done through a suitable sort. Also, to help the stock easier to find for the staff I will use an easy-to-read table layout similar to one I found during my desk-based research with all the relevant information for each piece of stock, these key characteristics for the stock were highlighted in the investigation with Stuart.

## Scheduling:

When a **customer** contacts the company for a job, they often book 1-2 months in advance, sometimes the bookings may be on shorter notice however I found that none of the **employees** booked further than 1-2 months in advance. The main schedule for the company is a diary, the only information shown is the **date the job starts** and the **customer information** (as shown in the collection of the documents). When I was at the company it was clear that any **employees** could access the diary and write in new booking or cross out anything that was cancelled. Any amendments were done by the **employees** by rewriting in the diary. Potentially the **employees** could change any of the bookings for any of the employees however the **staff** tended to only edit their own unless given permission or asked to by another member of the company unlike **Stuart** who has the ability to change anything in the diary. If an employee wrote the customer information down into the diary there was no form of validation to show that the information was correct apart from proof reading what they had wrote down. Furthermore, there was no form of back-up in relation to the schedule since it was all in one diary so if there was any damage or the diary was lost there would be no way to trace the schedule back.

An issue with the schedule that was brought up during the investigation is the lack of security. Since the schedule is in a dairy it's easy to change therefore, I will introduce hierarchical access meaning only **Stuart** can change the schedule but allow the other **staff** to be able to view it. During the desk-based research I discovered a way to present absences and bookings using unique icons, I will use something similar to help make the schedule easier to understand and read for the employees to help potentially reduce errors in mix-ups or booking a job when an employee is off.

## Invoices:

All **employees** could create an invoice by using the same information as a quote: **customer information, dates of the job, labour materials, a description of the job and the calculation for the price is redone with relation to the new material prices**. Invoices are created in a paper-based form, any changes can either be written onto the invoice or if necessary, a new invoice will be written out. Any to be deleted are done so by shredding the paper and placing it in the bin. When I visited the company, I found that all these changes can be done by any **employees** of the company however similarly to producing a quote each employee

tends to only do the documentation for their own jobs. When I observed the system I noticed that if an **employee** wanted to find a specific invoice to see whether a job had been paid they had to **search** through the diary to find the **date of the job** and if the job had a note next to it alerting the fact **if it had been paid for**, the employee knew. Furthermore, I found that there was no form of backing up for the invoices so if the original copy were lost the company would have to produce a new one. Also, validation was extremely limited on the creation since the only way to check if the information written down was correct, or to check the output of the calculation was to proofread it.

When I carried out the short questionnaire it was made clear to me that sometimes the **customer** found how the price of the job is calculated confusing and that it was not well explained on the invoice. Therefore, during the desk-based research I found a feature that showed how the tax was added to the price. I will take this feature and use it in a similar way for the invoice by showing how the materials, mileage, labour, and tax influences the cost of the job to help resolve his problem for the customer.

Additionally, another problem that was found during the short questionnaire is that **customers** can only have paper invoices whereas some would prefer an email since it is easier to save and less likely to be lost. Unlike the paper invoices which **Stuart** does not back up, an email would be backed up automatically therefore I will use validation techniques similar to that shown in the desk-based research to collect an email address for the **customer** in case they would prefer an email invoice.

## Purpose of the System

### General Requirements:

The purpose of the system is to provide a friendly, easy to use user interface that will allow the staff to easily navigate the system and provide a menu structure that clearly displays to the user the purpose of that aspect of the system. Also, I will centralise all the data in a computerised system instead of the staff using multiple notebooks to help keep the information organised.

### Staff:

The purpose of the system in relation to the staff is to introduce increased security allowing the staff to log in with unique usernames and passwords. Furthermore, there will be suitable validation in place to reduce errors when entering the employee's contact details such as a format check on the national insurance numbers allowing the information to be stored in permanent text files with full file editing capabilities that will then be backed up.

### Customers:

A storage system with full file editing capabilities to store customer information, the details entered will then be validated to reduce the number of errors such as making sure an email address, or a telephone number is in the correct format before saving it to the system. Customer details will be stored in a permanent text file but also backed up to help keep all information as safe as possible. Also, in the customer section there will be a suitable search via a customer's name or postcode which will then output an easy-to-read list containing the customer's full name, address and telephone number.

### Quotes:

The purpose of the system is to store multiple quotes on the system in a permanent text file all with full file editing capabilities. The system will be able to conduct a search to find via quote reference or customer name to produce a clear list of related information including customer information, the basic stock required and the estimated price of the job. When entering information into the system on a quote validation will be used, for example, checking that the price entered is correct. Furthermore, a multistage calculation taking into account mileage, number of days worked, stock used, VAT and labour costs will be used by the system to estimate a price for the job when a customer contacts the company. Employees will have the ability to edit a quote to tell whether a customer has accepted or rejected the quote for their own jobs only, using suitable hierarchical access for each employee.

### Stock:

The storage of the permanent text files for the stock allows the employee to conduct a suitable search to find specific information on an item of stock including the cost and stock quantity. The stock files will be backed up appropriately in case the system crashes for example. Also, a member of staff can conduct a fitting sort to sort the stock quantities from low to high and the system will produce a useful message when stock reaches a certain level. The purpose of the stock system is to produce a user-friendly interface that makes a table of stock easy-to-read for all employees at the company.

#### Invoices:

The purpose of the system is to produce a user-friendly interface which allows an invoice to be easily read and understood for both customers and employees by storing them in a permanent text file with all editing capabilities. All files will be appropriately backed up and suitable validation will occur for the data entered such as the price calculated and the dates of the job once its complete. A useful multistage calculation will also be done by the system to provide an accurate price for the booking using the most up-to-date prices of stock. Also, a suitable search will be used to identify unpaid invoices so the company can keep track of their finances.

#### Scheduling:

The schedule will have a storage system with full file editing capabilities that will have fitting hierarchical access allowing only specific member of staff to edit the schedule but allow all to view it. For viewing the schedule, I will create a user-friendly interface with the option to view the work booked up to a month in advance. To reduce the number of errors when creating the schedule I will use appropriate validation. Furthermore, to make sure that the chance of the schedule being lost I will back up the data files.

Methods to be used in the solution

| Objective   | Tool / Techniques Required   | Suitability of Borland C++   |
|---|--|--|
| Allow the user to add a new employee to the system, entering key information including: Full name, Address, Telephone number and national insurance number. This will then be stored in a permanent file. | To be able to add and store information in a clear way in permanent text files.  | C++ can write to the files using serial access files.  |
| Permit the user to change information stored on an employee e.g., Address and telephone number or to delete a member of staff that no longer works there.   | To be able to edit the text in the file and rewrite to it to save these changes.   | Since C++ has the ability to rewrite to the files and store the updated information  |
| Allow the user to search for staff via employee number or name.   | To produce an easy-to-read list of specific information using a linear search.   | Since the language can use selection statements and the linking of files to retrieve information from the text files.  |
| Include validation on all data entered when adding a new employee.  | Before the staff data is committed to the text file validate the information for example using format checks and produce specific error messages when data entered is incorrect. | Borland C++ can apply different forms of validation such as format and presence checks.<br>For example, when entering the postcode, the use of isalpha and isdigit check that the letters and digits are in the correct format for the postcode of that length.<br>C++ also allows the use of ispunct when checking for a piece of punctuation when validating a new password. |
| Ensure all information saved is backed up.  | Rewrite data to alternative storage to back up data.   | Since it can readback and rewrite the information stored to a new file.  |
| Allow all information stored in the file to be recovered.   | Use a procedure to readback the data stored in the back up text file.  | The ability of C++ to be able to rewrite the information from the alternative storage by reading back the file.  |
| Allow the user to enter a new customer to the system by storing: Full name, Address,  | To be able to add and store information in a clear way in permanent text files.  | C++ can write to the files using random access files to quickly retrieve customer information.   |

|   |   |   |
|---|---|---|
| and a basic description of the job in a permanent file.   |   |   |
| Allow the user to delete a customer from the system when they are no longer using the company or to change the address of a customer stored on the system.  | To be able to edit the text in the file and rewrite to it to save these changes.  | Since C++ has the ability to rewrite to the files and store the updated information.  |
| Enable the user to search for customer using name or customer reference.  | To produce an easy-to-read list of specific information using a linear search.  | Since the language can use selection statements and the linking of files to retrieve information from the text files.   |
| Ensure all data entered is validated.   | Before the customer data is committed to the text file validate the information for example using format checks and produce specific error messages when data entered is incorrect. | Borland C++ can apply different forms of validation such as format and presence checks using commands such as isalpha to check letters are in the correct position and isdigit to check digits are in the correct position for customer postcodes and not mistyped. |
| Ensure all information saved is backed up.  | Rewrite data to alternative storage to back up data.  | Since it can readback and rewrite the information stored to a new file.   |
| Allow all information stored in the file to be recovered.   | Use a procedure to readback the data stored in the back up text file.   | The ability of C++ to be able to rewrite the information from the alternative storage by reading back the file.   |
| Allow the user to add a new quote to the system by storing it in a permanent file. The information to be stored on a quote will be: Date the quote was produced, customer information, a job description, the number of days required to complete the job, a basic idea of what stock will be needed and an estimated price of the job. | To be able to add and store information in a clear way in permanent text files.   | C++ can write to the files using serial access files.   |

|   |  |  |
|---|--|--|
| Enable the user to delete a quote once the booking is finalised or to change the information on the quote including the estimated price and the number of days required | To be able to edit the text in the file and rewrite to it to save these changes.   | Since C++ has the ability to rewrite to the files and store the updated information.   |
| Enable the user to search for a specific quote using quote reference or customer name.  | To produce an easy-to-read list of specific information using a linear search.   | Since the language can use selection statements and the linking of files to retrieve information from the text files. C++ can use records and 'typedef struct' to allow the linking of files so information from the customer file can be extracted and used on the quote in a quick and efficient manner. |
| Produce a calculation for the quote taking into account current stock prices, labour costs, number of days worked and mileage.  | Using step by step processes to produce the price of a quote and be able to write this to the quotes file.   | The ability to use mathematical operators such as '*' and '+' in C++ to break down the steps of the calculation.   |
| Validate all quote information upon entry.  | Before the quote data is committed to the text file validate the information for example using format checks and produce specific error messages when data entered is incorrect. | Borland C++ can read back the file to check the quote reference entered doesn't already exist and if it does produce a suitable error message alerting the user using 'cout'.  |
| Ensure all information saved is backed up.  | Rewrite data to alternative storage to back up data.   | Since it can readback and rewrite the information stored to a new file.  |
| Allow all information stored in the file to be recovered.   | Use a procedure to readback the data stored in the back up text file.  | The ability of C++ to be able to rewrite the information from the alternative storage by reading back the file.  |
| Allow the user to add additional stock to a permanent file including information such as: colour of paint, type of paint, volume of can, price and quantity.            | To be able to add and store information in a clear way in permanent text files.  | C++ can write to the files using serial access files.  |
| Allow the user to delete stock from the system if it is no longer required or is no longer  | To be able to edit the text in the file and rewrite to it to save these changes.   | Since C++ has the ability to rewrite to the files and store the updated information.   |

|   |  |   |
|---|--|---|
| sold or to change the price and quantity of the stock.  |  |   |
| Enable the user to search for stock using stock ID to display information.  | To produce an easy-to-read list of specific information using a linear search.   | Since the language can use selection statements and the linking of files to retrieve information from the text files.   |
| Enable the user to sort stock quantities from low to high.  | The ability to write a bubble sort producing a user-friendly list of stock quantities from that with the lowest quantity to the highest.   | C++ commands such as if statements and loops allow for a bubble sort to be made to sort the stock quantities.   |
| Produce a message when stock quantities drop to a specific level.   | Allow the system to produce an alert when stock reaches a specific quantity using a loop.  | The language allows for a program to be produced that will produce an output using 'cout' to tell the user that the stock is low.   |
| Ensure information entered is validated.  | Before the stock data is committed to the text file validate the information for example using format checks and produce specific error messages when data entered is incorrect. | Borland C++ can apply different forms of validation such as format and presence checks. Using nested if statements and character arrays to check certain positions are either integers or a decimal point in the case of stock price. Using isdigit to check everything other than the decimal point entered is a number. |
| Ensure all information saved is backed up.  | Rewrite data to alternative storage to back up data.   | Since it can readback and rewrite the information stored to a new file.   |
| Allow all information stored in the file to be recovered.   | Use a procedure to readback the data stored in the back up text file.  | The ability of C++ to be able to rewrite the information from the alternative storage by reading back the file.   |
| Allow the user to add a new booking to the schedule including: Customer information and the start date of the job and stores this in a permanent text file. | To be able to add and store information in a clear way in permanent text files.  | C++ can write to the files using a sequential access file.  |
| Allow only those with the highest access to change information such as date of the job or to delete   | To be able to edit the text in the file and rewrite to it to save these changes.   | Since C++ has the ability to rewrite to the files and store the updated information.  |

|  |   |   |
|--|---|---|
| information such as a cancelled booking.   |   |   |
| Include validation on the new information which is entered including the date.   | Before the schedule data is committed to the text file validate the information for example using format checks and produce specific error messages when data entered is incorrect. | Borland C++ can apply different forms of validation such as a format check on the date using nested if statements and sscanf to allow the system to validate the date in as much detail as possible and make sure it is in the correct format when entered. |
| Ensure there is hierarchical access with levels of access of the administrator and the members of staff below.   | The ability to use access levels using security checks when logging in to ensure only certain member of staff can access certain editorial tasks.                                   | C++ allows for security to be in place by validating the user's information when they attempt to log in.  |
| Ensure all information saved is backed up.   | Rewrite data to alternative storage to back up data.  | Since it can readback and rewrite the information stored to a new file.   |
| Allow all information stored in the file to be recovered.  | Use a procedure to readback the data stored in the back up text file.   | The ability of C++ to be able to rewrite the information from the alternative storage by reading back the file.   |
| Allow the user to add a new invoice to the system storing this in a permanent text file including the following information: Customer information, Date of the job, Description of the job and a new price.    | To be able to add and store information in a clear way in permanent text files.   | C++ can write to the files using serial access files.   |
| Allow the user to be able to change information including date of the job and whether the job has been paid for or to delete an invoice from the system once it is no longer needed and the job has been paid. | To be able to edit the text in the file and rewrite to it to save these changes.  | Since C++ has the ability to rewrite to the files and store the updated information.  |
| Produce a multistage calculation for the invoice taking into account: number of days worked, mileage costs, current stock costs and labour costs.  | Using step by step processes to produce the price of an invoice and be able to write this to the invoices file.   | The ability to use mathematical operators such as '*' and '+' in C++ to break down the steps of the calculation.  |

|   |  |   |
|---|--|---|
| Enable the user to be able to search for an invoice by reference.                                     | To produce an easy-to-read list of specific information using a linear search.   | Since the language can use selection statements and use procedures to readback and retrieve information from the text file. |
| Enable the user to be able to search for paid or unpaid invoices.                                     | To display a list of customer names via a linear search that are yet to pay their invoice.   | Since the language can use selection statements and the linking of files to retrieve information from the text files.       |
| Ensure there is validation in place for all information entered excluding the description of the job. | Before the invoicing data is committed to the text file validate the information for example using format checks and produce specific error messages when data entered is incorrect. | Borland C++ can read back the invoicing file to check that the new reference number entered doesn't already exist.          |
| Ensure all information saved is backed up.  | Rewrite data to alternative storage to back up data.   | Since it can readback and rewrite the information stored to a new file.   |
| Allow all information stored in the file to be recovered.   | Use a procedure to readback the data stored in the back up text file.  | The ability of C++ to be able to rewrite the information from the alternative storage by reading back the file.             |

## Objectives and Success Criteria

Staff:

S1. Allow the user to add a new employee to the system, entering key information including: Full name, Address, Telephone number and national insurance number. This will then be stored in a permanent file.

Success Criteria: A permanent text-based file that stores the employee's Full name, Address, Telephone number and national insurance number.

S2. Permit the user to change information stored on an employee e.g., Address and telephone number.

Success Criteria: Allows the user to change the employee's address and/or telephone number which is then saved to the permanent text file.

S3. Allow the user to delete a member of staff that no longer works there.

Success Criteria: Allows the user to remove a member of staff from the system and for the information to be deleted from the text file.

S4. Include validation on all data entered when adding a new employee.

Success Criteria: National insurance number, telephone number, and the postcode will undergo format checks reducing the chance of incorrect information by producing error messages.

S5. Allow the user to search for staff via name.

Success Criteria: Allow the user to search for a member of staff producing a list including their Name, Address, Telephone number and national insurance number.

S6. Allow the user to search for staff via telephone number.

Success Criteria: Allow the user to search for a member of staff producing a list including their Name, Address, Telephone number and national insurance number.

S7. Ensure all information saved is backed up.

Success Criteria: In the user interface provide a menu option to back up data stored in the text files.

S8. Allow all information stored in the file to be recovered.

Success Criteria: In the user interface provide a menu option under the administrator to recover data stored in the text files.

Customer:

C1. Allow the user to enter a new customer to the system by storing: Full name, Address, and a basic description of the job in a permanent file.

Success Criteria: A permanent text-based file that stores the customer's Full name, Address, Telephone number, and a basic description of the job.

C2. Allow the user to delete a customer from the system when they are no longer using the company.

Success Criteria: Allows the user to remove a customer from the system and for the information to be deleted from the text file.

C3. Allow the user to change the address of a customer stored on the system.

Success Criteria: Allows the user to change the customer's address which is then saved to the permanent text file.

C4. Enable the user to search for customer using name.

Success Criteria: Allow the user to search for a customer producing a list including their Name, Address, Telephone number, and a basic description of the job.

C5. Enable the user to search for customer using name or customer reference.

Success Criteria: Allow the user to search for a customer producing a list including their Name, Address, Telephone number, and a basic description of the job.

C6. Ensure all data entered is validated.

Success Criteria: Validate the address and telephone number using a format check, producing an error message if incorrect.

C7. Ensure all information saved is backed up.

Success Criteria: In the user interface provide a menu option to back up data stored in the text files.

C8. Allow all information stored in the file to be recovered.

Success Criteria: In the user interface provide a menu option under the administrator to recover data stored in the text files.

Quotes:

Q1. Allow the user to add a new quote to the system by storing it in a permanent file. The information to be stored on a quote will be: Date the quote was produced, customer information, a job description, the number of days required to complete the job, a basic idea of what stock will be needed and an estimated price of the job.

**Success Criteria:** A permanent text-based file that stores the following information on a quote: Date the quote was produced, customer information, a job description, the number of days required to complete the job, a basic idea of what stock will be needed and an estimated price of the job.

**Q2.** Enable the user to delete a quote once the booking is finalised.

**Success Criteria:** Allows the user to remove a quote from the system and for the information to be deleted from the text file.

**Q3.** Allow the user to change information on the quote including the estimated price and the number of days required.

**Success Criteria:** Allows the user to change the number of days and the price quoted which is then saved to the permanent text file.

**Q4.** Enable the user to search for a specific quote using quote reference or customer name.

**Success Criteria:** Allow the user to search for a quote producing a list including the customer reference, the basic stock required and the estimated price of the job.

**Q5.** Produce a calculation for the quote taking into account current stock prices, labour costs, number of days worked and mileage.

**Success Criteria:** Allow the system to calculate the cost of the quote and then show the cost in an easy-to-read table breaking down the cost and including the VAT.

**Q6.** Validate all quote information upon entry.

**Success Criteria:** Validate the date entered and the price using a format check, producing an error message if incorrect.

**Q7.** Ensure all information saved is backed up.

**Success Criteria:** In the user interface provide a menu option to back up data stored in the text files.

**Q8.** Allow all information stored in the file to be recovered.

**Success Criteria:** In the user interface provide a menu option under the administrator to recover data stored in the text files.

**Stock:**

**SK1.** Allow the user to add additional stock to a permanent file including information such as: colour of paint, type of paint, volume of can, price and quantity.

**Success Criteria:** A permanent text-based file that stores the following information on the stock: colour of paint, type of paint, volume of can, price and quantity.

**SK2.** Allow the user to delete stock from the system if it is no longer required or is no longer sold.

**Success Criteria:** Allows the user to remove stock from the system and for all the information related to be deleted from the text file.

**SK3.** Allow the user to change the price and quantity of the stock.

Success Criteria: Allows the user to change the price and quantity of the stock which is then saved to the permanent text file.

SK4. Enable the user to search for stock using stock ID to display information.

Success Criteria: Allow the user to search for stock producing a list including the colour, price, and quantity.

SK5. Enable the user to sort stock quantities from low to high.

Success Criteria: A list of stock with increasing quantities will be shown on screen displaying the stock id and the actual level of stock.

SK6. Produce a message when stock quantities drop to a specific level.

Success Criteria: Allow the system to determine when stock quantity drops to a specific point and produce a message to alert the user.

SK6. Ensure information entered is validated.

Success Criteria: Validate the price using a format check, producing an error message if incorrect.

SK7. Ensure all information saved is backed up.

Success Criteria: In the user interface provide a menu option to back up data stored in the text files.

SK8. Allow all information stored in the file to be recovered.

Success Criteria: In the user interface provide a menu option under the administrator to recover data stored in the text files.

#### Scheduling:

SH1. Allow the user to add a new booking to the schedule including: Customer information and the start date of the job and stores this in a permanent text file.

Success Criteria: A permanent text-based file that stores the following information in the schedule: customer information and the starting date of the job.

SH2. Allow only those with the highest access to change information such as date of the job.

Success Criteria: Allows the user to change the date of the job which is then saved to the permanent text file.

SH3. Enable only those with the highest access to delete information such as a cancelled booking.

Success Criteria: Allows the user to delete a booking from the system and for all the information related to be deleted from the text file.

SH4. Include validation on the new information which is entered including the date.

Success Criteria: Validate the start date using a format check, producing an error message if incorrect. Also include validation on the quote reference entered to check it exists on the system.

SH5. Ensure there is hierarchical access with levels of access of the administrator and the members of staff below.

Success Criteria: Include levels of access with level 1 being dedicated to the administrator to backup data. Level 2 will be for staff members who have the authority to edit the schedule and then level 3 will be for the staff with limited access who can only view.

SH6. Ensure all information saved is backed up.

Success Criteria: In the user interface provide a menu option to back up data stored in the text files.

SH7. Allow all information stored in the file to be recovered.

Success Criteria: In the user interface provide a menu option under the administrator to recover data stored in the text files.

Invoices:

I1. Allow the user to add a new invoice to the system storing this in a permanent text file including the following information: Customer information, Date of the job, Description of the job and a new price.

Success Criteria: A permanent text-based file that stores the Customer information, Date of the job, Description of the job and a new price.

I2. Allow the user to be able to change information including date of the job and whether the job has been paid for.

Success Criteria: Allows the user to change the date of the job and to be able to edit when the invoice has been paid which is then saved to the permanent text file.

I3. Allow the user to delete an invoice from the system once it is no longer needed and the job has been paid.

Success Criteria: Allows the user to delete an invoice from the system and for all the information related to be deleted from the text file.

I4. Produce a multistage calculation for the invoice taking into account: number of days worked, mileage costs, current stock costs and labour costs.

Success Criteria: Allow the system to calculate the cost of the quote and then show the cost in an easy-to-read table breaking down the cost and including the VAT.

I5. Enable the user to be able to search for an invoice by reference.

Success Criteria: Allow the user to search for an invoice producing a list including the customer's reference, price, and dates of the job.

I6. Enable the user to be able to search for paid or unpaid invoices.

Success Criteria: Allow the user to search for an invoice producing a list including the customer reference and whether the invoice has been paid.

I7. Ensure there is validation in place for all information entered excluding the description of the job.

Success Criteria: Validate the date and price using a format check, producing an error message if incorrect.

I8. Ensure all information saved is backed up.

Success Criteria: In the user interface provide a menu option to back up data stored in the text files.

I9. Allow all information stored in the file to be recovered.

Success Criteria: In the user interface provide a menu option under the administrator to recover data stored in the text files.