A2 COMPUTER SCIENCE COURSEWORK: INVESTIGATION

CAMERON McKIMM

WJEC UNIT 5

Contents

A2 Computer Science Coursework

Section 2: Investigation

Discussion

For the nature described in **Section 1**, I will be conducting research about Hastings Hotels and how they use their current system. My current understanding is that the company uses an **Off-the-shelf (OTS)** software solution which satisfies all of their demands and needs. As referred to in Section 1, this software is under the name of **Visual One.** It has been designed as a "generic" solution to cater multiple companies', this ensures they have good profit margin.

My solution will be tailored to be a piece of **Bespoke** Software compared to that of the current **OTS** system. I have decided to focus on a bespoke solution as it will comfortably fit into the working environment of my client. This means that there will not necessarily have to be any training for the majority of users. For the administrator side, some training would not hurt. If I was to create an OTS system, it would leave a vast majority of users in need of training to effectively and efficiently use the system. This is because some users may not ever use some functionality included in the package that the OTS system offers (an example of a stakeholder that might fall under this bracket could be a Cleaner).

In order to collect proficient data, I intend to complete an interview and a shadow/observation session. I believe these will be the most effective ways of collating data about the current system, to find out how various users/stakeholders utilise all of the tools it provides. Using the interview process allows for clarification of any idiosyncrasies found with system, it is not always the easiest to convey your point across in a questionnaire. This will also allow for a more personalised approach towards fact finding, thus, ensuring there will be a higher response rate rather than users being given a questionnaire and just not completing it (It's much more difficult to procrastinate from an interview compared to a questionnaire). However, this is more likely to be the slowest way to collect data. Furthermore, respondents who prefer anonymity may be inhibited by a personal approach. In regard to the Observation, the setting will be a more natural and flexible environment for the observee. It will also allow me (as the evaluator) to actively participate or observe passively. Conversely, the Hawthorne effect may occur (If a group is aware that they are being observed, it may result in "normal" behaviour being affected). Also, I as the evaluator have to have the required skills to understand and/or use parts of the system.

Investigation of the System

Luckily, my step-mother is one of the directors of Hastings Hotels, so organising an observation and interview process wasn't too difficult. The woman who was asked to help me on my fact-finding mission was called Michelle Press. She was a pleasant and very helpful person to meet. I initially conducted an interview before she logged onto the system. The following are the questions I asked Michelle during the interview process before I began to analyse the system:

1.   Q: Do you feel you have been given sufficient training to use Visual One? Or was the learning experience kinaesthetic?

     A: "Personally, I feel as if Visual One has been tolerable to work with. There are parts of the system which I would never use, but for the bits and pieces I need, they are pretty self-explanatory. I have received training to use the system, but it has been over a

number of training weekends. Our training is usually refreshed every 3 years to make sure we keep up to date with any changes or updates made to the system."

2. Q: Are there any particular parts of Visual One you like or don't like? If so, what are they and why?

    A: "I like the layout of events and details stored in the system, having a grid and table to view data makes sure I can see it clearly. I'm not too fond of being able to see the different features I can't access. If there is a part which I'm not allowed to access due to my pay-grade, I'd prefer not to see it as it will make the overall layout look less cluttered and more personal for my use."

3. Q: Are there any problems with the current system that stand out or are a bug-bearer to you and other staff?

    A: "It would probably have to be the speed of it. When I come in the mornings, it takes an absolute age for it to boot up. However, whilst I wait, it gives me time to take my first sip of coffee. Every cloud has a silver lining!"

Michelle kindly logged in to her computer and booted up Visual One. The first window that popped up gave a list of the seven hotels owned by the company (As shown in *Fig 1.1*). **Central Reservations** is based at **Stormont Hotel**, it is considered as the headquarters and is where the Directors and call centre are based.
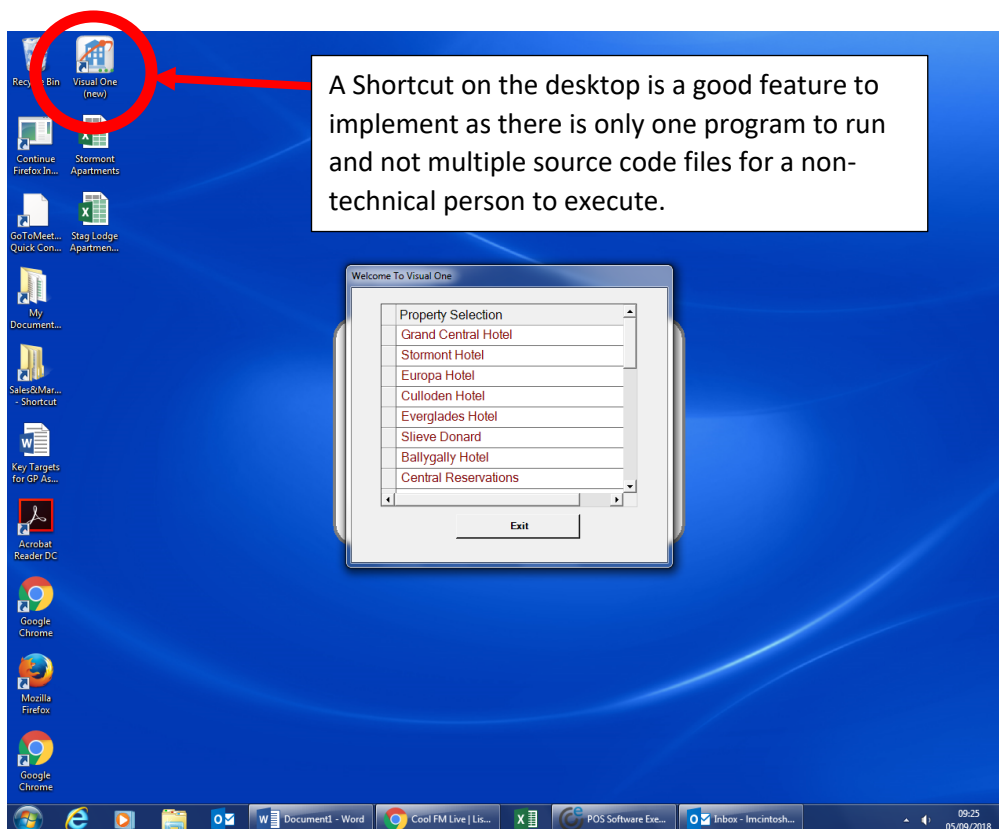

(Fig 1.1)

Proceeding this window, was the Login interface. It had a pretty bland interface (As shown in *Fig 1.2*). It allows the user to put in their relevant ID and corresponding password, and providing there is a match, it will grant the user access to the system based on their user access level. There are

methods of verification and validation put in place, so un-prying eyes aren't able to use/access a section (or more) of the system they do not have access to. I was made aware that the main methods of validation used in this Login Screen are: Presence Check (This ensures data exists in the entry fields); Format Check (This ensures data conforms to a set of rules defined by the system) and a Length Check (This checks the number of characters to make sure they do not go over a specific limit). This system stores its I.D.'s and Passwords in an encrypted format in a database so that any interception (or man in the middle attacks) would find it difficult to decipher the data.
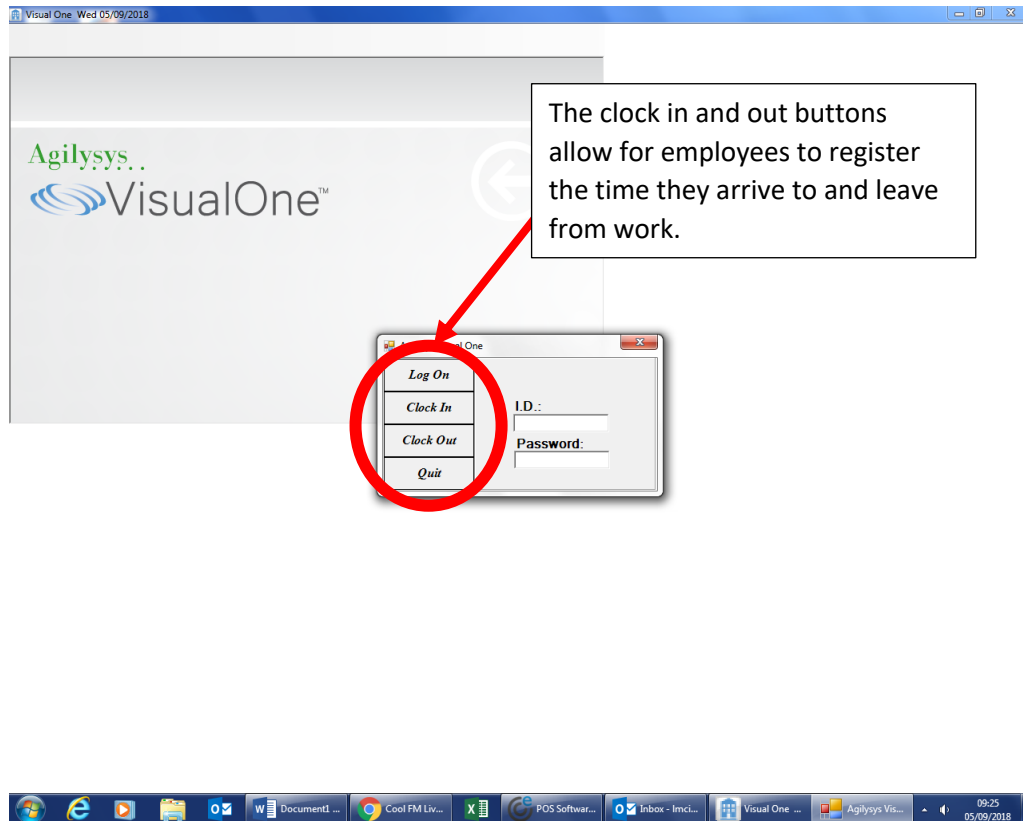

(Fig 1.2)

Once a user has successfully logged in, the following window opens (As shown in *Fig 1.3*). The first eye-catching section you notice is the Staff Reader Board. It has 8 sections for any notes staff may use. The Directions section is shown in *Fig 1.3*, and it has some statements related to the hotel chosen before login, that a customer may need to know whilst talking to staff.
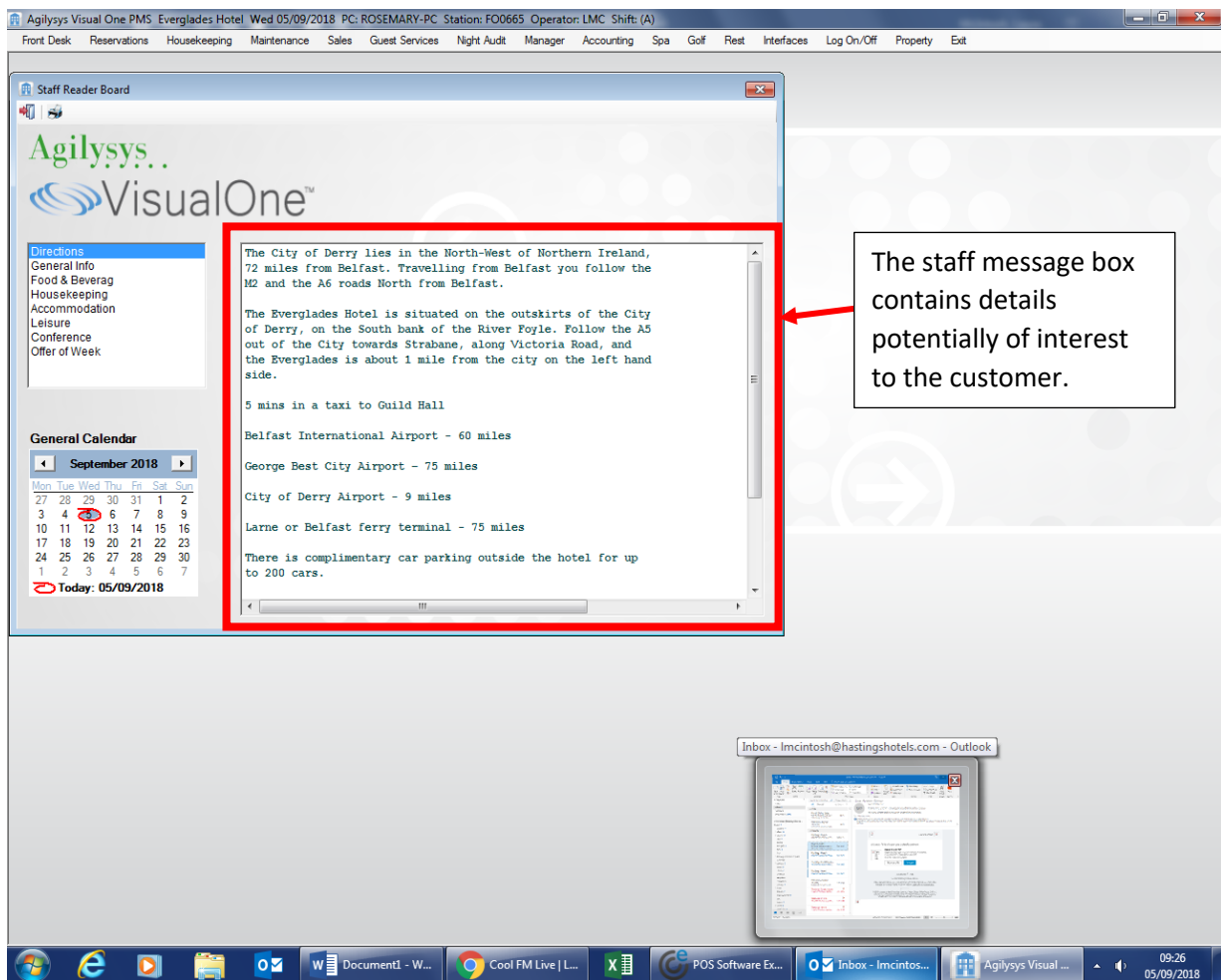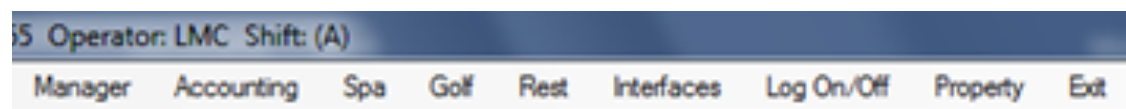
(Fig 1.3)

Notice in **Fig 1.3** at the very top of the screen there are a lot of tabs (As shown in **Fig 1.4 and Fig 1.5**). They let the user access a particular department within the company. Depending on your access level, you may or not be able to access these.
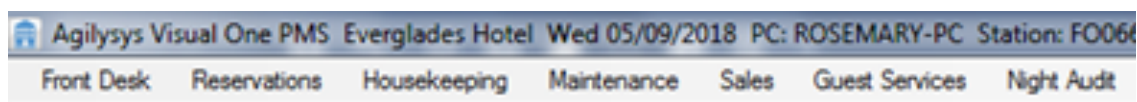
(Fig 1.4)

(Fig 1.5)

In **Fig 1.4** there is the first tab of "Front Desk", this is a section of the system designed for the employees working at the front desk. This section will give them access to the majority of what goes on within the hotel, if you work at the front desk, you are involved with most departments across the company. Due to User Access levels (from the stakeholders I listed in my Discussion Section 1), only Receptionists and Directors can access this feature. Thus, preventing Managers and Cleaners from viewing this section.

The next tab is the "Reservations" section. This is designed to show the events/bookings of rooms to the user. It provides a tabular interface listing the correct information for that particular event. Say for example, there is an Elvis Presley Tribute Act performing in the Gala Ball, then customers are invited to purchase tickets for one of the performance nights. This allows for a systematic output to view, create, edit and delete data within that section.

Next up is the "Housekeeping" section, it is specifically for the Cleaner Stakeholder. It gives them the opportunity to view their jobs for the day and to discuss if there are any problems that need to be rectified. Additionally, it shows them what rooms have a high priority of "turnover" (Turnover meaning that the room is one of the following: Cleaned, Style Change or even Upgraded).

The "Maintenance" tab is also designed for the Cleaner Stakeholders/Maintenance team. It outlines a list of the property problems rather than room specific problems. So, if a pipe has burst, if something has been broken or some other sort of damage needs fixing, this is the section where it is discussed and made sure to be fixed as soon as possible to ensure a healthy and *drama-free* stay for the customer.

Proceeding that tab is the "Sales" tab. It allows the sales team at Central Reservations to look at the various properties owned by the company and see which hotel is falling below its targets or not exceeding their targets. It allows the sales team to really encourage the hotels to put different measures in places to ensure an exponential growth in the profit margin. Thus, it provides statistics and graphs for the various budgets and spending allowances for each property.

The "Guest Services" tab, is the section for any extras needed/wanted by the customer or for any special requirements to be documented. For example, if a customer wants an extra pillow, then it will be documented in this section. However, say for example, there is a customer with a wheelchair, and they need help with bags or just help in general, then it is documented in this section so all relevant parties are aware of the special needs of the customer. This section can be accessed by all stakeholders listed in my Discussion section, but the only stakeholders able to create, edit and delete special arrangements are the Directors, Receptionists and Managers.

Following on from that, is the "Night Audit" section. It is specifically designed for those employees on a night shift. It lists the business of the day and any jobs that need to be completed before the day shift employees begin. It further outlines any special needs/requirements of any relevant customer that the night shift may have to deal with. This just ensures that the staff are prepared for any event that may occur.

In **(Fig 1.5)**, there is the "Manager" section. It allows the Managerial Stakeholders to delegate duties for the day. This will also outline how their hotel is performing in regard to their targets. Deductions or Additions to features or staff members will be made upon the decision of this section from the Manager.

Following on from that, there is the "Accounting" section. This allows the relevant stakeholders to view the budget for their hotel and spending rates alongside that. Having this function ensures that the higher up stakeholders (i.e. Directors) know where their money is being spent, how much is being spent and if it is actually worth the money to spend on a particular product or service. So, the likelihood of any "loss" or "misplacement" of money or assets is drastically minimised.

The "Spa" and "Golf" sections are relevant to only the corresponding hotel, as not all of the hotels have one or both of these facilities. They just talk about who is booked in to the relevant luxury and allow for a view of use for the Managers, to see if these luxuries are being properly utilised.

The "Rest" section is alike the "Spa" and "Golf" sections in terms of size – it is a small section. It simply states if there are any staff members that are off work due to an illness or are off work for some other reason. Details of which are documented in this section. This is usually accessible by the Managers and Directors.

Furthermore, the "Interfaces" section just allows for the current user of the system to change into another hotel's interface providing they meet the relevant user access level requirements. Don't confuse this section with the "Properties" section, as this allows for scope of productiveness across the various properties for the Managers, as they can relate to how their own performance is (as a manager) for their property alongside the other managers.

The "Logon/off" and "Exit" sections do exactly what they say on the tin. They allow the user to close the window or just log off completely.

The next screen that we are greeted with is the "Room Availability" screen (As shown in *Fig 1.6*). It is a page in which the user can view the general availability in one of the seven hotels. It shows the data in a very "Excel" layout. Having this tabular structure makes it easier to acquire information from the data. It also has a plethora of options and filters which can be utilised to acquire the correct amount, quality and quantity of information. Noticeable features that catch my eye are: the records can be displayed by date; shows how many rooms are available and not available; shows what particular rooms are popular on those dates and finally, the "Calculate Packages" button (located just to right of the centre of *Fig 1.6*).
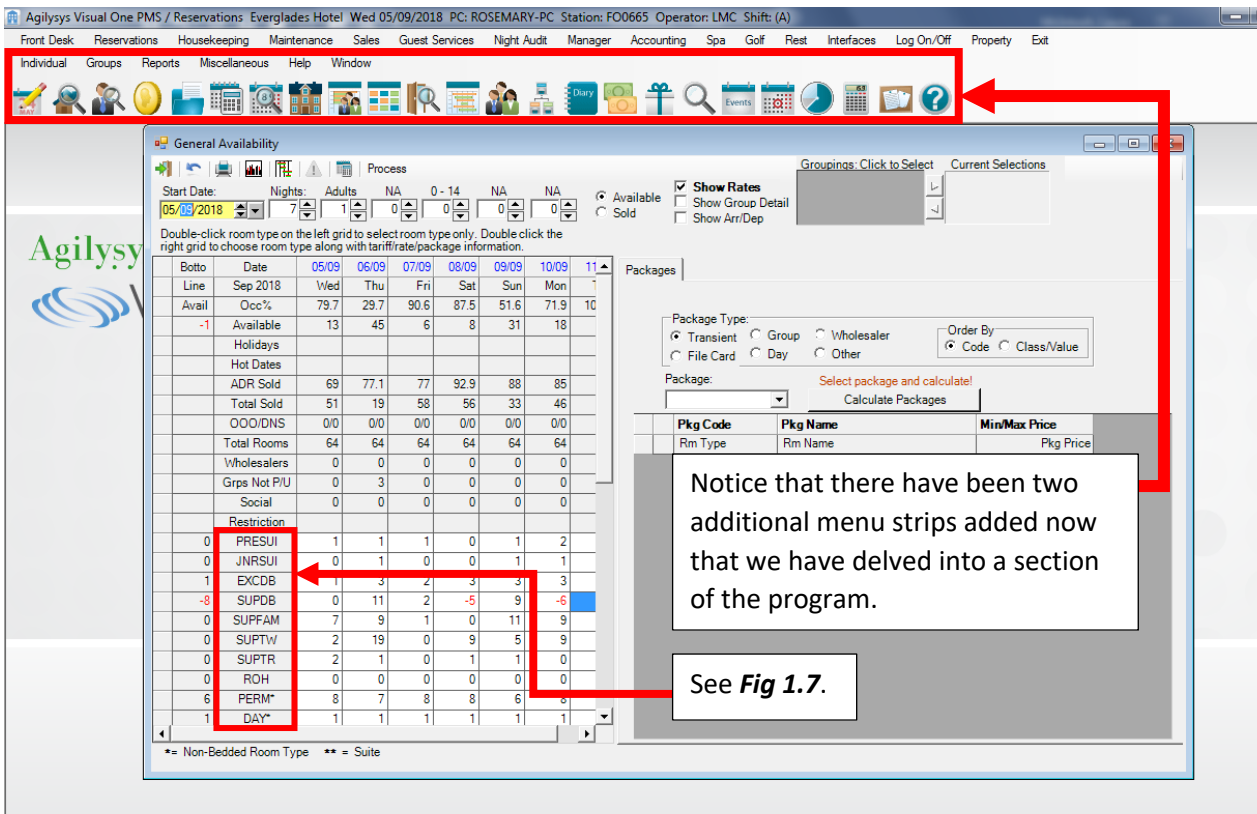
(Fig 1.6)

The next photograph (*Fig 1.7*) shows just an iota of the rooms that Hastings Hotels provide. From this snapshot, we can see that each room has been abbreviated. It has been put in this format for a few reasons: Having smaller labels (Or in this case, labels that don't exceed six characters) will

decrease the amount of wasted space in the database and server(s) where all of their data has been stored; it will also help maintain efficiency if not increase efficiency. Finally, it is a quicker way for the user to read data when it is in an abbreviated format. Furthermore, notice that there is a column of integers just to the left of these labels. This shows the current status of how many rooms are available for that particular hotel for that particular room. Most of these integers are positive, however, "SUPDB" (Also known as Super Double) has the value of -8, this means that there has been an over booking of 8 guests. In order to deal with this situation, the hotel may offer an upgrade to one of the suites. The decision on how this overbooking will be dealt with, will be up to the managers of that hotel.

0	PRESUI
0	JNRSUI
1	EXCDB
-8	SUPDB
0	SUPFAM
0	SUPTW
0	SUPTR
0	ROH
6	PERM*
1	DAY*

(Fig 1.7)

Following on from this, Michelle showed me the "Guest Search" screen (As shown in *Fig 1.8*). This screen is specifically designed to allow the user to search their database with more than 40 different options to filter their guests by. In their table it specifies the room number first, before any other field. This is useful information when quickly trying to find where a guest may be. This type of interface includes check buttons, radio buttons, entry boxes and drop-down menus. Having these different methods put in place make an easier inputting experience for the user. It also adds a slice of validation, for example, with the drop-down menus a user can only select syntactically correct data to input.

(Fig 1.8)

Whilst on the "Guest Search" screen, the user can select a guest and bring up this next screen (As shown in *Fig 1.9*). This is the "Guest's Stay Record" screen, and holds the metadata about the guest in question. This allows the user to view any and all history of the guest in question. This means that if the guest decides to make another visit to the hotel after their initial stay, their data will not have to be input into the system from scratch again. Also, if any existing details need updating, they can be done so here. As you can see in *Fig 1.9*, there is a multitude of options that the user can use. It could almost be said that the screen is a little too cluttered, however, this does allow for a lot of changes to be made if necessary, lots of data to be viewed and also for the user to see what certain customers are spending with the company (this could determine if they receive a discount of some description).

(Fig 1.9)

Finally, the last screen I was shown by Michelle is pictured in *Fig 1.10*. This is the "Events Availability" screen, or as it is officially titled the "Function Book". This screen permits the operator to view past, present and future events in and around the hotel that what was chosen before login to the system. As you can see in *Fig 1.10*, there is a lack of text entry boxes, and this is to ensure that the program is robust and won't have to unnecessarily validate a text entry field when a dropdown menu can be put in its place, having a dropdown menu, ensures that only data which is considered to be "errorless" can be utilised by the system. Furthermore, having the events themselves highlighted in the table, makes it easier for the user to find bits of data.
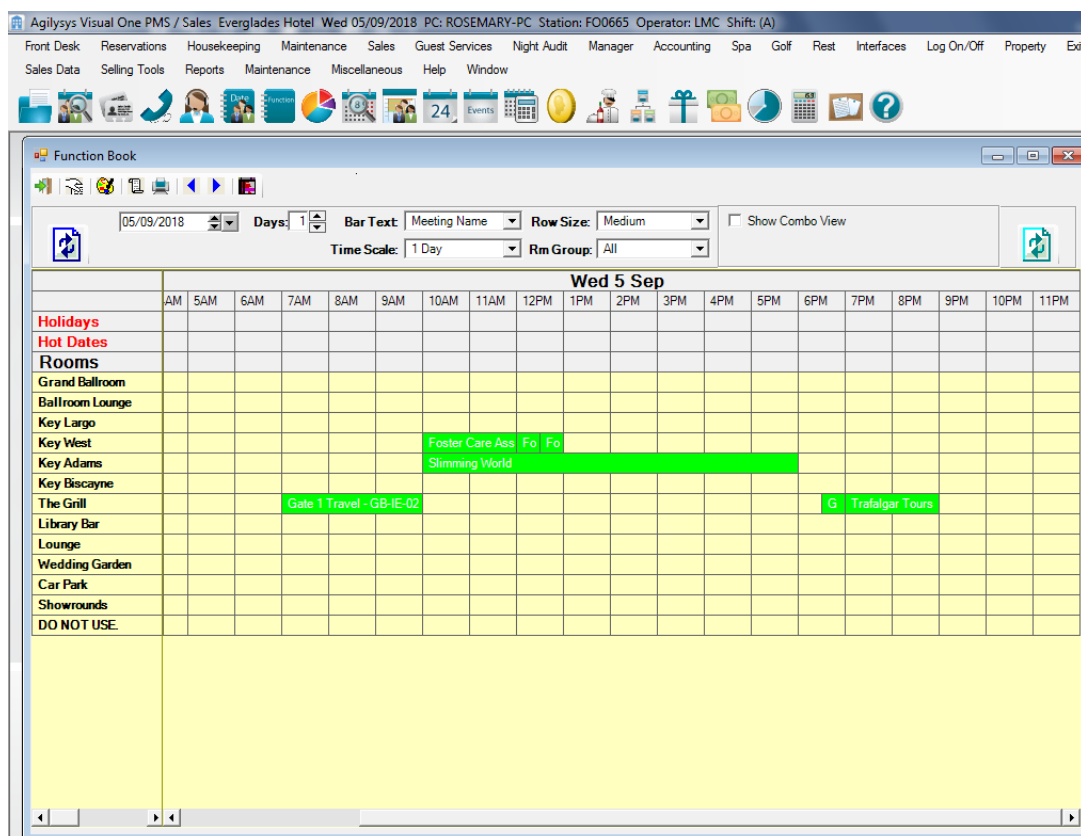
(Fig 1.10)

Evaluation of Visual One Interaction

First and foremost, I would like to thank Michelle Press for taking the time out of her busy schedule to talk to me. Overall, I think it would be unrealistic for me to try and attempt to replicate this system, function for function, by myself with regards to the limited time I have to complete this project. However, I feel like I could make a really good stab at planning, building and evaluating a system of my own to fulfil the core responsibilities that Visual One already satisfies.

It has an utterly enormous scope in terms of functionality as shown in *Figures 1 → 10*. Thus, depending on your access level, you may need more or less training compared to the rest of your work colleagues. For example, a Director will need much more training for the system compared to a Cleaner. This is due to the amount of variance in functionality. Fundamentally, a Director will have more access rights compared to that of a Cleaner. This means that training would need to be organised accordingly. Having time *"off"* of work will mean that staff will have to take their training during slow periods around the hotels (For example, it would be a pretty bad idea to have a shortage of staff members around Christmas time due to the high demand of the season). However, once they have received the training, it will enable the staff to use the system more efficiently and effectively, especially if there are updates made to the system. This will hopefully correlate to an increased profit margin as customers will find the staff's speedy services of high quality.

The plethora of inputs would take a while to go through them all individually, however, I will attempt to try my best. With regards to customer input, the system user has the ability (depending on their access level) to enter a lot of data into the system. If I refer back to the Guest Search Screen or otherwise known as the Guest's Stay Record Screen in *Fig 1.9*, you can clearly see the number of

inputs available to the user. This allows for important and niche data about the user to be put in. As I mentioned in my description of *Fig 1.9* in the Investigation of the System section, it allows the user to view any and all history of the guest in question regarding their stay(s) in any of the Hastings Hotels. The interface has a systematic layout, but it still looks a bit cluttered due to the sheer amount of entry widgets. To the untrained eye it could look menacing or intimidating, nevertheless the entry widgets allow the user to perform very specific searches or even give the ability to utilise other specified functions. The Inputs/Processes/Outputs are based alongside each stakeholder (As I mentioned in the Discussion Section, there is a similarity to the specification points for each stakeholder):

Directors –

i.   Will have the most functionality out of all staff members.
ii.   Will be able to create, edit and delete all aspects of the system i.e. Rooms, Customer details, Bookings etc.
iii.   Will be able to view all details of Customers, Staff, Bookings and Properties.
iv.   Will be able to help reconcile a problem with the chunk of software they are able to access. There is also a dedicated "Help" team for all of Visual One's customers that work as a 24/7 service. The Help team can also remotely access the user's computer from their *"Streaming Service"*.

Managers –

i.   Will have a good majority of functionality but not all of it.
ii.   Will be able to create, edit and delete most aspects of the system i.e. Rooms, Customer details, Bookings etc.
iii.   Will be able to manage staff's details i.e. Current Salary, their position within the group, get a scope with what staff members are assigned to help out at different events, et cetera.
iv.   Will be able to view most details of Customers, Staff and Properties. However, not all details are available for them to look at. The data which is censored is dependent on the data subject.

Receptionists –

i.   Will have a fair amount of functionality around the system.
ii.   Will be able to create, edit and delete most aspects of the system i.e. Rooms, Customer details, Bookings etc.
iii.   Will be able to view most details of Customers, Staff and Properties. However, not all details are available for them to view.

Cleaners –

i.   Will have the least amount of functionality.
ii.   They will only be able to view bookings of rooms: as to know when it has to be immaculate for the new customer.
iii.   Will receive notifications about which rooms have a priority turn over (This could be for a VIP or even for an early check-in from a new customer) and about which rooms need to be cleaned in general for that day.

The common way data is processed through Visual One, is usually "In-house". This simply means that the majority of any data is dealt with on the computer the system is being ran on. Once these processes have completed, they are sent to the server which is maintained by a dedicated IT department from Hotel-to-Hotel. Each hotel has its own server which can be accessed from the relevant stakeholders i.e. Directors and Managers. Having this structure allows for traffic of data to not slow the rest of the network at a drastic rate. This ensures that when a user wants to access data, it is output in a prompt fashion. This also allows for each Hotel's IT department to make regular

backups of data on a daily basis. However, there is also an automatic backup that happens daily on the server. This is put in place as a "fail-safe" in case the IT department fails to make their daily backups or if there are any other preventative measures that would stop them from doing their job.

Furthermore, sensitive data such as passwords, personal details or other, are either stored in an encrypted way or sent to and from the server in an encrypted packet. Quite recent work has allowed the hotels to make an investment into incorporating end-to-end encryption to their system. This is in correlation to the GDPR Act of 25th May 2018. There are a lot of drop-down menus for a reason. The reason being is that if the system can give the user a variety of valid input statements, then there is a decrease in the likelihood of the system raising an error as generally there will only be valid data listed in the drop-down menus. For example, say there is a drop-down menu for date of birth (which **has** to be syntactically correct), this will allow for less validation to be implemented, saving the programmer time and saving the user the world of confusion if an error were to arise. Having this level of security and encryption available to staff and customer's personal or sensitive information is a shining star in terms of quality. It allows the hotel to guarantee that data is sent, received and handled with high levels of security. This is definitely a positive side of the system.

Due to the complexity of the system, it makes it difficult to point out any obvious drawbacks or limitation that the system has. From a day-to-day user's perspective (Michelle): "The limitations I seem to encounter are usually frustration with the speed of the system. When I arrive into work in the morning and turn the computer on, the system takes probably about a minute and a half to turn on. That may seem like no time at all, but when you are under pressure to get jobs done, then all of your time is vital. I would probably also pinpoint the way invoices have to be sent out. We usually send them out manually, however, if we had an automatic invoice, then it would save me and the rest of my staff a lot of time. In order to create an invoice, we have to find the guest's record card and see if they caused any damages that need paid for, if they ordered any extras and if what they actually booked into, whether that be the renting of a function/event room or whether they booked a room to stay in. Moreover, I don't like that I can see buttons that I'm not able to access due to my pay-grade. It's sort of like being shown a cake and you've been given a fork, but you are not able to eat it! So, I would prefer that the system was *more* specifically tailored to each level of staff member."

Functionality to be Implemented

In my solution to this, I intend to implement User Access Levels which customise the system for each stakeholder/staff member. This will ensure that there will be no temptation for other staff members to see sections of functionality which are not designed for their department. Having user access levels in place will enable the ability to restrict users from retrieving sensitive information. For example, if there are user rights/permissions for staff accounts, then they may be viewed/read-only by the manager, but they will not have the permission to edit this information.

i. The system should provide a login screen before access is permitted to the main system.
ii. The database to store usernames and passwords should be separate from the "main database".
iii. The usernames and passwords should be encrypted whilst stored in the database.
iv. There should be an option for the user to choose what hotel they would like to login to.
v. When a user attempts to login, they will be given a maximum of three attempts before they are booted out the login screen.
vi. Validation methods should be put in place for every entity, such as: Presence check; Length check; Format check and Character Check.

vii.   Incorrect or invalid data should prompt an error like a popup window.

viii.   The system will load the appropriate interface for the user according to their access level.

ix.   The system should provide an invoice/ bill of receipt to the customer once they have purchased a package or otherwise. This should be a soft copy – an email. If opted by the customer, a hard copy should also be generated.

x.   Once logged out, the user should be prompted to a login screen on request of access, and not given the right to view the previous session whether it was their session or not.

xi.   The system should run from an executable file to allow for ease of use. This means that the source/program code will not be able to be viewed.

xii.   The code should be recycled throughout. This means that there should be functions/methods which are able to incorporate lots of entities and are compatible with lots of commands compared to having lots of dedicated functions for one specific purpose.

Overall Purpose and Goal of the Project

The purpose of my attempting solution is to try to create a system which handles the core functionality of the current, but still allows for efficient use for stakeholders to complete their tasks that they are required to do. I am trying to make a less cluttered but functional solution. Giving Hastings Hotels a bespoke system will be more acquired/tuned to their company compared to that of the OTS system. This means that the system that I am aiming to build will not be beneficial for any other hoteliers, because the system will be built according to how Hastings Hotels operates. So, lots of functionality will not be available due to it either being unnecessary or simply unneeded. Any software which is built will be specific to this business' need and therefore will not be transferable to other companies or problems. Moreover, it may be in the customer's best interest that bespoke software is not transferable, as it may give them a competitive edge over their rivals.

Key Features and Improvements

The following list of broad aims summarise the key features and improvement within the proposed system.

i.   Shortcut will be implemented.
   a.   This shortcut on the desktop will also have the icon/logo of Hastings Hotels. This ensures that it catches the user's eye and is easy to run.
   b.   Having all code files as a single shortcut makes it easier for non-computer literate people to access, as they don't have to type any code to access the main program.

ii.   Simple Login Interface.
   a.   Will have an option to choose what hotel that the user would like to access.
   b.   Clean outlook as the initial window.
   c.   Buttons and entry widgets will be kept to a minimum unless necessary. This allows for an added "layer" of validation, as if there are less entry widgets, then it keeps human error to a minimum.
   d.   When a new user is being added to the system, double entry will have to be carried out for their username and password to ensure accuracy.

iii.   Admin interface will have all functionality.
   a.   See point ii.c.
   b.   "Normal" users will not have the problem of seeing buttons or toggles on their interface which they can't access, thus preventing frustration or misconduct.

      c.   Having an access level based system is the most ideal solution for a hotel structure.

      d.   There will be four stakeholders, so there will be four different access levels.

  iv.   Output Methods.

      a.   Customer outputs: Email and Letter (Print Out).

      b.   User outputs: Relevant to the specific window (For example, structured tables displaying data or calculations being made automatically upon data editing).

  v.   Encryption and Security.

      a.   Usernames and passwords will be encrypted in the database.

      b.   The username and password database (A.K.A Login Database), will be stored separately to the hotel database.

      c.   Sensitive information will not be displayed to eyes which don't have the relevant access level (For example, a cleaner won't be able to see the home address and bank account information of the guest's room that needs to be cleaned).

      d.   Type, Length, Format and Presence checks will be implemented throughout the system to ensure data integrity.

Stakeholders

The following is a list of the major stakeholders in the system: Director; Manager; Receptionist and Cleaner. This was talked about in my Discussion section. These four stakeholders each hold a "core" role in the system. This list covers each major department for the hotels, thus if I can cater for them, then the system should function in the day-to-day working environment just fine. Although, I want to ensure that the system works at as high an efficiency as possible. Having each stakeholder having a designated section will ensure efficient work is completed daily and if you have an efficient and effective team, then you will increase your profit. It's business.

Functional Requirements

Directors (Administrators) –

  i.   Will have the most functionality out of all staff members.

  ii.   Will be able to create, edit and delete all aspects of the system i.e. Rooms, Customer details, Bookings etc.

      a.   All aspects will be editable (this includes creating, deleting and editing) for this particular access level. It is an AAA (Access All Areas) type of account.

  iii.   Will be able to view all details of Customers, Staff and Properties.

      a.   No aspects will be encrypted or hidden from view for this particular access level. It is an AAA (Access All Areas) type of account.

  iv.   Will be able to help reconcile a problem with the chunk of software they are able to access.

Managers –

  i.   Will have a good majority of functionality but not all of it.

  ii.   Will be able to create, edit and delete most aspects of the system i.e. Rooms, Customer details, Bookings etc.

  iii.   Will be able to manage staff's details i.e. Current Salary, their position within the group, get a scope with what staff members are assigned to help out at different events, et cetera.

      a.   Won't be able to delete members of staff.

  iv.   Will be able to view most details of Customers, Staff and Properties. However, not all details are available for them to look at.

Receptionists –

  i.   Will have a fair amount of functionality around the system.

ii. Will be able to create, edit and delete most aspects of the system i.e. Rooms, Customer details, Bookings etc.

iii. Will be able to view most details of Customers, Staff and Properties. However, not all details are available for them to view.

iv. Will be able to quickly communicate with the other properties and book in a customer by being able to view other hotels booking reservations, thus preventing from losing a customer.

Cleaners –

i. Will have the least amount of functionality.

ii. They will only be able to view bookings of rooms: as to know when it has to be immaculate for the new customer.

Non-Functional Requirements

The system:

i. Will have a simplistic layout.

    a. Items for input or output will not be cluttered together.

ii. Will not take long to load.

iii. Will provide accurate output in a diagrammatic format.

iv. Will present the logo of Hastings Hotels to represent the bespoke nature of the system.

v. Will have different tab titles for the specific hotels logged into.

vi. Will cater for access levels. Functions will be added or removed according to the relevant level tied to the user.

vii. Access level can be changed by the Administrators.

viii. Will be located by single file to ran.

Methods of the Solution

I intend to go with a programming language I am comfortable with and have been programming in for a few years: **Python**. This is a high-level language in which I have experience in, thus, it should help me when I attempt to create a solution as I'm familiar with the libraries available, the syntax of the language and how to effectively write code. I hope this will give me an advantage as I am definitely fond of Python. Alongside this language, I will be taking use of the **Tkinter** library. This specific library will allow me to create a Graphical User Interface (GUI), which is useful due to this already being the setup which the current solution utilises, and that of which users are familiar with compared to a Command Line (CMD) Interface. If I didn't use this library, then I would have to make a CMD interface. This type of solution would not be as efficient as users would have to learn commands and some people struggle with that. Keeping it simple with a GUI is the best way forward.

Objectives

i. The system shall be accessible via a shortcut, rather than running program code files.

ii. The system shall provide a login interface.

    a. Username entry field will be provided with a label.

        i. Will be validated with a Presence check and that it is a valid username in the database.

    b. Password entry field will be provided with a label.

    i. Will be validated with a Presence check and that it matches the specific username that is input.

    ii. Characters will be hidden with a constant character. E.g. *

  c. Hotel Selection entry field will be provided with a label.

    i. Drop down menu will be provided to prevent user error.

  d. If the username is a valid username, the password matches the password of the username input and there is a hotel chosen, then the system will successfully login.

    i. If any of these conditions aren't true, then the system will throw the relevant error.

    ii. The system will only allow a maximum of 10 errors in the login interface before shutting down for security. However, once the system is reopened, the error count will reset.

    iii. If these conditions are true, then the relevant interface will load, and the login interface will close automatically.

iii. The system will provide relevant interfaces dependent upon access level.

  a. Access levels will have 4 types: 1; 2; 3 and 4.

    i. The types are Cleaner, Receptionist, Manager and Director (Administrator) respectively.

    ii. A user will have their access level tied to/linked to their username and password in a separate database to the main database.

    iii. Access levels can only be set by the Administrator. So, if someone gets a promotion, then the Directors of the company can only "authorise" this by adapting the user's account.

    iv. Each access level will determine the view of the interface or layout of the interface (4 different types, i.e. Functionality or $\pm$Buttons and Views).

  b. Each window or page will have a structured constant (Will have a similar layout).

    i. There will be a logo on each to represent the bespoke nature of this system.

    ii. There will be Entry fields and Drop-Down Menus to input data.

    iii. There will be a table to output lists of data.

    iv. There will be a symmetrical layout of buttons (Functioning as the "home" area).

    v. The relevant title will be provided at the top of the window to let you know: What hotel you've logged into and what department you are in.

    vi. There will be 5 areas to access: Staff; Customer; Room; Booking and Events.

iv. The system will accurately output data.

  a. There will be 3 types of output: Calculation; Email and Hard Copy (Print out/letter).

    i. Calculations will have specific roles for each department.

    ii. Calculations involving numbers (i.e. Prices), will be displayed to 2 decimal places.

    iii. Calculations involving rooms (i.e. Length of time in a room), will be displayed in integer formats.

    iv. Emails should be automatically generated with the relevant information and sent automatically or have the option to make a custom message and sent manually.

    v. Emails should include: Title/Subject; Greeting; Main Information and a signature.

      vi.   Hard Copies should provide similar information to the email (it is just an alternative option to notify people).

      vii.   Hard Copies should include: Hastings Hotels Logo; Sent From Address; Sent To Address; Title/Subject; Greeting; Main Information and a signature.

      viii.   Ideally, Hard Copies will be generated or made manually in a Word Document (file type: ".docx").

b.   Outputs should be accessible through a reports button.

      i.   This will be on each department/area specific page.

      ii.   Should be a bigger button than the others to catch the user's eye quickly.

c.   When data is added, edited or deleted and is also viewable to the user according to their access level, then a refresh button should be applied to update the output data on screen.

d.   There should be a dropdown menu to output dates.

      i.   This will ensure there are no validation errors due to user error using the wrong format of a date. (For example, "YYYY/MM/DD" would be acceptable. However, "YYYY.MM.DD", "MM-DD-YYYY" and a host of others would not be acceptable formats.

      ii.   This should allow the user to look at the present time, look into the past and look into the future, at the click of a button.

      iii.   Dates should be accurate to the Gregorian Calendar.

      iv.   Dates should take in consideration the days of the month and list them in a "Sunday to Saturday format".

      v.   Dates should also take into consideration leap years.

e.   Search functions should update the output table and remove any data from view (**NOT REMOVE DATA FROM THE DATABASE AND DISPLAY THOSE CHANGES**) that doesn't meet the specified search criteria.

f.   Placeholders should be implemented for entry fields.

      i.   Placeholders should automatically fill in entry widgets when left blank or invalid to the specific process occurring.

      ii.   Placeholders should be removed when clicked on, so that the placeholders aren't used "valid" data by the main system.

      iii.   Placeholders should have a different colour of character to the normal entry character colour, to help distinguish itself as a placeholder and not data to be entered.

g.   Labels should clearly identify what entry widgets are relating to.

h.   A "Logout" widget should be created which closes their main operations window and opens the login window automatically.

i.   A main window icon should be implemented to emphasise the bespoke nature of this solution. This will be an icon of the Hastings Hotels logo.