Analysis

Background

Towards the end of September, Mark Sweeney, an employee at East Belfast Mission (EBM), has approached some of our classmates, including myself, with a number of projects that his organization would find very beneficial. One such project is concerned with a system designed solely to manage external and internal room bookings on EBM premises.

East Belfast Mission is an organization setup in 1985 that engages in community development in the Newtownards Road area of Belfast. The organization employs approximately 100 people, and receives help from roughly 150 volunteers who support them in offering homeless support services, employment and benefit advice, as well as a place to worship. East Belfast Mission is also the home of the Skainos Project which is an urban regeneration project in inner East Belfast providing a shared space for community transformation and renewal. Skainos provides a wide range of low cost room hire and conference facilities. They are suitable for interviews, meetings, functions and training courses.

My main client and primary point of contact is Lynsey Subasi who is employed as an Administration Assistant at EBM. Ms Subasi shall assist me in the creation of the project by providing me with relevant, existing paperwork and documentation. She will also set out the rudimentary objectives of the project.

Problem definition and the current system

In order to find out the details of the system I am to create, I arranged an interview with Lynsey Subasi at East Belfast Mission.

During my first interview with Lynsey we discussed the current system and its drawbacks, however it was mostly focused on the procedure for processing bookings. Lynsey has also provided me with a copy of the documents used by the system.

The main problem that EBM has asked for my help with is their room bookings system. The current system relies on the use of a Microsoft Outlook calendar to store the bookings which need to contain all the necessary details about the customers. The system is designed to process both external bookings, and internal bookings, in other words bookings placed by employees of EBM. It should be stressed that internal bookings have no costs attached to them, with the exception of catering costs which would be subtracted from the budget of the client's department at EBM.

The customer must fill in a Room Bookings and Catering request form shown in **Figure 1.1,** which is to be returned to a member of EBM staff in charge of bookings. This part of the process may also involve the catering request form shown in **Figure 1.2** and the room hire price list in **Figure 1.3**.

The most important of the three forms is the Room Bookings and Catering Request form. The Room bookings form is split into four separate sections, three of which are for the client to complete and the last is for office use only. Beneath **Figure 1.1** are the four sections and their descriptions.

Skainos

Booking Ref: _____

__Proforma for Room Bookings & Catering requests.__

__Booking details__

Name of Room	
Date(s) of booking	
Time(s)	
Set up requirements for room	
Technical Assistance required Y/N	
Catering required Y/N	Catering form completed. Y/N Attached Y/N

__Booking contact__

Name of Company/ Charity etc	
Name of booking contact	
Telephone number	
Mobile telephone number	
Email address	
Full postal address	

__Invoicing details__

Name of Company/ Charity etc	
Name of invoicing contact	
Telephone number	
Mobile telephone number	
Email address for invoice	
Full postal address for Invoice (if different from above)	

__Costs   (For office use only)__

Price for room (Exc VAT)	
Hours of Technical Assistance required at £25.00 per hour (Exc VAT)	
Roaming Mics (Exc VAT)	
Catering price (Exc VAT)	

Name of Staff member taking booking: _____

Fire and evacuation procedures
on room doors:

Revised 09/05/2

Figure 1.1
Bookings & Catering Request form

The first section of the form is mostly concerned with the actual booking and it fields are:

Name of Room	This is the name of the room on-site
Date(s) of booking	The date of the bookings decided by the client
Time(s)	Time of the booking as requested by the client
Set up requirement for the room	This varies from client to client and can include things such as the number of chairs present in the room or the need for a microphone
Technical assistance required	Indicates whether or not the client requires extra assistance with microphones or projectors
Catering required	Indicates whether the customer requires catering (This requires a separate catering form which can be seen in **Figure 1.2** and will be discussed later)

The client's contact details are handled in this section and the necessary fields are as follows:

Name of Company/Charity	This is the name of the company or charity that the client is representing
Name of booking contact	The name of the client making the booking
Telephone number	The client's telephone number
Mobile telephone number	Client's mobile phone number
Email address	Email address of the client
Full postal address	Client's postal address

Invoicing details are used by the staff of East Belfast Mission to create invoices for the clients and may use the same information as the booking contact details given that the client requesting the booking is also the one to receive the invoice. If however that is not the case then the contact details of the individual who will receive it should be recorded here.

The last section on the booking requests form is concerned with the costs of the booking(s). It should be noted that this section is to be filled in by the appropriate staff at EBM and not by the client. All prices are excluding the Value Added Tax (VAT) which will be handled later on in the system.
The fields for this section are:

Price for room	This is the price of the room chosen by the client. The prices depends on whether it has been booked for a whole day or for a half-day. The rooms also have different rates which are dependent on the type of organization booking the room. The room costs and rates are discussed in full beneath **Figure 1.3**
Hours of technical assistance required	If applicable this is the number of hours of technical assistance that is needed by the client. The technical assistance is charged at £25 per hour at the moment.
Roaming Mics	The price for roaming microphones which can be rented out. The microphones are £30 each along with a returnable deposit of £50 at present.
Catering Price	The price of the catering can be obtained from a separate catering form shown in **Figure 1.2**

The completed form will also contain a booking reference on it along with the name of the staff member taking the booking. The booking reference is normally the initials of the room along with the date of the booking.

Optionally, the client may request on-site catering, provided by the "Refresh" café at East Belfast Mission. If the client requests catering along with their booking, they must fill out either the external or internal catering form. **Figure 1.2** shows the External Catering Form. The forms, both internal and external, are identical in that they contain the same fields and information, however the costs of an internal catering request will be forwarded on to the client's department. The catering must be booked at least 48 hours before the date specified in the booking.

The mandatory fields on the form include:

Name	Name of the individual requesting the catering service
Address (1)	Primary contact address of the client or organization
Address (2)	The client's secondary address if applicable
Town	Town or City where the client or their organization resides
Postcode	Client's Postcode
Venue	The venue specified on the booking form
Date	The date
Time	Time of the booking
PO Number	Purchase order number if applicable
Number of people in your party	This is the number of people being catered for

The rest of the catering form is comprised of a list of available food and drinks options along with their prices. All food and drinks incur a 20% VAT charge. The client has the ability to pick which items should be provided and their quantity. The form also gives the client the power to choose when the ordered items should arrive during their booking. For example if the booking stretches from 10am to 3pm, the client could request the food to be delivered to the venue at 1pm. Furthermore the client can choose which items should arrive at the specified delivery times. If the ordered items are to be delivered all at the one time then this section should remain blank. The total cost of the catering service will be added to the cost of the room hire.

refresh
A social economy project of East Belfast Mission

Function booking form 2014

External invoiced catering only. Please ensure this form is fully completed

ALL CATERING MUST BE BOOKED 48Hrs IN ADVANCE

All food and drinks will incur a 20% VAT charge

Name:	Venue:
Address (1):	Date:
Address (2):	Time:
Town:	PO Number (if applicable)
Postcode:	Number of people in your party:

Drinks	Per Unit	Required	Price	VAT 20%	Total	
Flask of tea (13 Cups)	£5		£0.00	£0.00	£0.00	In the interest of Health & safety we cannot allow our clients to bring their own food.
Flask of coffee (13 Cups)	£5		£0.00	£0.00	£0.00	
Jug pure orange (8 Cups)	£6		£0.00	£0.00	£0.00	
Jug diluting juice (8 Cups)	£2		£0.00	£0.00	£0.00	
Handy Treats	**Per Person**					Our café uses nuts, wheat, dairy and other products which may cause allergic reactions. If you have any concerns please speak to a member of staff
Selection of Homemade Scones	£0.70		£0.00	£0.00	£0.00	
Homemade Tray bakes	£0.70		£0.00	£0.00	£0.00	
Selection of biscuits	£0.30		£0.00	£0.00	£0.00	
Breakfast						
4" Bap Bacon/sausage mix	£1.75		£0.00	£0.00	£0.00	
Breakfast On A Stick	£3.50		£0.00	£0.00	£0.00	
Fresh Fruit salad & natural Yogurt	£1.95		£0.00	£0.00	£0.00	
Lunch & Finger food						If you require any special meals, Coeliac, lactose, Halal or Vegan please write your request in the notes section
Homemade soup	£1.50		£0.00	£0.00	£0.00	
Bread Selection	£0.60		£0.00	£0.00	£0.00	
Selection of sandwiches	£2.25		£0.00	£0.00	£0.00	
Hot finger food						If you require something that is not listed on this function sheet please ask as we can accommodate most requests
Mini Quiche (V) (1pc)	£1.20		£0.00	£0.00	£0.00	
Piri Piri chicken goujons (3pc)	£1.55		£0.00	£0.00	£0.00	
Cocktail sausage (4pc)	£0.75		£0.00	£0.00	£0.00	
Mini sausage rolls (3pc)	£0.85		£0.00	£0.00	£0.00	
potato Wedges (V) (8pc)	£0.85		£0.00	£0.00	£0.00	
Hot fork buffet (Min order 10)						
Red Thai chicken curry	£4.50		£0.00	£0.00	£0.00	Please be aware that alterations/cancellations to bookings within 24hrs of the event will be charged at any actual costs incurred by us. Exceptional circumstances will be considered.
Beef Goulash	£4.85		£0.00	£0.00	£0.00	
Deep dish Lasagna Beef or Vegetable	£4.50		£0.00	£0.00	£0.00	
Creamy Chicken, bacon & mushroom	£4.50		£0.00	£0.00	£0.00	
Honey Mustard Pork	£4.85		£0.00	£0.00	£0.00	
EXTRAS (for office use)						
			£0.00	£0.00	£0.00	
			£0.00	£0.00	£0.00	
			Price	Vat	TOTAL	
	TOTAL COST		£0.00	£0.00	£0.00	Email

Function food Timings break down

Michael.wilson@ebm.org.uk

REQUIRED ITEMS (if to be delivered all at once please leave blank)	Delivery Time

Notes

Figure 1.2
External Catering Form

Bookings can be separated into two different categories, Internal and External. Internal bookings involve the staff who work at EBM and all costs are forwarded onto their respective departments. Additionally internal bookings have access to other facilities at EBM which are not available to the public, these are known as the internal rooms. On the other hand, external bookings are only concerned with customers from outside of EBM and it is up them to cover the costs of any booking.

The price of external bookings depends on the nature of the organisation making the booking, the event and the location. The classifications are:

1. If you are a private individual, a voluntary or community organisation based in or working in East Belfast.
2. If you are a voluntary or community organisation NOT based in East Belfast.
3. If you are NOT a voluntary or community organisation NOR based in or working in East Belfast.

Figure 1.3 shows the pricing sheet for voluntary or community organisations not based in or working in East Belfast. The pricing sheet shows a list of all of the rooms available to external clients, along with the prices per each room. Each room has two prices one for a full day booking and one for a half-day booking. Whether the booking is counted as a half day or a full day depends on how long the booking is supposed to last. It is up to the judgement of the person processing the booking to decide which option is applicable in a given case.

voluntory in -NI or UK.

Skainos Room Hire VAC

Room	Seating Capacity					Voluntary and Community	
	Theatre	Board	Cabaret	Class	Open	Full Day	Half Day
Ground Floor							
Auditorium							
conference	230		120			£155 + Vat	£115 + Vat
performance	250		120				
Community Hall							
football							
basketball							
badminton							
conference	200		160			£140 + Vat	£100 + Vat
concert/perfo	250		160				
Skainos Centre					30		
IT Suite					15	£115 + Vat	£85 + Vat
Arts & Craft Room					20	£115 + Vat	£85 + Vat
Montrose	50	30	30	30	35	£115 + Vat	£85 + Vat
Baskin	65	40	50	50	70	£115 + Vat	£85 + Vat
Dance Studio					30	£115 + Vat	£100 + Vat
First Floor							
Seaforde	20	15	15	20	30	£90 + Vat	£65 + Vat
Belvoir	15	12	12	15	25	£90 + Vat	£85 + Vat
Mountforde	50	30	30	30	35	£115 + Vat	£85 + Vat
Beechfield (Board Room)		15				£115 + Vat	£85 + Vat
Second Floor							
Roof Terrace					35	£90 + Vat	£65 + Vat

Evening and weekend bookings may incur an extra cost of £11 per hour

Please be aware they will be a charge if a FM staff member has to stay on site for the event and work the AV equip. £25 per hour.

The roaming mikes cost £30 each and returnable £50 deposit

Please note there are only PA Systems in the Auditoruim and Community Hall

Figure 1.3
Room Hire Pricing Sheet

After all of the data is collected in from the clients it will be entered into a public calendar in Microsoft Outlook. The Accounting department will then use the data to create invoices for each customer. Once this is done nothing more will be done with the data and it will remain on the main server so that the details for each booking may be revisited. My contact at EBM has also mentioned that they would like to hold on to customer contact information so that they may forward them, the customer, details of events organized by EBM.

The current system has been proven to work for a number of years, however it has problems that make it difficult to use at times. The system itself can be slow as customer data and information concerning bookings has to be retrieved in batches, thereby decreasing productivity as each batch of data has to be analysed in order to find any useful information. Security is also a concern as all staff at can look at the hired rooms as the files are stored on a public folder on the server at EBM. Ms Subasi has also stated that the current system does not provide any statistics, therefore it is difficult to estimate how many people are being handled by the system every month. While it would be possible to provide this information by looking at the bookings in the Outlook calendar it would be a very difficult task, as the data in the calendar is only sorted by its date thus searching for a particular room would involve looking at each day of the month.

A great deal of the problems associated with the old system is due to the use of the Outlook calendar, therefore I plan to design a computerised system which could replace it. The system will still have to rely on information from all of the different forms but it will be designed solely to deal with processing the bookings and creating invoices. A new system should be able to address most of the problems outlined above and potentially help decrease the amount of time taken to process the bookings every day and hence increasing productivity.

Data Flow Diagram for current system
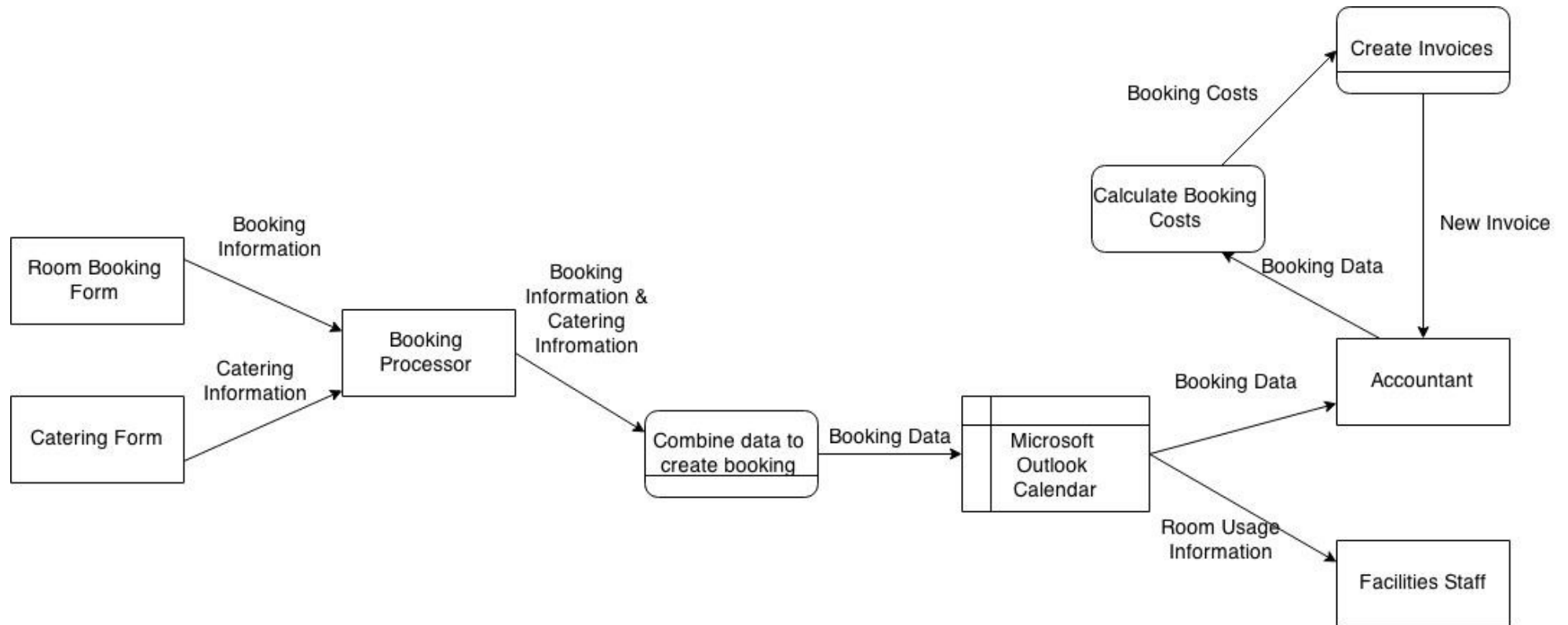
Identification of prospective users

The most important users and the ones with the most power are the "Administrators". These users have complete control over the system and are able to use any and all parts of the system unlike some other users. Their main purpose is to look after the system and manage its users, however, aside from managing the system, Administrators are also required to create bookings for customers wishing to hire a room.

Another important type of user is the "Bookings Processor". As the title suggests, this user's job is to process the bookings requested by the customer. This mainly involves collecting the booking and catering forms from the customer and entering data into the system so that details of the booking may be recorded. Based on the information contained on the forms they also decide the pricing rate.

The next category of users are the "Facilities Staff". Their job is to look after the actual rooms at EBM as well as set them up prior to any booking. In order to properly carry out their duties they need to have access to the system so that they can look up the layout of the rooms every day.

Finally the last type of user that is expected to make use of the system is the "Accountant". Their job is to create invoices for each booking meaning that they need to access customer contact details.

From my research into the system I learned that the system is likely to be used by a minimum of ten users from different categories.

User needs and acceptable limitations

Firstly, the administrators need to have access to the entire system and all of the files that will be used. The administrators will need to possess the highest access levels and the ability to add or remove users from the system or change their passwords. Moreover, the Administrator's high access level means that they are able to both edit and see the confidential customer data. Administrators must be provided with all of the tools necessary for them to effectively manage the system. As an additional feature the administrators should be provided access to a facility which will list some statistics about the system for example the number of bookings per month, or the most frequent customer.

Secondly, the booking processors need to have the ability to add new bookings to the system and to update and change the customer data when necessary. The system should provide the necessary computer interfaces that would allow them to do this. Some users have also requested that the system includes an email facility

that would allow them to send details about catering or room layout to other employees ,for example the staff at the Refresh café who need to be provided with the information regarding catering. While this is possible, it is uncertain whether or not this feature could actually be implemented and this mostly depends on the accessibility of the EBM email server. In the event that this feature cannot be implemented, the system will simply output a text file which could easily be transferred to the appropriate parties via email. Alternatively, the system could create a physical print out which can be handed to the catering staff. The access level of the booking processors should be lower than that of administrators meaning that they can access any part of the system that is not specifically for administrators. Their access level allows them to access customer details and edit them. Accountants need the system to be able to assist them in the creation of invoices, using the customer details and booking information. They should also be provided with a facility to print out bookings reports which contain the fine points of each booking. Accountants do not need to change customer data, therefore their access level will be lower than that of a booking processor.

Finally, the facilities staff need to be able to view a calendar containing the details for each booking. These details should only include the name of the customer and any information about the room itself, such as how the room should be prepared prior to the booking. In addition they should also be allowed to print a physical copy of the booking schedule detailing the resources required for each booking for that particular day. Facilities staff need not edit or even view customer details, thus they will possess the lowest access level and will not be allowed access to the system resources available to users with higher access levels. Furthermore, the facilities staff need to be able to print out a technical support report for each booking. This report should contain the details of the technical support required by the customer if it is required at all.

It is also vital that all users have access to an interface containing a calendar which they can use to look up past, present and future bookings.

Data Sources, Destinations and Data Volumes

The entirety of the data to be input into the system comes straight from the Bookings and Catering request form (**Figure 1.1**) and the Catering form (**Figure 1.2**). It is not uncommon for the old system to handle at least 30 bookings every day, hence the new system should also be prepared to handle this amount of data. This data is entered into the system where it can be processed, this involves working out the price of the booking and specifying any extra arrangements necessary for the booking. From that point on the data has a number of destinations.

Firstly, the customer and booking data is used to create invoices which will be sent to the customer via electronic or regular mail.

The next destination of the data is a print-out containing the booking schedule which is crucial to the facilities staff. This print-out may cover the bookings for each day and the frequency of its usage may vary from once a day to ten times a day,

particularly when a large amount of bookings have taken place or when a booking had its details updated.

Following on, another destination for the data is the bookings calendar which can be used to search for bookings taking place on a specified day. This is very likely to be the most commonly used part of the system and it is safe to assume that it will be used around 40 to 60 times every day. This calendar will be provided in an on-screen interface so that users may be able to interact with it. It should also be noted that the physical copy of the booking schedule for a particular day originates from this calendar as the interface holding it will also provide the user an option to print it. Another destination for the data is the catering report which can either be printed out or, alternatively, it can be sent via email to the catering staff.

The data from the system can also be used to create a technical support report which lists the necessary technical support for a certain booking.

The last destination of the data will be the usage report which details the basic statistics of the new room hire system. This report will be available as a physical document and as an on-screen document. The report is likely to be created once or twice a month as this period of time allows for enough data to accumulate and be used in the creation of reliable statistics.

Proposed System and System Objectives

In order to improve the shortcomings in the old system, I plan to create an application which will help automate some of the tasks that are currently handled by the old room hire system. The new system should be able to support multiple users and provide them with a secure username and password that will allow them access to the resources provided by the system. The new system will allow employees at EBM to transfer the data from the Bookings and External/Internal catering forms straight into the system so that the customer details may be processed. The application should provide an interface which will allow the employee to enter in the details of the customer along with the details of the booking, such as what room it will be taking place in or if the customer has chosen make use of the catering service. This data will be stored on the public server at EBM and some parts of it may need to be encrypted as the system is dealing with confidential data and hence leaving it in an unencrypted state could potentially be a security issue. The new system must also provide an interface which will allow my clients to quickly search for a customer and bring up their details. Moreover, it must cater for the facilities' staff at EBM, as they need to know the layout of the rooms every day so that they can be set up prior to each booking.

Furthermore, the new system needs to be able to create reports for the accounting department and daily reports for the bookings taking place in each room, these reports could then be sent via e-mail to the necessary parties. Reports detailing catering and technical support should also be made available to the users. The system could potentially send these documents by e-mail or simply place them in shared storage on the server so that they can be accessed when required. Additionally, it is essential that the system contains a facility for the creation of invoices. Lastly, the new system will provide usage statistics for each room such as which room is the most popular or the number of people making use of the rooms every month.

Below are the main objectives for my proposed system:

1. The system should be able to store a minimum of 15 user accounts which can be logged into without any errors.
2. The system should allow the users to create and store information of a minimum of 5000 bookings and be able to display in an on-screen interface in approximately 40 seconds. The data should be stored for at least 2 years before it will be archived.
3. The system should be able to create a usage report detailing common statistics recorded by the system such as the most popular room or the most frequent customer within a specific time frame.
4. Administrators should have the necessary facilities to manage their users. The system should allow them to add or delete users in less than 5 seconds.
5. The system should grant users different access levels depending on what they will be using the system for. The access levels govern what parts of the system the users can and cannot access.
6. The system should be able to create bookings, catering, and technical support reports in under 2 minutes.
7. Users with the sufficient access levels should be able to view, edit, add, and delete customer details using an appropriate interface.
8. The system should include a facility which allows users to search for a particular customer or booking and retrieve their information within 10 seconds.
9. The system should allow for the deleting or amending of bookings. In the event of a cancellation the system should allow the deletion of a booking if the customer has given at least 48 hours' notice.

Data Flow Diagram for proposed system
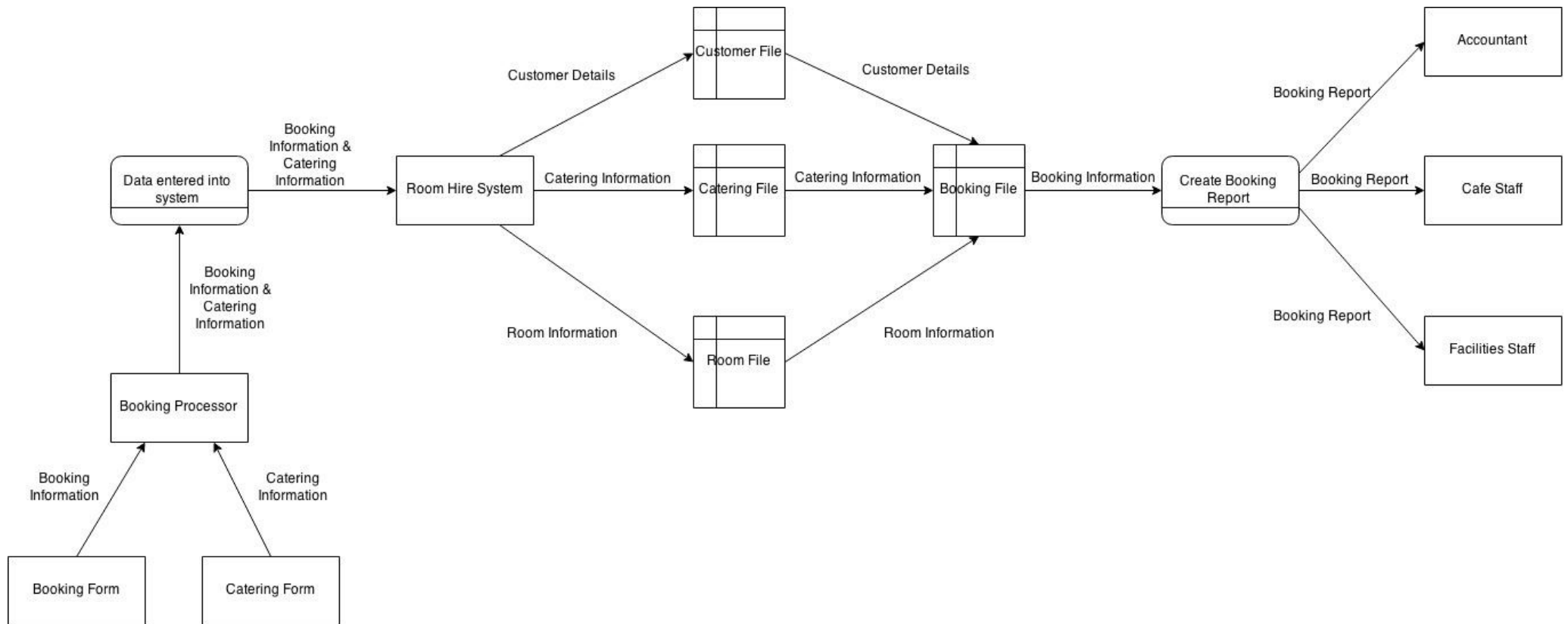
Realistic appraisal of the feasibility of potential solutions

For any problem there exist a finite number of solutions that can be used to rectify it. This holds true even for the problems present in the current room hire system. It is only reasonable to go over some of the possible solutions which could be implemented in order to solve these problems.

The first solution, and the easiest one to implement, is to keep making use of the current system but change some of the procedures associated with it in order to make the system more organized and productive. The current system itself is fully functional and can be used to carry out the tasks expected of it, furthermore, it would not require many extra resources or expenses to set up as it is already in use. This option, however, does not provide a solution to any of the flaws that the current system possesses and the users would have to run into the same problems that they have always had to deal with. So while this solution is easy to implement and does not have a cost attached to it, none of the problems associated with the current system will be fixed.

Another possibility is to use professionally made bespoke software that can be used to make bookings. An example of such software is the "Halls for hire" bookings system made by Avalon Software. This software package provides facilities that allow for the creation of bookings, invoices and for maintaining a customer database. The software can also be used to keep track of important data such as income and usage statistics. An advantage of this system is the reliability and stability of it as it has been tried and tested by professional software developers. The downside to using this program is its cost as a single user licence costs £475 and any additional licences cost £175. In order to cater for at least 10 users from the current system EBM would have to pay around £2000. This price does not cover the extra expenses that would come from any necessary technical support.

The final solution , and the one that I will use, is for me to create a computerised system, complete with a graphical user interface that can be used to create bookings and make invoices for customers. The system would be a form based, event driven application written entirely in Visual Basic .NET and would provide its users with all the necessary features that they require to successfully fulfil their job. To assist in the development of this system I shall use Microsoft Visual Studio 2013 which is an integrated development environment (IDE). The system will also be tailor made to suit the requirements set by EBM. The advantage of this method is that it will be done for free, thus meaning that no financial strain will be placed on the East Belfast Mission. The disadvantage of this method is that it is difficult to gauge the potential success of this project since it will not be created by an experienced software developer. This could eventually lead to the creation of a system which does not

meet the criteria set by the people commissioning this project i.e. East Belfast Mission.

Analysis Data Dictionary

The proposed system will make use of at least 9 files in order to store its data. Below is a basic description of all files along with their attributes.

Key: Example - Description
Booking ID – Primary Key
Item ID – Foreign key
Password – Normal Attribute

User File   [**User ID**, User Name , Password, Access Level, Active]
The user file shall store information about the users who will utilize the system

Customer File   [**Customer ID**, Customer Name, Telephone number, Mobile Phone Number ,Email Address, Postal Address, Post Code, Invoicing Contact Name, Invoicing Telephone number, Invoicing Mobile Phone Number, Invoicing Post Code , Oldest Booking Pointer , Active]
This file contains the information about the customers who have made a booking or plan on making one in the future. The file also contains a pointer to the oldest booking made by the customer.

Room File   [**Room ID**, Room Name, Extra Details, Active]
This file contains the room information for every single room that can be used for a booking. The "Active" states whether or not a room is available for bookings.

Catering File   [**Item ID** , Item Name , Price , Active]
The catering file contains the information about the food which can be provided for a booking

Customer Order File   [**Item ID**, Quantity , Delivery Time]
The customer order file holds all of the items that have been ordered for a particular booking. This file stores the ID of the item, the quantity of the item, and the time at which it should be delivered. Each booking has one of these files. The naming convention for these files is Order_**BookingID**.dat

Extra Requests File   [Extra Request]
This file holds any extra requests regarding the catering. This could be a request for an item which does not exist on the menu or a request detailing special dietary requirements. Each booking has one of these files. The naming convention for these files is Request_**BookingID**.dat

Room Setup File   [Room Layout, Microphones, Technical Support]
This file contains any details regarding the room layout for a booking, the number of microphones and details of any technical support that might be necessary. Each booking has one of these files. The naming convention for these files is Setup _**BookingID**.dat

Booking File   [**Booking ID**, **Room ID**, **Customer ID**, **User ID**, Reference , Date, Start Time, End Time , Customer Order File , Room Setup File, Extra Requests File, Active ,Next Booking]
The booking file stores all of the information about a particular booking. The "Next Booking" field stores the location of the next booking in the booking file that has been made by the same customer.

System Setup File   [Company Name , Resource Folder]
The Setup file contains the name of the company making use of the system and the location of the resource folder which stores all of the system files.