

# Exemplar Candidate Work

## **Applied GCE ICT**

OCR Applied GCE in ICT: H315

Unit G045: Software development - design

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# Introduction

This exemplar material serves as a general guide. It provides the following benefits to a teacher:

- Gives teachers an appreciation of the variety of work that can be produced for this unit
- Shows how the mark scheme has been applied by a senior assessor

It is important to make the point that the teacher support materials play a secondary role to the Specification itself. The Specification is the document on which assessment is based and specifies what content and skills need to be covered in delivering the course. At all times, therefore, this teacher support should be read in conjunction with the Specification. If clarification on a particular point is sought then that clarification should be found in the Specification itself.

# Moderator's Commentary

## G045 Software development - design

**Total mark for portfolio: 41 (Max. 50)**

This portfolio illustrates the work of a candidate who has described different tools and techniques used to analyse, design and investigate ICT systems, written a feasibility study which investigates different solutions and proposes the best one, drawn data flow diagrams which model the current system, presented a data structure for the proposed solution in the form of an entity relationship diagram and evaluated the success of the solution and their own performance during the unit. The portfolio is based around Bob who runs an agency that handles the bookings of bands for clubs and who requires a new system to assist with his work. The portfolio is well structured, with each task clearly defined and separated with a divider page, making it easy to follow and assess. The pages have been numbered electronically within tasks and a contents page provided at the front of the work.

### Task a

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Task a of this unit requires candidates to identify and describe tools and techniques which can be used during the analysis stage of software development. Sample tools and techniques are given on pages 46 and 47 of the course specification, although others may also be included. The explanations for mark band 3 may be in context with examples being given of how each tool / technique could be used when analysing a current system with the intent of designing new software to solve any problems.

Work for this task begins on page cw5 where the candidate lists 5 tools (data flow diagrams, rich picture diagrams, entity relationship diagrams, data dictionaries and system (data) flow charts), which can be used during the analysis stage. System flowcharts are included within this section. Normally these would appear within the design stage but the candidate has misidentified the tool and has actually meant "data flow charts" (these do not show any decisions and are a clear way of identifying input and outputs from a current system) which is acceptable. The work produced is of mark band 3 quality, with good descriptions of each tool and relative advantages and disadvantages included. The candidate has also provided good examples of how each tool / technique could be used for the analysis of a given scenario, although not in context of the assignment.

The award of mark band 3 can be justified, although explaining how the tools / techniques could be used in the context of the assignment would further demonstrate the candidate's understanding. It would also be nice to see some tools / techniques included which are not listed of the specification e.g. case tools although this is not essential.

**Mark Band 3**

**Mark Awarded: 4 (Max. 4)**

### Task b

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Task b of this unit requires candidates to identify and describe tools and techniques which can be used during the design stage of software development. Sample tools and techniques are given on pages 48 and 49 of the course specification, although others may also be included. The

explanations for mark band 3 may also be in context with examples being given of how each tool / technique could be used when designing software to solve an identified problem.

The work for this task begins on page cw17 and has been clearly separated from the work of other tasks with a clear heading and divider page - this is good practice as its clear to both the assessor and moderator which tools and techniques relate to which task. The candidate has correctly identified and written about 5 tools / techniques (Input Form Design, Decision trees, Pseudo Code, Flow Charts and Output Designs) which can be used to design software. There is, correctly, no overlap with the tools / techniques described in task a. At first glance the work produced seems to be of band 3 quality with good descriptions of each tool and relative advantages and disadvantages included, however the teacher's annotation indicates that there are omissions and the examples are not as well explained as those in task a, so mark band 2 should be awarded.

More explanation of the application of the tools / techniques would have allowed the candidates to achieve higher marks for this task. It would also be nice to see some tools / techniques included which are not listed of the specification, e.g. class diagrams although this is not essential.

**Mark Band 2**

**Mark Awarded: 3 (Max. 4)**

## Task c

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Task c of this unit requires candidates to identify and describe tools and techniques which can be used during the investigation stage of software development. Sample tools and techniques are given on pages 46 of the course specification, although others may also be included. The explanations for mark band 3 could also be in context with examples being given of how each tool / technique could be used to gather information about a current situation so analysis tools can be used.

The work for this task begins on page cw27 and has been clearly separated from the work of other tasks with a clear heading and divider. The candidate has correctly identified and written about 6 tools / techniques (Interviews, Questionnaires, Observation, Document Analysis, Meetings, and Video Conferencing), which could be used to investigate a current system. Although the descriptions produced for each tool are rather brief they do include relative advantages / disadvantages of each and suggestions are made as to how each tool would be used by a systems analyst. The candidate has also written about video conferencing as an investigation tool, which is beyond the specification and, although not required, is certainly encouraged – referring to past case studies would also be a suitable tool. As the candidate has applied each tool and gone beyond the specification, even though descriptions could be more thorough a mark in band 3 can be awarded.

**Mark Band 3**

**Mark Awarded: 4 (Max. 4)**

## Task d (i)

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Task d(i) of this unit requires candidates to produce a report which investigates the feasibility of proposed solutions to problems relating to a scenario within the set assignment. A report is required that considers the technical, economic, legal, operational and schedule feasibility of each proposed solution. At least two different solutions will need to be considered for mark band 2 and they will be suitable for the needs of the end user. For mark band 3 the feasibility report will consider in detail the technical, economic, legal, operational and schedule feasibility of each proposed solution. The most feasible solution will be clearly identified with the choice being justified by the candidate. It is also worth noting that the structure of the report and the spelling,

punctuation and grammar are assessed during this task and assessors should take this into consideration when awarding marks.

The feasibility report produced by the candidate commences on page cw32 of the work, starting with an overview of the current system and problems which the new solution aims to solve. This is a good starting point for the report as it sets the scene and highlights the issues which a new solution needs to address. On page cw37 the candidate talks about the technical, economic, legal, operational and schedule feasibility of general solutions to the problem rather than an actual solution. For high marks in this task candidates need to look at each aspect of feasibility for each proposed solution so the relevant merits and issues can be compared and the “most feasible” proposal recommended. On page cw40 different off-the-shelf and bespoke solutions are suggested, including how each would meet the needs of the company and any disadvantages of each. On page cw41 the candidate clearly recommends which solution is the best, along with some justification.

The work contained elements of both mark bands 2 and 3 – although each solution had been described this could have been in more detail. A fuller description of each solution is expected with details of the features which would help the organisation to solve the problems faced. Precise costing for each solution would also have been useful when recommending which to buy. Generic rather than solution specific feasibility was carried out and a recommendation of which solution should be used was presented. It was felt there was just about enough evidence for the bottom of band 3, as a recommendation of which solution to implement had been included, although this evidence is very much on the border line.

For higher marks a more detailed description of each proposed solution should be written including technical, economic, legal, operational and schedule feasibility issues for each. Candidates aiming to achieve very high marks may also carry out some cost / benefit analysis on each solution to further assess its feasibility. These can then be used to write a fully informed recommendation of which solution should be implemented.

**Mark Band 3**

**Mark Awarded: 7 (Max. 9)**

## Task d (ii)

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Task d(ii) requires candidates to plan the input screens and outputs generated by the potential new system. Even if an off the shelf solution is opted for then both input screens and outputs will be customisable to some degree. Designs for input/output requirements will meet the defined requirements of the end-user and standard design concepts, listed on page 49 of the course specification, will be taken into account, although for mark band 2 some areas may not be fully considered – the layout may be cramped or the fonts and colours used may not be consistent. For mark band 3 the designs produced will fully meet the defined requirements and will include enough detail so that another experienced IT user could create them - for example any required calculations in a report will be shown. The standard design concepts will be taken into account with the layout being clear, and the fonts and colours used being consistent.

The design work begins on page cw43 of the work and clearly shows designs for 8 input screens, 1 output screen and 2 automatically generated emails. The specification requires designs; however, as the forms are not populated with data, they are just about acceptable, although sketched designs would be preferable. The forms use a standard house style, labels are sensible and fields are spacious enough for data to be entered. The designs for the emails are suitable, although lack annotation that would allow another IT competent person to make them. There are some processes and calculations explained on pages cw50-52, although it would have been better to see these linked to an output as, although its obvious these are needed, it is not clear where they would be used. A mark at the bottom of mark band 3 should be awarded for this evidence.

For higher marks in the band it is expected that all designs are fully annotated showing the fonts and colours to be used and that it is clear which outputs will use calculations.

**Mark Band 3**

**Mark Awarded: 5 (Max. 6)**

## Task e

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Task e requires candidates to draw data flow diagrams of the current system and provide appropriate supporting documentation including descriptions of the external entities and some details of the processes and data stores if a level 1 diagram is drawn. For the award of mark band 2 candidates will produce a data flow model that is mostly complete and correct, using a simple graphical presentation method. The documentation is complete, appropriate and relates to the data flow model. Mark band 3 requires candidates to produce a full and complete data flow model using a formal modelling technique. At least two different levels of data flow should be documented - perhaps a context diagram (level 0) and a level 1 diagram, showing the major process and stores within the current system will be included. Supporting documentation will be complete with an appropriate level of detail and related to the data flow model produced.

A level 0 (context) diagram is presented on page cw54 of the work and clearly shows the external entities, the BBBS system and information flows entering and exiting the system. Most of the information flows seem sensible and flow in the correct direction. One small criticism of the diagram is that the presentation of the flows between the system and the club manager could be presented more clearly as the arrows and labels are on top of one another. Some explanation of the diagram is given on page cw55 which explains the external entities and how they relate to the system.

A level 1 diagram for the system is provided on page cw56 and it uses a standard set of symbols for the external entities, processes, stores and flows. There is a clear match between the level 0 and the level 1 diagram which would indicate that the current system is being modelled consistently. The processes on the diagram are difficult to read due to the quality of the photocopying however these are explained in further detail on page cw57. A level 2 diagram is provided on pages cw58 and cw59 expanding the "Making a Booking" process. The diagram is again consistent with the level 1 diagram and, although is more than is required, it is a useful expansion to the task.

The work in this task shows the candidate has a good understanding both of the current system and data flow modelling techniques. All diagrams make sense and are consistent and use standard notation. The supporting documentation explains the diagrams and provides a thorough overview of the current situation. A high mark in band 3 is certainly appropriate for the evidence presented.

**Mark Band 3**

**Mark Awarded: 8 (Max. 8)**

## Task f

---

Task f requires candidates to design and document a data structure for the proposed system. For the award of mark band 3 candidates need to produce a full, complete and correct ERD with detailed documentation that is complete, to an appropriate level of detail, and relates to the ERD produced. This will usually take the form of a data dictionary.

The entity relationship model produced by the candidate is on page cw61 and is rather difficult to follow. The diagram has not been properly thought out and as a result entities are joined in loops and redundant relationships have not been removed. There is also a many to many relationship between BAND and CLUB, which may have been resolved underneath but is still included on the

diagram. Although this solution could work with some adaptation, in its present form it is an incomplete solution to the given problem. Supporting documentation is provided on pages cw62-64 which consists of descriptions of the relationships and full details of the attributes of each entity. The documentation is fairly detailed however primary keys and foreign keys could be more overtly defined.

As the solution is not correct and documentation has detail missing a mark in band 2 is appropriate for the evidence presented. For higher marks a correct solution without redundant relationships should be presented along with full documentation including required keys being overtly identified.

**Mark Band 2**

**Mark Awarded: 5 (Max. 8)**

## Task g

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Task g requires candidates to evaluate their proposed solution and their performance during the unit. Mark band 2 requires candidates to provide an evaluation leading to a conclusion which considers the benefits or disadvantages of the new system and identifies an alternative solution. The evaluation will also consider both good and not so good features of the way the problem was tackled and solved with sensible suggestions on how each method could be improved. For the award of mark band 3, candidates need to provide an evaluation leading to a conclusion, which fully considers both the benefits and disadvantages of the new system, with alternative solutions being identified. There will be evidence of refinement of the work as it progresses with perhaps reflective comments on draft versions of the feasibility report and supporting diagrams. The evaluation will also consider both strengths and weaknesses in the strategies used to solve the problem and explain how these were refined to meet the purpose more clearly. Final evaluations will also include consideration of how a more efficient approach might be adopted for a similar task in future.

The evaluation written by the candidate commences on page cw65 of the portfolio. It starts with the candidates recapping the user requirements and commenting on how the proposed system meets these. This includes some analysis of how the new system will assist the user and what still needs to be done. General benefits of the chosen solution are presented and an explanation is offered as to why the alternative solutions were not selected. There is an analysis of why the solution is appropriate for BBBS on pages cw67 – 69, although few drawbacks are included. A brief reflection on the strategies used during the unit are on pages cw70 and cw71 including some refinements made during the work and how a similar task would be tackled in the future.

A mark at the bottom of mark band 3 can be awarded for the work in this task. For higher marks more emphasis needs to be placed upon ongoing reflection throughout the work, disadvantages of the proposed system should be fully explained and a more in-depth analysis of the strategies used to complete the work should be included.

**Mark Band 3**

**Mark Awarded: 5 (Max. 7)**

**Total mark for portfolio: 41 (Max. 50)**

# Unit G045 - Assessment Evidence Grid

Unit G045: Software development – design					
What candidates need to do:					
Candidates need to produce a design for a solution to a given problem, in a familiar context. Evidence needs to include: <b>a</b> [AO2] the identification and explanation of the tools and techniques used in the analysis stage [4]; <b>b</b> [AO2] the identification and explanation of the tools and techniques used in the design stage [4]; <b>c</b> [AO2] the investigation methods used when designing solutions [4]; <b>di</b> [AO1] a report documenting feasibility and proposed solutions [9]; <b>dii</b> [AO1] designs for input and output requirements to meet the defined needs of the end-user [6]; <b>e</b> [AO3] data-flow modelling and associated documentation [8]; <b>f</b> [AO3] entity-relationship diagrams and associated documentation [8]; <b>g</b> [AO4] a conclusion and evaluation of the proposed solution and their performance in solving the problem [7].					
How the candidate will be assessed:					
Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
<b>a</b>	<b>AO2</b>	The candidate identifies the tools and techniques which are used during the analysis stage; [0 1 2]	The candidate gives a simple explanation, including advantages or limitations of the tools and techniques which are used during the analysis stage; [3]	The candidate gives a detailed explanation, including advantages and limitations of the tools and techniques which are used during the analysis stage providing examples of when each could be used. [4]	<b>4/4</b>
<b>b</b>	<b>AO2</b>	The candidate identifies the tools and techniques which are used during the design stage; [0 1 2]	The candidate gives a simple explanation, including advantages or limitations of the tools and techniques which are used during the design stage; [3]	The candidate gives a detailed explanation, including advantages and limitations of the tools and techniques which are used during the design stage providing examples of when each could be used. [4]	<b>3/4</b>
<b>c</b>	<b>AO2</b>	The candidate identifies investigation methods; [0 1 2]	The candidate gives a simple explanation, including advantages or limitations of investigation methods; [3]	The candidate gives a detailed explanation, including advantages and limitations of investigation methods providing examples of when each could be used. [4]	<b>4/4</b>
<b>d(i)</b>	<b>AO1</b>	The candidate produces a simple report considering some aspects of feasibility and showing a single solution to the given problem; The candidate's report may contain errors in spelling, punctuation and grammar; [0 1 2 3]	The candidate produces a detailed report considering all aspects of feasibility and showing alternate solutions to the given problem; The candidate's report contains few spelling, punctuation and grammar errors; [4 5 6 ]	The candidate produces a detailed report considering all aspects of feasibility in detail and showing alternate solutions to the given problem, justifying the chosen solution; The candidate's report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors. [7 8 9]	<b>7/9</b>

<b>Unit G045: Software development – design</b>					
<b>Task</b>	<b>Assessment Objective</b>	<b>Mark Band 1</b>	<b>Mark Band 2</b>	<b>Mark Band 3</b>	<b>Mark Awarded</b>
<b>d(ii)</b>	<b>AO1</b>	The candidate produces simple or incomplete designs for input/output requirements that do not fully meet the defined requirements of the end-user; The candidate does not consider standard design concepts; <b>[0 1 2]</b>	The candidate produces designs for input/output requirements that meet the defined requirements of the end-user; Standard design concepts are taken into account but some areas may not be fully considered; <b>[3 4]</b>	The candidate produces designs for input/output requirements, including calculations that are needed, that fully meet the defined requirements of the end-user; All standard design concepts are taken into account. <b>[5 6]</b>	<b>5/6</b>
<b>e</b>	<b>AO3</b>	The candidate produces an incomplete data-flow model for the current solution with incomplete documentation; <b>[0 1 2]</b>	The candidate produces a data-flow model of the current solution using simple graphical representation with complete documentation; <b>[3 4 5]</b>	The candidate produces a complete data-flow model of the current solution, making effective use of formal graphical representation with complete and detailed documentation. <b>[6 7 8]</b>	<b>8/8</b>
<b>f</b>	<b>AO3</b>	The candidate produces an incomplete ERD for the proposed solution with incomplete documentation; <b>[0 1 2]</b>	The candidate produces a simple ERD of the solution, with complete documentation; <b>[3 4 5]</b>	The candidate produces a complete ERD of the solution, with complete and detailed documentation. <b>[6 7 8]</b>	<b>5/8</b>
<b>g</b>	<b>AO4</b>	The candidate produces a simple evaluation of the system; The candidate comments on their actions and role in solving the problem; <b>[0 1 2]</b>	The candidate evaluates the solution discussing either benefits or disadvantages of the solution; The candidate includes an analysis on their experiences in order to improve their own performance; <b>[3 4]</b>	The candidate evaluates the solution discussing both benefits and disadvantages of the solution; The candidate includes an analysis on their experiences, suggesting how they might approach a similar task in the future. <b>[5 6 7]</b>	<b>5/7</b>
<b>Total mark awarded:</b>					<b>41/50</b>

# Candidate's work

# AS UNIT: G045

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# TASK A

## Task A- Analysis Tools and Techniques

There are many tools that can be used during the analysis and design stages of software development to show the working practises of a system. These include;

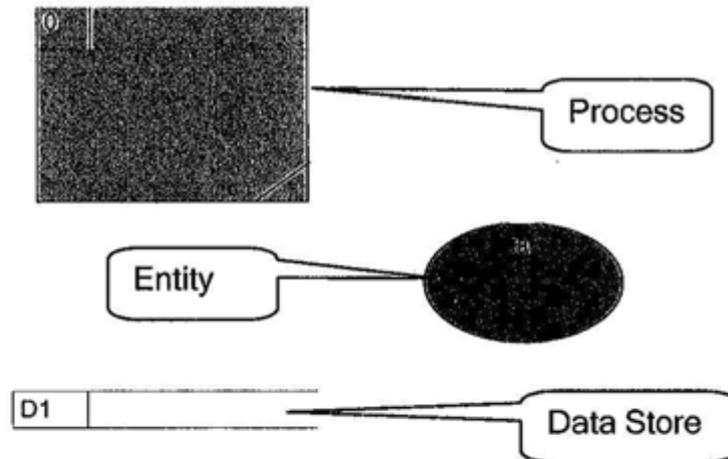
- Data Flow Diagrams ✓
- Rich Pictures ✓
- Entity-Relationship Diagrams ✓
- Data Dictionaries ✓
- System Flow Charts ✓

*...for Analysis*

### Data Flow Diagrams

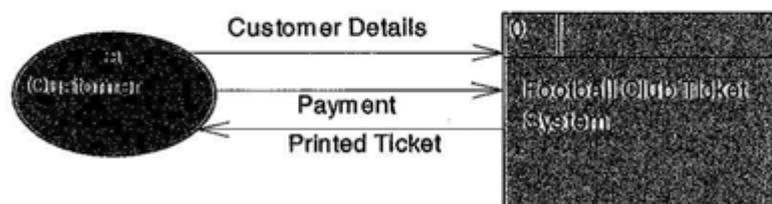
A data flow diagram shows the processes that the data goes through within a system. It takes into account, the inputs, processes, outputs and stores that the data goes through. ✓

The method of creating a data flow diagram involves using different symbols to represent different parts within a system, the symbols shown below are the symbols used.



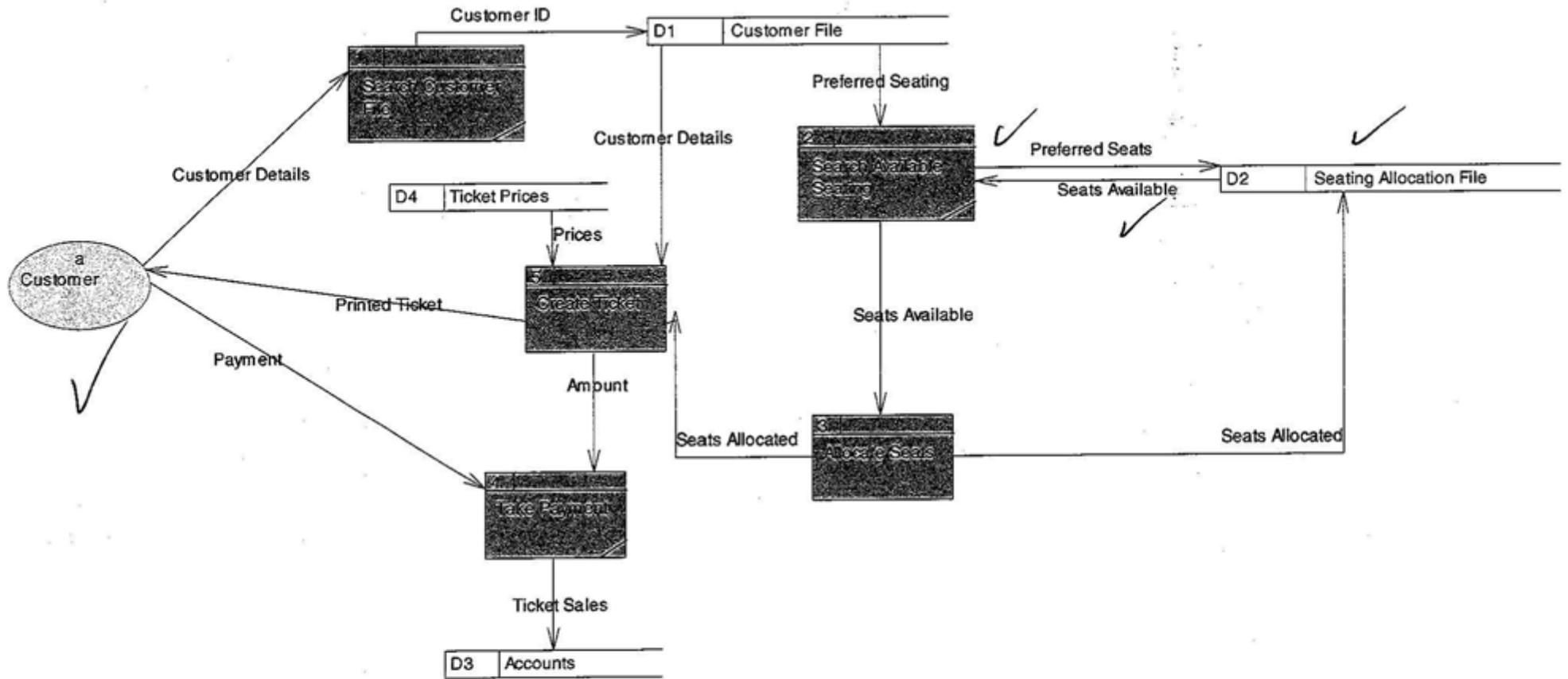
There are many different levels of data flow diagram to show the system at its different stages. An example of this is shown below, starting with the Context Diagram and moving up to the Level 2 stages.

### Football Club Ticket System - Context Diagram



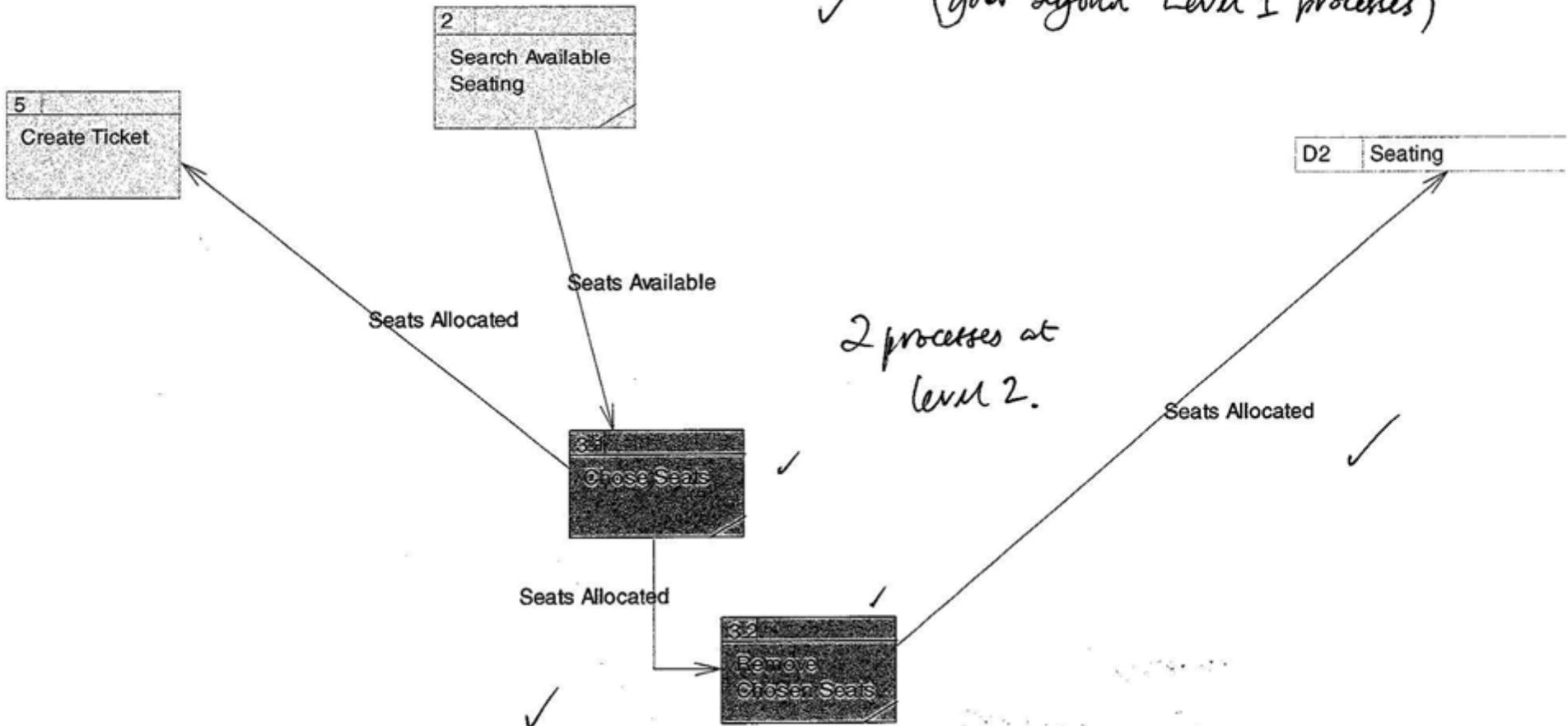
Football Club Ticket System (Level 1 Diagram)

✓ examples of all JFD components.

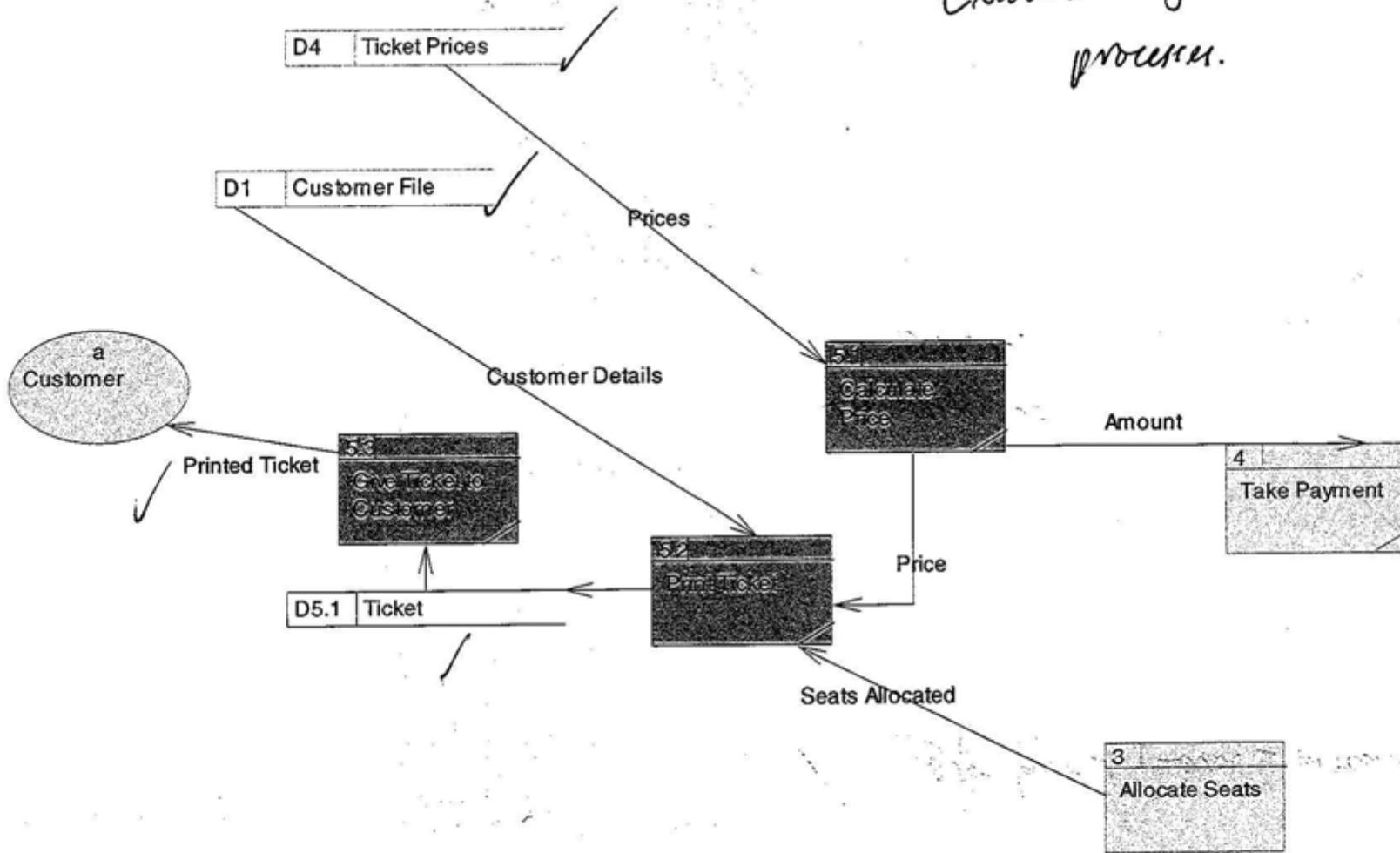


### Allocate Seats (Level 2 Diagram)

✓ (goes beyond Level 1 processes)



### Create Ticket (Level 2 Diagram)



*Excellent ex. of level 2. processes.*

### Advantages

DFD's have several advantages, they clearly show where and how the data moves between the entities and how it is stored along the way. Another advantage is that the DFD's allow the processes to be broken down into smaller processes making the diagram a lot more detailed.

### Disadvantages

Unlike a rich picture this method does not show how the people who are using the system feel about what they are doing.

Another disadvantage of a DFD is that it doesn't show you the information that is stored about which entity and the format that it is stored in. A diagram that does do this is a data dictionary. (or E-RD)

Another disadvantage is that the DFD doesn't show the calculations that take place within the processes.

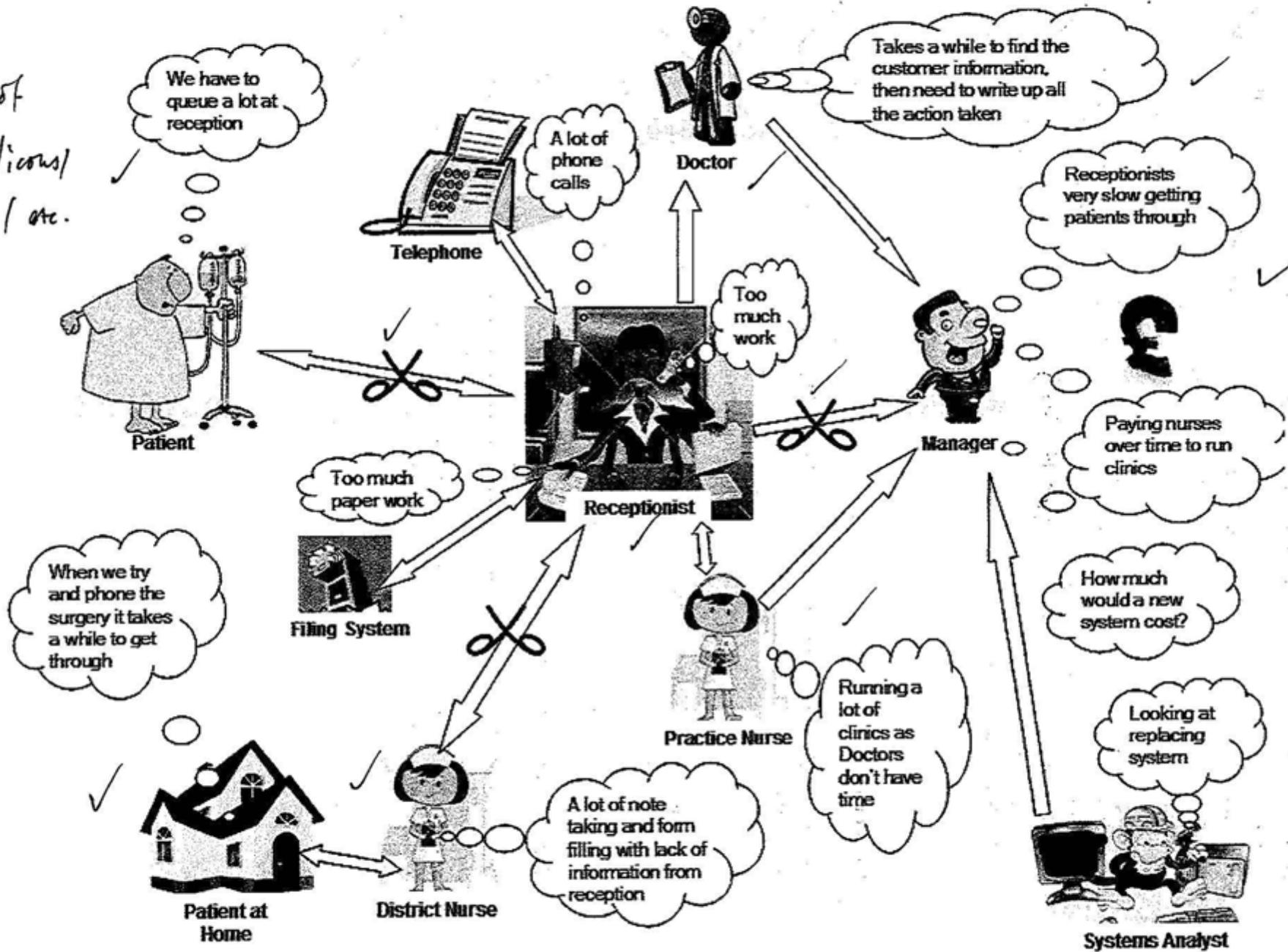
### Rich Pictures

Rich pictures are used to show the lines of communication between the entities in a system. This picture is designed to include the human side of the system as it shows how the users feel about what they are doing to complete the task.

The rich picture example below uses the following case study;

*The Highgrove Surgery serves a busy market town. It has nine GPs and approximately 15,000 patients. It has a Practice Manager, five reception staff, a number of nursing staff who carry out minor procedures at the surgery, and a team of district nurses who visit patients at their homes. When patients join the surgery they are allocated to one of the GPs, however, they may make an appointment to see any of the GPs. At an appointment the GP may prescribe many treatments for the patient. Manual records of patients' consultations with GPs are kept. The surgery also processes repeat prescriptions and runs a number of clinics, such as Baby Care, Asthma and Diabetes. At present the surgery does not use computers, but owing to the high volume of paper work involved in scheduling appointments, the surgery would like to develop a computer system to cover this part of its operation.*

Good use of symbols / icons / thoughts / etc.



**Advantages**

A major advantage of this is that it shows the human element, it clearly shows ~~the~~ where the problems are from the people that are using the system first hand.

Another advantage of this diagram is that the views of all of the entities are shown, which none of the other diagrams show.

**Disadvantages**

A disadvantage of a rich picture is that it doesn't show what data is moving around the system it only shows the path it takes. Also this diagram does not show how the data moves around the system.

Another disadvantage is that it doesn't show where the data is stored unlike a DFD which does.

The system also doesn't show what data is stored about each of the entities whereas an entity relationship diagram would show this.

Entity-Relationship Diagrams (ERD's)

Entity relationship diagrams show how the system creates links or relationships between the different entities. The symbols used to create an entity relationship diagram are as follows;

Entity = 

Relationship = \_\_\_\_\_

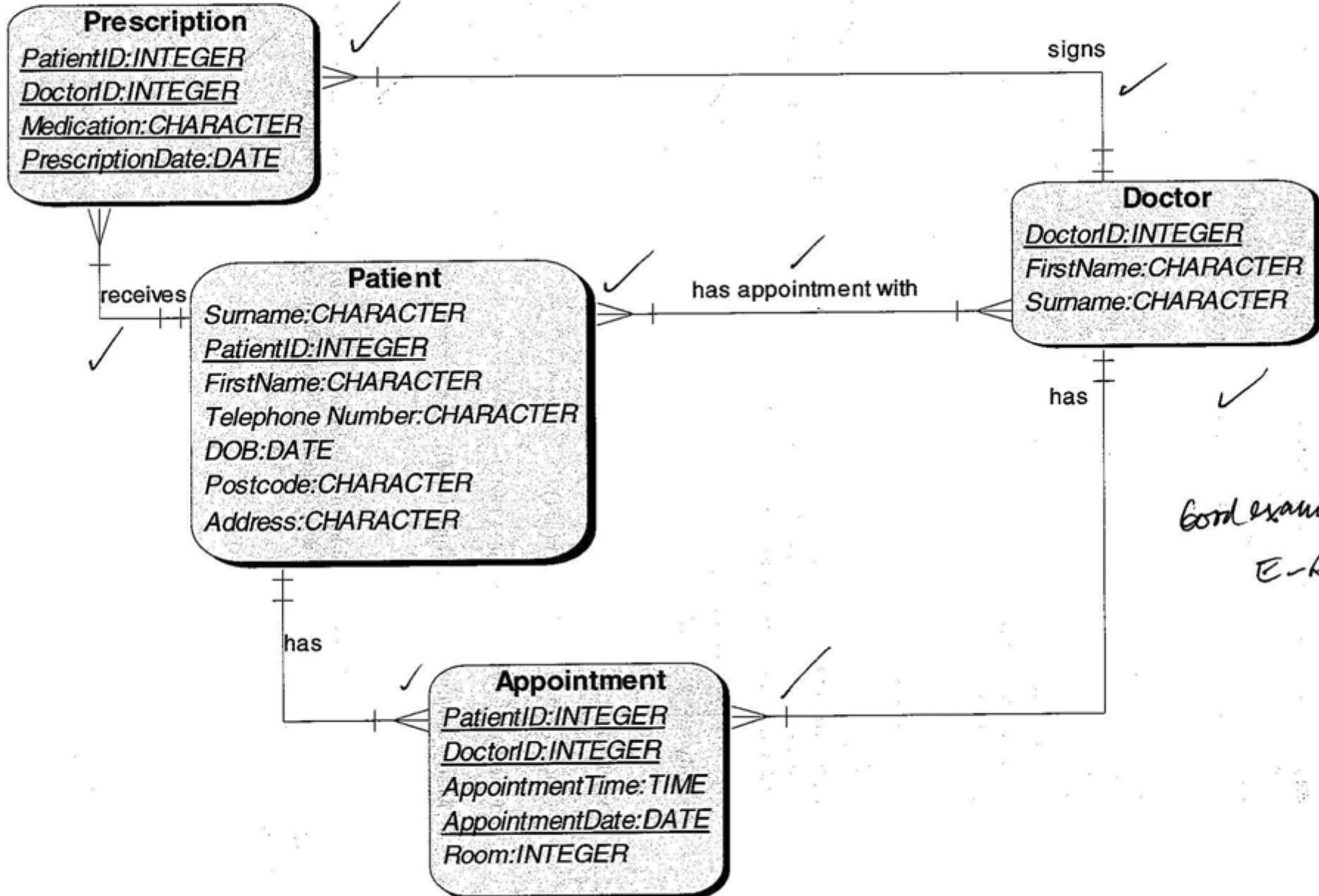
One to One Relationship (1:1) = \_\_\_\_\_

One to Many Relationship (1:M) = \_\_\_\_\_ 

Many to Many Relationship (M:M) 

The entity relationship diagram shown on the next page uses the same case study as the rich picture example as it is constructed for the High Grove Surgery.

# High Grove Surgery



**Advantages**

An advantage of this is that it lists all of the attributes that are going to be stored about the entity and the format that they are going to be stored in. Another advantage is that it shows you how many of a particular entity will communicate with a different entity. In this case study for example one doctor has many appointments, a systems flow chart or a data dictionary would not show this. ✓

**Disadvantages**

A disadvantage of this is that it doesn't show the human element of the system. This doesn't explain to you how the people using the system feel about the tasks that they are creating in the way that a rich picture would. Another disadvantage would be that the diagram doesn't show where the data is stored or how it is stored in the way that a systems flow chart would. ✓

**Data Dictionaries**

A data dictionary is when a table is created listing all of the attributes that will be stored about a particular entity. A data dictionary would also state the validation rules that would be implemented on the data entered about the individual attributes to increase the amount of data accuracy. ✓

The data dictionary shown below looks at the three different entities Patient, Appointment, Consultant and GP. ✓

**PATIENT**

Attribute Name	Data Type	Description/Validation/Typical Data
Patient ID	Integer	e.g. 034562 - 6 digits auto-numbered by Access, e.g.
Surname	Text	e.g. 'Mitchell' - max 25 characters; first letter capital
Forename	Text	e.g. 'Steven' - max 25 characters; first letter capital
Title	Text	e.g. Mr, Mrs, etc max 10 chars - Lookup list
Date Of Birth	Date/Time	e.g. 30/04/1984 - dd/mm/yyyy, required
Address1	Text	e.g. '12 Roman Road' - max 30 characters, required
Address2	Text	e.g. 'Hythe' - max 20 characters, required
Post Code	Text	e.g. 'SO42 7ZN' - max 8 characters, required
GP ID	Integer	e.g. '4' - max 30, required, must exist in consultant table
Date of Next Appointment	Date/Time	e.g. '10/10/09' - range check, must be > today's date
Date of Last Appointment	Date/Time	e.g. '03/09/09' - must be <today's date
Private?	Boolean	e.g. Yes/No- required

**APPOINTMENT**

Attribute Name	Data Type	Description/Validation
Appointment_Date	Date/Time	e.g. 21/12/2004 - dd/mm/yyyy format
Appointment_Time	Date/Time	e.g. 13:14- hh:mm format, 24hr

Patient_ID	Long Integer	e.g. 035427, Lookup in Patient table
Consultant_ID	Long Integer	e.g. 245. Lookup in Consultant table
Test	Text	e.g. 'Blood', max 30 characters
Test_Results	Text	e.g. 'High Red Cell Count', max 50 characters

CONSULTANT ✓

Attribute Name	Data Type	Description/Validation
Consultant_ID	Integer	e.g. 245, 3-digit number, unique to each consultant
Surname	Text	e.g. 'Mitchell' - max 25 characters; first letter capital
Initials	Text	e.g. 'H F' - no dots, space in between chars
Title	Text	e.g. Dr, Mr, Miss, etc - Lookup list
Specialism	Text	e.g. 'Paediatrics' first letter capital, required
Private	Boolean	e.g. Yes/No - takes private patients, or not
Office_Number	Text	e.g. 2343 - suitable range from existing rooms
Office_Telephone	Text	e.g. 236 - <999

GP ✓

Attribute Name	Data Type	Description/Validation
GP_ID	Integer	e.g. 245, 3-digit number, unique to each GP
Surname	Text	e.g. 'Mitchell' - max 25 characters; first letter capital
Initials	Text	e.g. 'H F' - no dots, space in between chars
Practice	Text	e.g. 'Waterfront Surgery', max 30 characters, required

**Advantages**

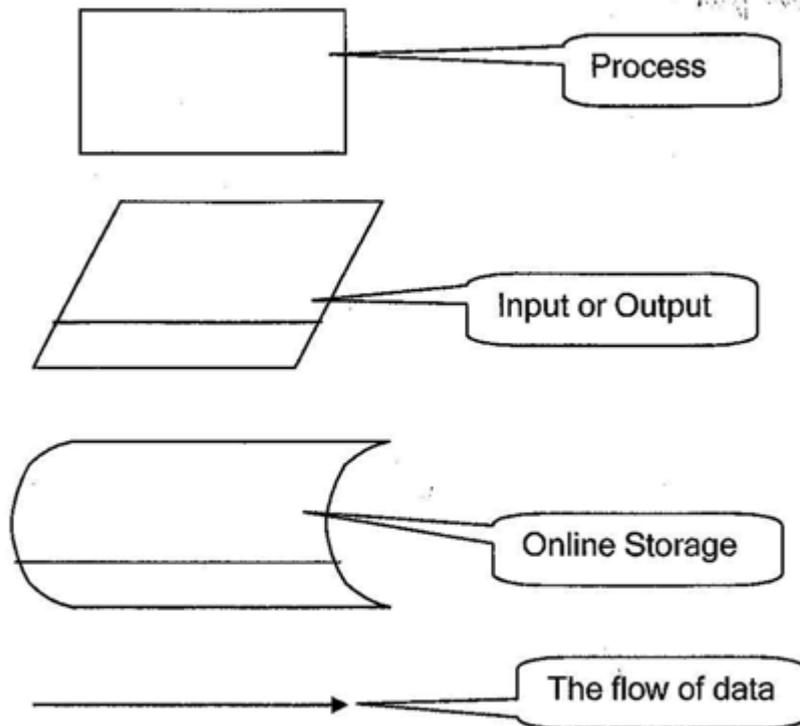
✓ An advantage would be that it shows all of the attributes stored about each entity similarly to the ERD. This diagram also shows the validation rules for each attribute as well as giving examples of the types of data that are going to be input which none of the other diagrams show.

**Disadvantages**

✓ A disadvantage of a data dictionary is that it doesn't show how the entities interact in any way like a DFD would.  
 ✓ Another disadvantage is that the data dictionary doesn't show how or where the data is going to be stored, this is again something that a DFD would do.

**System Flow Charts**

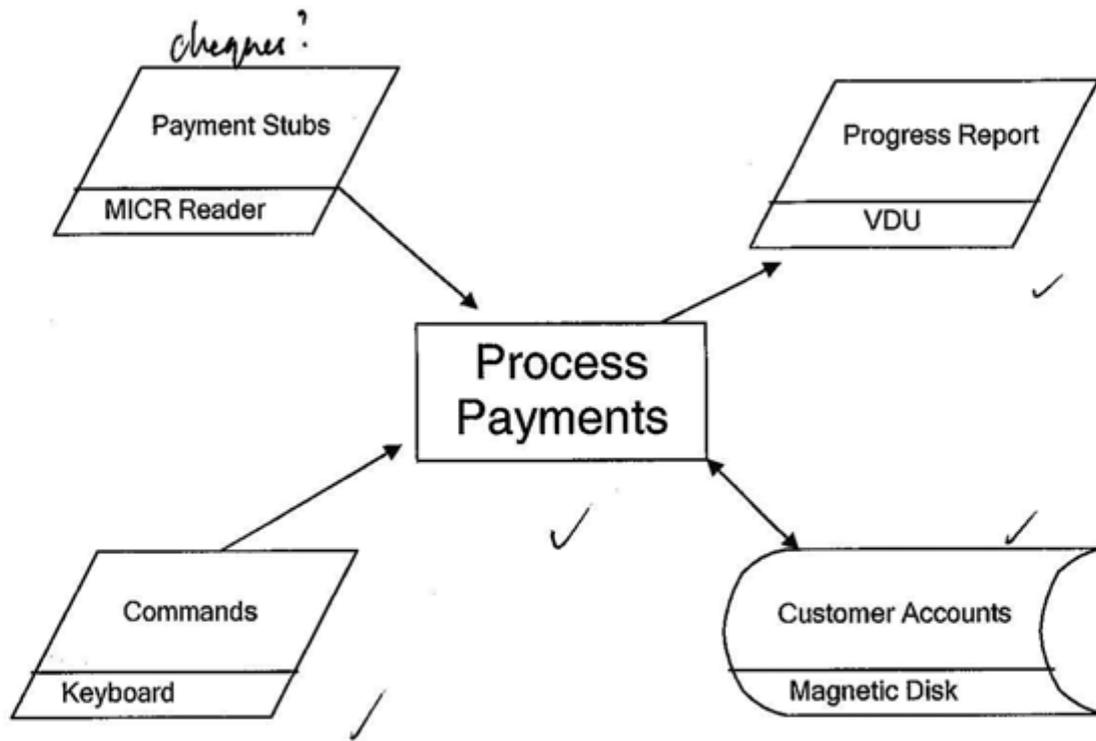
✓ A systems flow chart is designed to show how the data moves around the system and into and out of the different processes. This is done using different symbols for specific tasks. The symbols used vary between different diagrams but some of the symbols that can be used are as follows;



As you can see the input or output and storage symbols are split up into two sections. The larger section is used to show what the system is using, the smaller section at the bottom is used to show how the information is being used. An example of this can be seen below using the following case study.

*Customer payments are processed by a computer system that stores customer accounts on magnetic disk in a database, Customer Accounts. The amount paid by a customer is encoded on a payment stub. A process, Process Payments, is then applied to batches of payment stubs and the database Customer Accounts updated. A progress report is sent to a VDU. The system is controlled by commands from a keyboard.*

*(Cheques?)*



**Advantages**

An advantage would be that the input and output methods used within the system are easily identifiable and this isn't shown in any of the other diagrams.

Another advantage would be that data flow is shown similarly to being shown in a DFD.

**Disadvantages**

A disadvantage of a systems flow chart is that it doesn't show the individual entities that are involved with the process as an entity relationship diagram would.

Another disadvantage would be that the chart doesn't show the data that needs to be stored about the entities in the way that the data dictionary would.

In conclusion the different ways of showing the designs of the overall system can be shown in a number of different ways. However the best system design would use several of these techniques to produce a detailed design.

✓ good

# TASK B

## Task B- Design Tools and Techniques

### Forms

Forms can be used for input and output in two main ways, they can either be paper based or screen based.

When designing the forms there are many things to take into consideration to make the forms as easy as possible for the user to interact with. Whether the form is based on screen or on paper the colour and layout will have a big impact on how easy it is for the user to use the form.

The colour of the forms should be chosen so that the text is easy to read; therefore non-clashing colours should not be used. The best colours would be colours that are contrasting against the background for example; a light background would then have dark text on top if it. If the form is going to be output to a printer another factor will be whether or not the form should be printed in colour or in black and white.

The layout of the form should allow enough space for the user to enter the relevant information. Also the places where the information is displayed should be spread out so that the form does not become too crowded with information.

An example of a paper based form can be seen below;

**THE NATIONAL MUSEUM TRUST**

**Be a giftaid visitor**

**GIFT AID**  
How you can help us claim tax back from the government - at no extra cost to you

The National Motor Museum is one of the attractions of Beaulieu and is a charity. By making a gift of your payment today you will receive entry to the National Motor Museum for one year (See reverse for full terms and conditions of the pass).

If you choose to Gift Aid your payment we can claim back the tax that you have paid from HM Revenue & Customs. You can imagine the difference this will make to the finances of the National Motor Museum Trust - with your help we can preserve the historic vehicles and unique archives in our care for future generations to enjoy.

This costs you nothing but your time to fill in your details below.

**Thank you for your interest in our work**

The National Motor Museum Trust Limited  
Registered Charity No. 1107956



**PLEASE COMPLETE IN CAPITALS**

Title (Mr, Mrs, Miss, Dr etc)

First Name(s)

Surname

House name / number

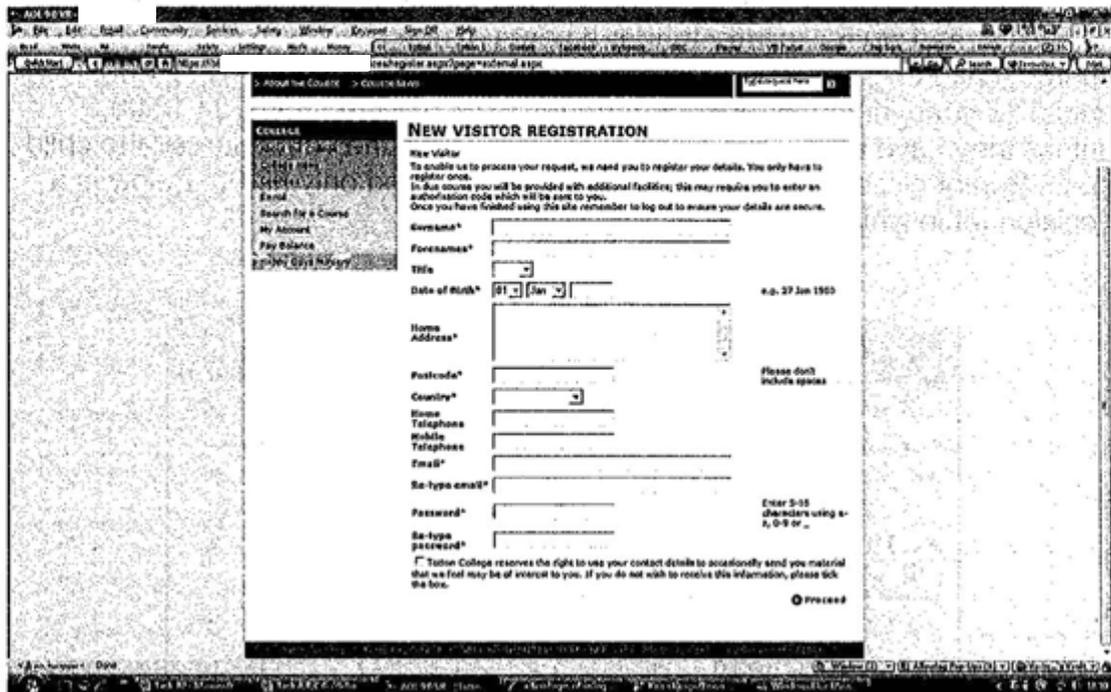
Post Code

E-mail

Please tick this box if you wish to receive further information about Beaulieu

This form is used to gather customer details for people who visit a local museum and want to participate in a Gift Aid scheme. The customer fills out the form, and then later on a member of staff will type the information into a computer.

This form is used online; the purpose of the form is to gather the information of someone who wishes to enrol as a student at the college. This form is screen based. ✓



**Advantages**

One advantage of a form is that the information can be collected both manually and electronically. ✓  
 Another advantage is that there is no limit or restrictions to the sort of information that can be collected. ✓

*+ others?*  
 ✓  
 ^

**Disadvantages**

One disadvantage is that forms may be filled out incorrectly this may reduce the accuracy of the data collected. ✓  
 Another disadvantage mainly from using paper based forms is that the information may then have to be entered onto a computer. This could lead to many inaccuracies as the information may not be read correctly or typed in inaccurately. ✓

**Decision Tables**

A decision table is used to represent all possible actions that a system can take based upon certain conditions. It does this by using a table which is split into three sections; conditions, rules and actions. ✓

*? process.*

The rules are represented in the different columns by using different symbols. An example of these symbols could be 1 or 0. Another set of symbols that could be used may be using a tick or a cross. There are no set rules to which symbols must be used, as long as the symbols are appropriate. ✓

✓ The number of possible rules in each table can be calculated using this formula; rules= 2 to the power of numberofconditions.

✓ An example of a decision table can be seen below. The table uses the following case study; children under 5 years of age are to be admitted free of charge, children 5 years and over but under 18 years are charged £8.00, adults 18 years and over but under 55 years of age are charged £12.00, unless they have a concession card, in which case they are charged the child price. Senior citizens, 55 years and over are charged only £6.00. Below is a decision table which represents these conditions.

Conditions	Rules				
< 5 years	✓	✗	✗	✗	✗
>= 5 and < 18	✗	✓	✗	✗	✗
>= 18 and < 55 with concession card	✗	✗	✓	✗	✗
>= 18 and < 55 no concession card	✗	✗	✗	✓	✗
>= 55	✗	✗	✗	✗	✓
Actions					
Free Admission	✓	✗	✗	✗	✗
\$8.00	✗	✓	✓	✗	✗
\$12.00	✗	✗	✗	✓	✗
£5.00	✗	✗	✗	✗	✓

**Advantages**

*explain ?*  
One example of decision table over a decision tree is that the table goes into much more detail. Another advantage of the tables is that they are quite clearly laid out; this makes it easier for the user to see what the outcome is of one condition. ✓

**Disadvantages**

A disadvantage of a table is that they are very complex to create and a decision tree would be much simpler. Also the tables can become quite complex making it difficult for some people to understand them.

*-if there are many conditions ✓*

Pseudocode

Pseudocode uses structured English to show the processes that a task needs to go through. The structured language means that anyone should be able to understand the processes taking place. *- not just a programmer.* ✓

Pseudocode is built using simple instructions such as;

```
IF
THEN
ELSE
END IF
```

This design feature is similar to the decision tables as it sets out the actions to carry out when certain conditions are true or false. ✓

The example below shows the pseudocode used for a process to generate the correct admission price for someone based upon certain conditions. It is based on the same case study used for the decision tables.

```
If age <5 then
    admission = £0.00
```

```
Else
```

```
    If age <18 then
        admission = £8.00 ✓
```

```
    Else
```

```
        If age <55 and concessioncard = false then
            admission = £12.00 ✓
```

```
        Else
```

```
            If age <55 and concession = true then
                admission = £8.00 ✓
```

```
            Else
```

```
                admission = £6.00 ✓
```

```
            End If
```

```
        End If
```

```
    End If
```

```
End If
```

*Good* ✓

Advantages

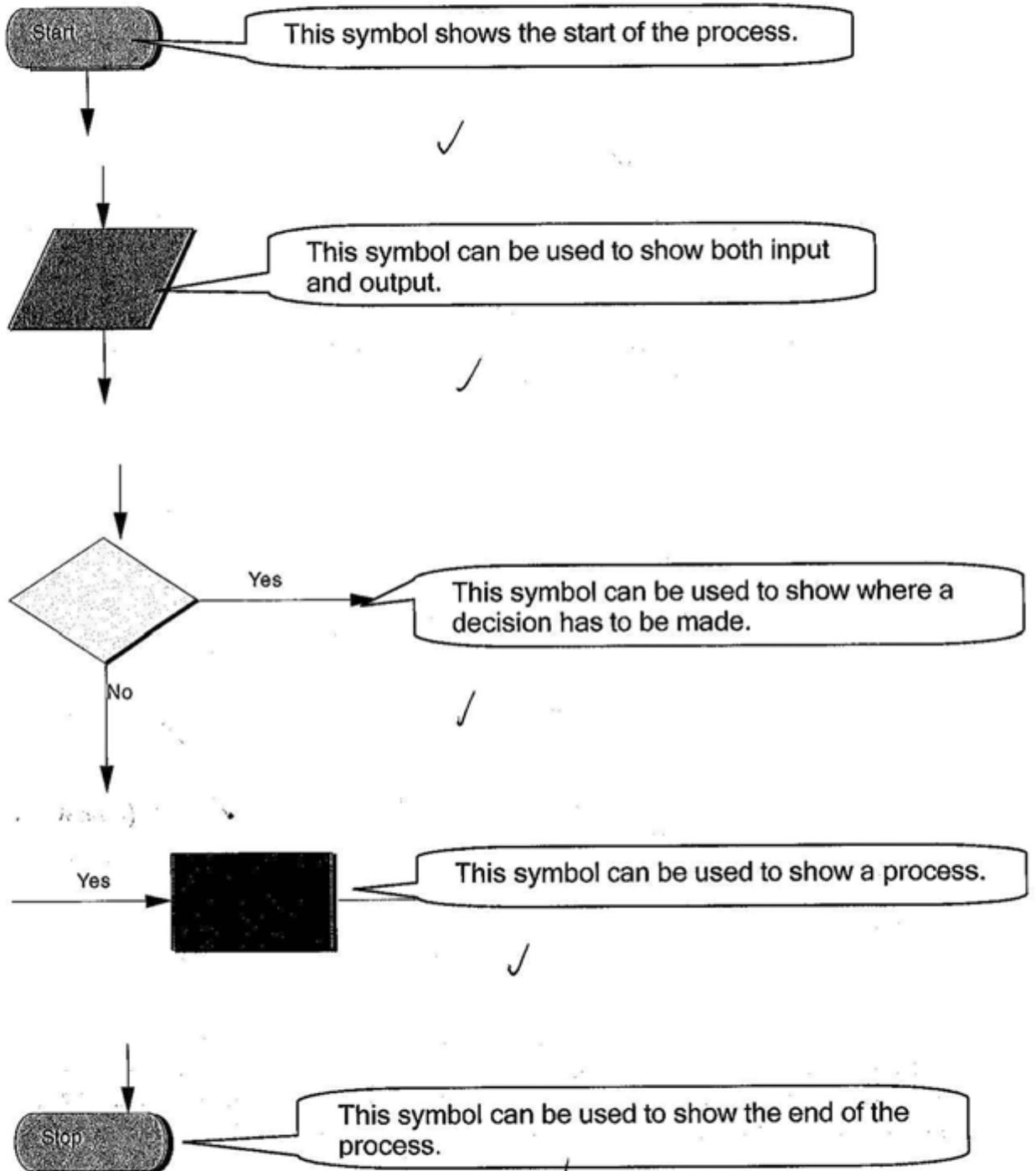
The main advantage of pseudocode is that any programmer could pick up the pseudocode and translate it into any programming language. The pseudocode can also be understood by anyone without having knowledge of the system or even a knowledge of programming. ✓

Disadvantages

One disadvantage would be that the person reading the code would need to understand the language that it is written in. For example if a piece of pseudocode was written in English you would need to be able to read English to understand it. *? write.*

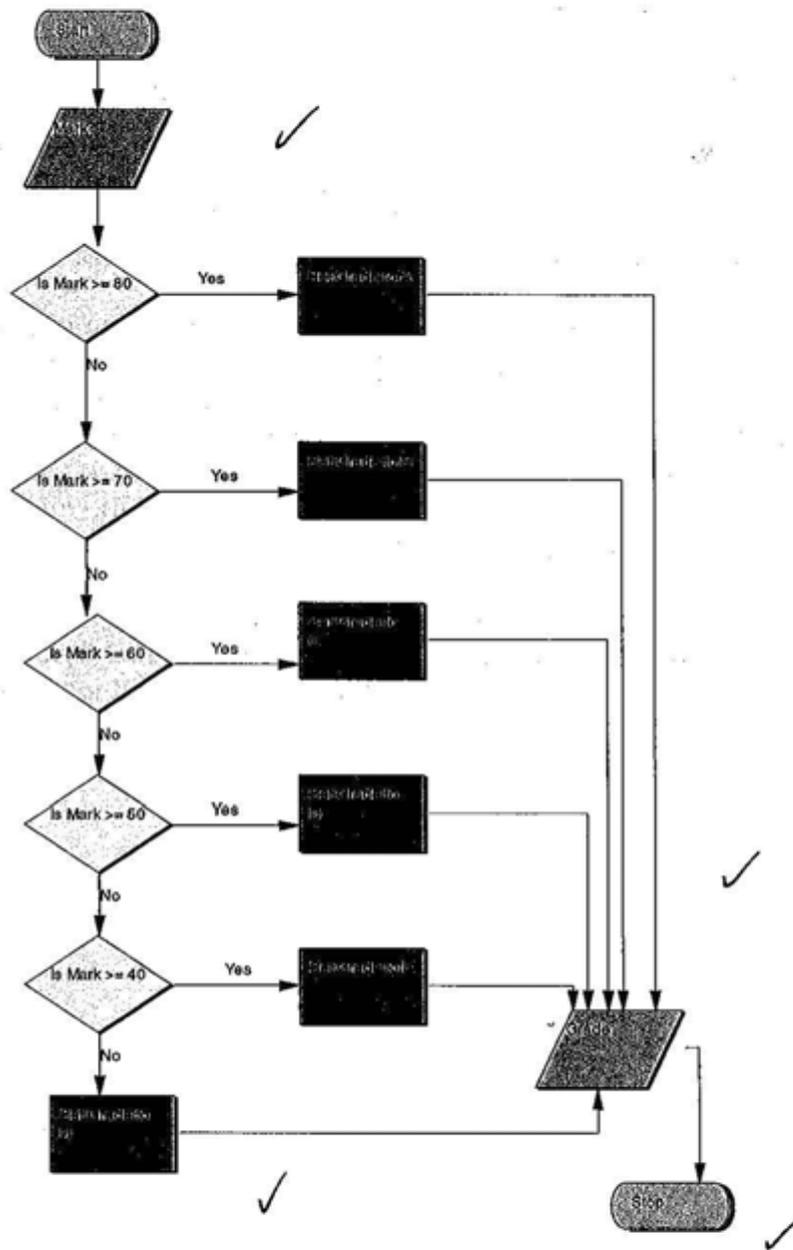
### Flow Charts

A flow chart can be used to show the steps that a process goes through. It is a diagram that uses certain symbols for certain tasks. An example of the symbols used can be seen below.



When put together they are connected using arrows showing the order in which to move between the different tasks. An example of a flow chart can be seen below. The flow chart here is used to calculate and output a student's grade based upon the number of marks they have received.

Calculates Grades



**Advantages**

An advantage of this is that similarly to a decision table the outcome of the processes can easily be seen. Also all of the processes can be seen in a clear and pictorial form unlike the decision tables or pseudocode.

### **Disadvantages**

✓ A disadvantage of this may be that it doesn't show the information in as much details as pseudocode would. As it doesn't show you the actual calculations that need to take place it only shows in which order they would take place.

### **Reports**

✓ Similarly to forms, reports can either be paper or screen based. When creating reports there are similar factors to take in consideration as there was with forms. The content and layout of the reports are vital to ensure that they are easily readable and achieve the maximum output for the user.

✓ Reports can be generated by filtering through the information so that only certain attributes about an entity are shown. For example if the data collected from the Gift Aid form shown above was going to be displayed in a report you could firstly only display the names of the customers and the towns where they live. Then the information could be filtered down so that only the people who live in certain areas are shown. This allows the information contained in the reports to be very specific.

✓ An example of a paper based report can be seen overleaf; this report shows my weekly timetable for college. This is generated by one of the administrators using the 'Columbus' software that the college uses to deal with the student details.

**Student Timetable**

<b>Monday</b>					
08:40 - 10:40	ICT, Applied A2-level (3 unit), line E	247	A		09.IJCTA.06780
11:00 - 11:55	Tutor Group Meeting	248	C		P-CIO
11:55 - 12:50	General Studies AS-level, yr 2, Mon G (Group 5)	142	B		09.H.GSTH.10798
13:35 - 14:55	ICT, Applied A-level (Year 2)	248	C		09.IJCTA.06782
14:55 - 16:15	ICT, Applied A-level (Year 2)	248	C		09.IJCTA.06782
<b>Tuesday</b>					
08:40 - 10:40	ICT, Applied A-level (Year 2)	248	Ai		09.IJCTA.06782
14:55 - 16:15	ICT, Applied A2-level (3 unit), line E	247	Di		09.IJCTA.06780
<b>Wednesday</b>					
08:40 - 10:10	ICT, Applied A-level (Year 2)	248	D		09.IJCTA.06782
10:30 - 11:50	Environmental Studies, A2-level, line B	232	D		09.S.ENVA.08457
11:50 - 13:10	ICT, Applied A2-level (3 unit), line E	247	D		09.IJCTA.06780
<b>Thursday</b>					
13:35 - 14:55	Environmental Studies, A2-level, line B	232	Di		09.S.ENVA.08457
14:55 - 16:15	ICT, Applied A-level (Year 2)	248	Ai		09.IJCTA.06782
<b>Friday</b>					
08:40 - 10:40	Environmental Studies, A2-level, line B	232	D		09.S.ENVA.08457
11:00 - 12:50	ICT, Applied A-level (Year 2)	248	C		09.IJCTA.06782

	Monday	Tuesday	Wednesday	Thursday	Friday
08:40	E	A	C	F	B
10:30	G		B		
11:00	G	D		D	C
12:10			E		
13:35	A	F		B	F
14:55	C	E	G	A	D

**Please note:**

Your personal timetable is also available on your homepage on the college intranet. New paper copies can be provided by Student Reception.

Please remember to keep us informed of any changes to your address or personal information.

As you can see the view of the printed report is much different to the screen based report. Although it shows the same data as the screen based report below it is displayed differently with the different headers and footers on the page instead of the toolbars and other options shown at the top and bottom of the screen based report.

An example of a screen based report can be seen below; this report is generated by the college intranet site it is a report of the lessons that I attend each week. This report is generated using the same Columbus software as the previous printed report.

ILP: Timetable

Please Note: This timetable is provisional and therefore subject to change.

Day	Start	End	Code	Course	Start	End	Code	Course
Monday	08:40	10:40	09.ICTA.06786	ICT, Applied A2-level (3 unit), line B	14-Sep-2009	21-Jun-2010	247	
Monday	11:00	11:15	P-000	PRV01	14-Sep-2009	12-Jul-2010	248	
Monday	11:55	12:50	09.H.GSTH.10799	General Studies AS-level, yr 2, Mon G (Group B)	21-Sep-2009	11-Jan-2010	142	
Monday	12:35	14:15	09.ICTA.06782	ICT, Applied A-level (Year 2)	14-Sep-2009	21-Jun-2010	248	
Monday	14:55	16:15	09.ICTA.06782	ICT, Applied A-level (Year 2)	14-Sep-2009	21-Jun-2010	248	
Tuesday	08:40	10:40	09.ICTA.06782	ICT, Applied A-level (Year 2)	14-Sep-2009	21-Jun-2010	248	
Tuesday	14:55	16:15	09.ICTA.06786	ICT, Applied A2-level (3 unit), line B	14-Sep-2009	21-Jun-2010	247	
Wednesday	08:40	10:10	09.ICTA.06782	ICT, Applied A-level (Year 2)	14-Sep-2009	21-Jun-2010	248	
Wednesday	10:30	11:50	09.S.ENVA.00457	Environmental Studies, A2-level, line B	16-Sep-2009	16-May-2010	232	
Wednesday	11:50	13:15	09.ICTA.06786	ICT, Applied A2-level (3 unit), line B	16-Sep-2009	21-Jun-2010	247	
Thursday	13:35	14:55	09.S.ENVA.00457	Environmental Studies, A2-level, line B	19-Sep-2009	22-May-2010	233	
Thursday	14:55	16:15	09.ICTA.06782	ICT, Applied A-level (Year 2)	14-Sep-2009	21-Jun-2010	248	
Friday	08:40	10:40	09.S.ENVA.00457	Environmental Studies, A2-level, line B	14-Sep-2009	24-Jun-2010	232	
Friday	11:00	12:10	09.ICTA.06782	ICT, Applied A-level (Year 2)	11-Sep-2009	21-Jun-2010	248	

Good ✓

In this example the data is filtered from the database to only show the information with regards to my personal timetable.

**Advantages**

- ✓ An advantage of a report is that it can display a wide range of varied information in the desired format.
- ✓ Another advantage of a report is that calculations can be made to the input data which can then be displayed in the necessary reports. eg. ?

**Disadvantages**

- ✓ A disadvantage of a report is that it can be time consuming to set up and write.
- ✓ Another disadvantage is that the reports can only contain certain types of media. For example if it is paper based the report can not contain videos or sound.

# TASK C

(Task C is on page 27)

## Task C- Investigation Methods

✓ There are several methods that a systems analyst could use to investigate a system, these include: interviews, questionnaires, meetings, observations and document analysis. (plus others on p. 30)

### Interviews

✓ An interview is when the analyst would sit down and talk to one or two employees about the system. Usually the systems analyst would have pre planned which questions they are going to ask. They would normally first discuss how the current system is used and how effective this may be. They will then go on to talk about how this system could be improved or in some cases replaced.

✓ There are both advantages and disadvantages to this method. An advantage would be that the analyst is able to talk one to one to the people who use the current system regularly. Also the analyst can change the questions as the interview develops, this wouldn't be possible with a questionnaire so the interviewer may end up with more information this way.

✓ A disadvantage would be that by interviewing everyone on a one to one basis it can be very costly and time consuming. Some people may not feel that they can say what they really think as an interview isn't carried out anonymously. Also it can be easy for someone to give incorrect or misleading information so it is important that the interviewer checks that the information they are given is correct.

✓ An example of where an interview would be used would be a tourist attraction where the customer details need to be recorded on entry for the national Gift Aid scheme. The attraction want to update their system so that all the information is recorded straight onto a computerised system instead of the paper based one they currently use. In this case the manager may be interviewed to find out what information needs to be input, processed and output from the system. They may also be asked the available time to complete the project and also the budget they have to do this.

### Questionnaires

✓ A questionnaire is when a list of prepared questions usually with a list of options for results is given to a client. This is usually used to give to several clients at the same time, and is an easy way of find the most common answers among several people.

✓ An advantage of a questionnaire over an interview is that they are cheaper than interviews as several people can be asked the questions at the same time. Another advantage with this is that several people are being asked the same questions so it would be easy to make comparisons about the answers

and to translate these into figures or graphs. Unlike an interview a questionnaire can also be anonymous this may mean that people feel they can be more honest in the answers that they give. ✓

A disadvantage would be that not everyone who is given a questionnaire will return it. Also the questions need to be carefully chosen to ensure that they are not misleading as it would be easy for someone to take a question the wrong way and give an inaccurate result. A disadvantage of questionnaires over interviews is that the questions can only have specific results whereas with an interview the person can say a wide range of results with varying lengths. ✓  
( ' open' answer Q's ? )

An example of when a questionnaire would be appropriate could also come from the tourist attraction example as a questionnaire may be given to the members of staff who work in the reception and operate the tills. It may be used to find out how competent they are at using a computer already to see what training may be needed and also what they think the problems are with the current system. ✓  
training?

### Observation

An observation is when the analyst watches the current system being used, this then gives them an idea of what a new system would need to be able to do and what the problems are with the current system. ✓

An advantage of observation is that the current working system including the inputs, outputs and processes can be viewed by the analyst on a first hand basis. Another advantage would be that they can see where and what the problems of the system are. ✓

A disadvantage would be that the users of the system may not feel comfortable when being observed so may not act as they normally would. Depending upon the system problems may not occur during the observation therefore the observation would have been a waste of time and money. Also they are very costly and time-consuming to carry out. ✓

An example of when an observation may be used would be <sup>in</sup> a doctors' surgery. A doctor's surgery is going to change from a manual paper based system, with each patient's details being stored on record cards. The analyst would go into the surgery and observe the receptionist dealing with the patient details on the cards to see how this system could be improved. ✓

### Document Analysis

A document analysis is when the analyst looks at any paper work which is used within the system. This will help them to identify the inputs and outputs of the current system and possibly the current data collection techniques. ✓

✓ An advantage of this is that this is very good for finding the inputs and outputs, if the analyst goes on to develop a new system this would identify the data fields that need to be included.

✓ One disadvantage of this is that it is only relevant when the system uses paper based documents for inputs and outputs.

✓ Document analysis may also be used in the doctor's surgery example as the analyst may look at the cards containing the patient details to see what data is stored about each patient and in which format.

### Meetings

✓ This is when the analyst conducts a meeting with several people involved in the system at the same time; this may include a manager, supervisor, sales assistant and customer for example. The meeting can be structured in a number of different ways but they can use presentation for example to aid the discussion topics.

✓ An advantage of this is that unlike an interview it is very cost effective as the views of several people are taken at the same time instead of one to one. Also any ideas that anyone may have during the meeting can be discussed around the group and the ideas they may have can be bounced off of one another.

✓ A disadvantage would be that some people may not feel able to talk in front of a group of people either because they are nervous or they may not feel that they can say what they think with the managers or other staff members present. If this is the case then the meeting wouldn't be a very successful way to gather information.

✓ An example of meetings could come from a small video shop. The video shop is looking to put in place a new system in place of storing all of the customer details on individual record cards. A meeting could be held with the manager, sales assistants and possibly a customer to look at how the system could be changed.

### Video Conferencing

✓ This is similar to meetings as it gathers the views of several people at the same time, it would be used if a larger company was looking to upgrade there systems across more than one site.

✓ The advantages of this would be similar to those of meetings as several people are being interviewed at the same time money can be saved as it is cost effective. Another advantage is that people don't need to travel across more than one site again making it more cost effective.

A disadvantage would be that the company would need to have the appropriate hardware and software available to be able to carry out a video conference as it would not be cost effective to purchase the appropriate equipment just for the one conference. ✓

An example of this may be a national supermarket chain. A supermarket want to upgrade their stock system to allow the stock to be automatically ordered when the number of a particular item of stock sold is lower than the number they should always have in stock, across all stores. A video conference could be set up between the supplier, director of the supermarket and the analyst to discuss what information needs to be sent between the different companies. ✓

### Conclusion

In conclusion the systems analyst would need to use a variety of different techniques to gather as much information as possible about the current system. They would use different techniques depending on the situation, for example if a small video shopping was going to upgrade there system an interview with the manager would be more appropriate than video conferencing. If the analyst has successfully gathered enough information about the system they should then be able to go on and look at possible solutions. ✓

# TASK D

### Task D (i)- Design

For this task I have been asked to produce a feasibility report and solutions to the problems that are occurring with Bob's Band's Booking System (BBBS).

#### Problems

There are many problems that Bob is facing with his current system which are making his company inefficient and unreliable. These problems are;

- When someone specifies which style of music they want to book out Bob must search through each individual record card. If he then finds a band that plays the correct style of music he must phone the bands manager and ask if they would be interested in playing at the club at the specific time and date. If the manager says no Bob then has to go back to the record cards and repeat the process again. He must then phone the club back and confirm the band that he has chosen. If the club say no to the chosen band Bob must again go back to the record cards and continue searching. This is very time consuming, also the bands that are at the front of the index cards will be chosen more often, this means that the bands at the back of the list may get very little business from Bob.
- It takes Bob a very long time receive and process payments from the clubs and to the bands. This is because Bob is currently using cheques as payment and the cheques are sent in the post which takes time to send.
- Barb spends a lot of time duplicating letters to the clubs and the bands this is very time consuming and could lead to errors if she enters the wrong information.
- With all of the notes written in the desktop diary it often becomes messy and confusion, this may cause the clubs to be misinformed or not informed if a cancellation or change to a booking occurs. This also leads to confusion for the bands that turn up where they shouldn't or don't turn up in the correct place at the correct time.
- When Barb sends out the letters there is a long delay with the post this may mean that the club or band don't receive the information with enough warning time.
- At present there is no evidence that Bob is recording the payments that he receives or sends out. This could cause additional problems when he generates his tax return as he may not know how much income he has made.
- Bob has to contact the bands and the clubs several times leading up to an event. Every time he does this he has to search through all of the record cards before finding the relevant one. Each time he does this he

ends up wasting a lot of his time as the process is very time consuming. Also Bob does not record the times when he contacts the bands and clubs so he may forget to contact them or contact them more than once.

- As Bob is keeping all of the bookings in a diary he may not be able to record all of the bookings that take place over a year in advance.
- Bob has to work out the fee for the band by hand; this may lead to human error. Also this process becomes quite complicated as he needs to try and work out the percentage to pay the band and keep for BBBS.

### Investigation Methods

When investigating this system the investigation methods I will use would be;

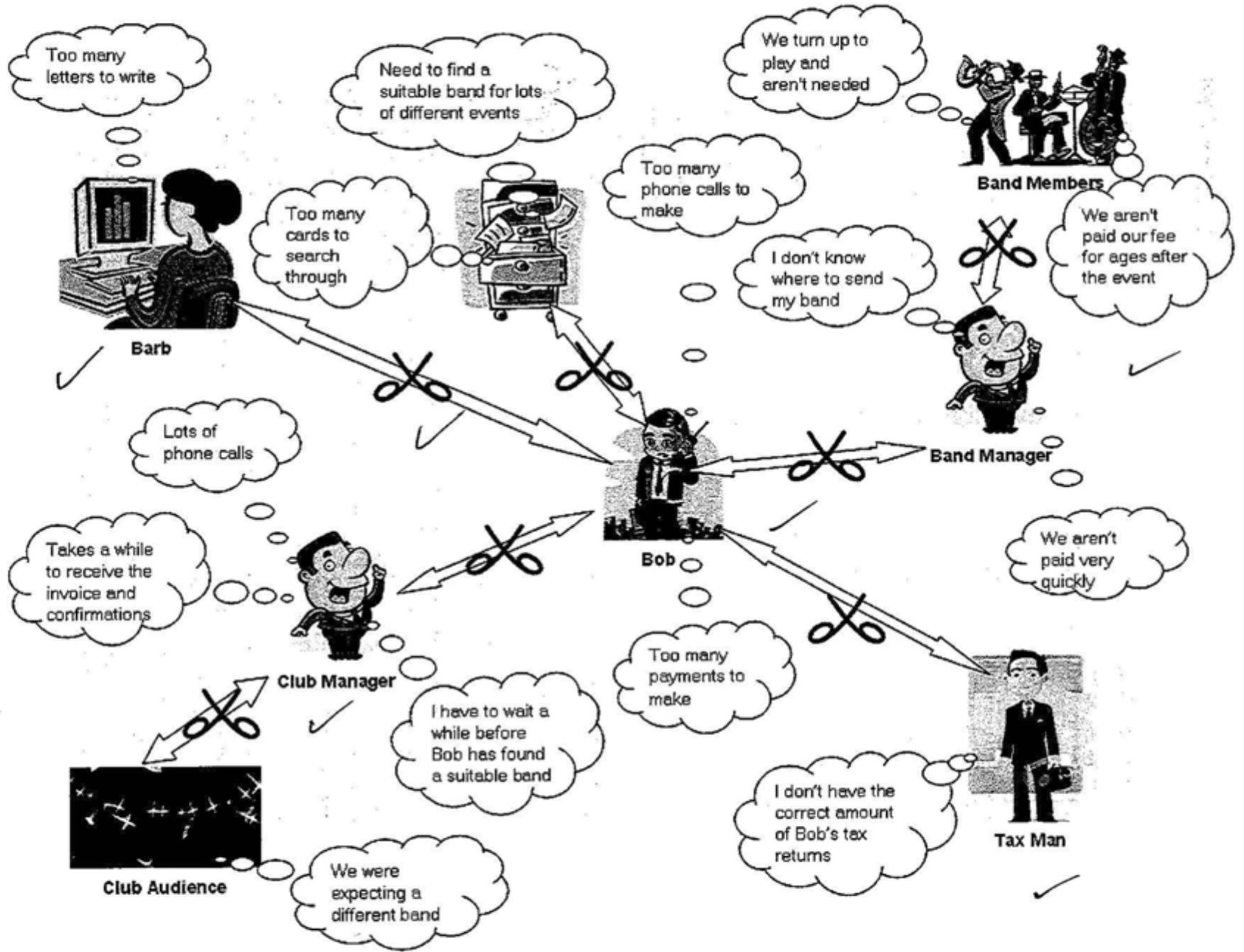
- Interview; I will conduct an interview with Bob to find out how he feels the current problems with the system can be addressed. I will also carry out an interview with Barb to find out how she finds the tasks that she carries out. I will also be asking her how long it currently takes her to carry out her tasks.
- Observation; I will observe how the current system is used and look at how the current processes are carried out.
- Questionnaire; I will construct questionnaires to send out to some of the clubs and some of the bands to find out how long it takes for them to receive their payments. I will also aim to find out whether or not they have any problems with mix ups of times or venues and how often this may occur.
- Meetings; I would also hold a meeting with Bob, Barb and a few of the managers from both the clubs and bands. Here we could discuss how the communication works between all of these people and also how they all think it could be improved.
- Documentation; I would finally look at the forms and input methods that the company currently use such as the index cards and the diary. This will give me the opportunity to find out what information the company need to store and process about their clients.

### Current System

To fully analyse and document the current working practises of the system I am going to create the following diagram. This diagram is a rich picture which shows the relationship between the entities. When designing the new system I will also create an entity relationship diagram, data flow diagram and data dictionary.

**Rich Picture**

This rich picture diagram shows the relationships between the different entities in the current system.



*Good*

### New System Requirements

The requirements that Bob would need from a new system are;

- An electronic way to store the band, manager, club and booking details.
- A way to calculate the fees to charge the clubs and to charge the bands quickly and accurately.
- A faster way to process payments, such as internet banking.
- To be able to contact the band and club managers quickly, for example via email.
- A faster way of generating the confirmation and invoice letters.
- A way of reporting the information that is collected. For example reports could be generated to show the clubs which have outstanding payments.
- A way to record the payments that Bob receives and is owed.
- A way of recording when he contacts the bands or clubs.
- To have a way of taking bookings more than a year in advance.

### Inputs, Processes and Outputs

All of the inputs that the system needs can be seen in the data dictionary (p.63?)

The processes needed are;

- When a club makes a provisional booking, the bands need to be searched to find one that is the correct type and available.
- The fee to charge the club needs to be calculated based upon the list the club is on, whether the band is headlining or not, whether it is a regular booking and the time of the booking.
- The amount to pay each band needs to be calculated based on certain percentages of the total amount paid to Bob.

The outputs that are needed are;

- A list of which bands are available at the specific time and date, this could be done as a screen based report.
- Confirmation of bookings made and costs to the club need to be sent out, probably via email.
- Several reports will be needed to generate things such as; total amount of income over a certain time period.

### Data to be Stored

The data to be stored about each entity can be seen in the data dictionary in task F. All of the data will be stored in separate files or tables for each entity. These files or tables will then be linked based on the necessary relationships needed between the different entities. The relationships between the entities can be seen in the entity relationship diagram also in task F.

**Feasibility**

Below the feasibility of creating a new system for BBBS has been assessed using the acronym TELOS.

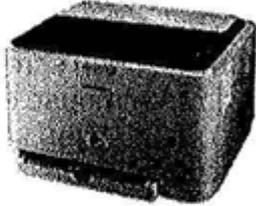
**Technical**

If a computerised system were to be implemented a computer would be needed with a screen for output. A touch screen could be used for input, alternatively to keep the cost down a mouse and keyboard could be used but this can be discussed with the organisation at a later date. The computer and printer that Barb currently uses could be used to do this. However the specification of this would need to be checked to see if they are suitable. Bob is also going to need an internet connection, preferably broadband, so that he can send out emails or carry out internet banking. Depending on the type of system that is chosen BBBS will need to purchase some software, this may be an off the shelf package such as a database package or this could be a piece of bespoke software. As the specification of Barb's laptop is unknown I have also specified a computer, printer and router. This can be seen below.

**A Personal Computer**

Type	Personal Computer
Picture	
Processor Type	Phenom X3
Processor Model	8550
Installed Memory	2GB
Office Ready PC	Yes
Optical Storage	DVD±RW (±R DL) / DVD-RAM
Operating System	Microsoft Windows Vista
Case Style	Desktop
Brand	Acer
Supplier	<a href="http://www.dabs.co.uk">www.dabs.co.uk</a>
Stock Status	In Stock
Price Inc VAT	£399.05

Printer

Name	Description	Picture	Supplier	Price
Samsung CLP310 Colour Laser Printer	Speed- Up to 16 ppm - A4 (210 x 297 mm) , Up to 17 ppm - ANSI A (Letter) (216 x 279 mm) , Up to 4 ppm - A4 (210 x 297 mm) , Up to 4 ppm - ANSI A (Letter) (216 x 279 mm) Wired- USB Resolution- 2400 dpi x 600 dpi 150-sheet multipurpose tray		www.dabs.com	£98.29

Router

BBBS will also need a router or a modem to allow them to connect to the internet. With most broadband internet packages a free wireless router is usually given, after looking at several broadband options the one I have specified can be seen below.

Name of Provider	Download Speed	Download Limits	Length of Contract	Comments	Normal Price (a month)	Logo
O2	Up to 8mb	Unlimited	12 months	Free McAfee security software to keep you virus-free as you surf Free Wireless Router Free Installation	£12.23	

Software

As BBBS will be writing letters and dealing with emails I would suggest that they would need a word processing package, internet browser and email client. The ones I have specified can be seen below.

Name	Description	Picture	Supplier	Price
Microsoft Office 2007 Small Business	Language- English License Type-1 User License QTY- PC 1 Platform- Windows OS Required- Microsoft Windows XP SP2 or later, Microsoft Windows Server 2003 SP1 or later System Requirements- Microsoft Windows XP SP2 or later - 500 MHz - RAM 256 MB - HD 2 GB & Microsoft Windows Server 2003 SP1 or later - 500 MHz - RAM 256 MB - HD 2 GB		www.novatech.co.uk	£193.60

<p>Mozilla Firefox</p>	<p>Firefox is a <u>web browser</u> created by Mozilla being open source makes Firefox infinitely adaptable. Some of Firefox's specialized features include pop-up blockers and advanced privacy settings. Firefox also offers <u>tabbed browsing</u>. You can open more than one website in your browser window, and tabs on the screen allow you to easily switch between them. The browser also has several advanced search options.</p>		<p>www.mozilla.com</p>	<p>Free</p>
<p>Mozilla Thunderbird</p>	<p>Mozilla Thunderbird is a <u>free, open source, cross-platform e-mail and news client</u> developed by the <u>Mozilla Foundation</u>. Thunderbird aims to be a simple e-mail, newsgroup and news feed client. Thunderbird can manage multiple e-mail, newsgroup and <u>RSS</u> accounts and supports multiple identities within accounts. Features like quick search, saved search folders ("virtual folders"), advanced message filtering, message grouping, and labels help manage and find messages.</p>		<p>www.mozillamessaging.com</p>	<p>Free</p>

**Economic**

When looking at the economic side of the new system a cost benefit analysis is going to be needed.

**Costs**

- Training the Staff
- Purchasing new hardware
- Purchasing new software
- Implementing the system-changing all the data over

**Benefits**

- A new system would save time as staff won't need to take as long to search the index cards, this means staff will not need to be paid for as many hours.
- Less time will be wasted from trying to correct human errors that often occur when Bob and Barb are making or changing the bookings made in the diary.
- Less likely for errors to be made when calculating the cost of the fees this could save them money.

*estimated figures?*

*✓ Bob*

- By using email instead of post to contact the bands and clubs money can be saved on postage.

#### Legal

✓ Data protection will need to be taken into account when handling the club, band and manager details. Also the amount of money and income generated will need to be closely monitored to ensure that the tax declarations are correct at the end of the year.

#### Operational

✓ All staff will need to be trained in using the new system, some staff may require general computer training to build their confidence using a computer before they begin using the new system.

#### Schedule

✓ Ideally BBBS would like the new system implemented after the 1<sup>st</sup> January 2010. They do not want the change over to happen over the Christmas period as they are normally very busy during this time.

✓ The feasibility shows that over time the costs of the new system would be outweighed by benefits in the future. The main advantages of a new system would mainly be that they reduce the number of staff hours needed. Also the reputation of the company would hopefully improve as fewer errors will be made when making bookings and controlling changes that may occur as the room for human error is greatly reduced.

#### Possible Solutions

✓ There are two different types of software available to Bob. The first is an off the shelf package, this could then be tailored to meet the needs of the company. The other type would be to get a bespoke software package; this would be a programmed solution that is designed specifically for BBBS.

✓ There are two main off the shelf software packages that would be suitable for BBBS; spreadsheet software or database software.

✓ If spreadsheet software were to be used the attributes about each of the entities could be stored on individual sheets. These sheets can then be linked together so that the data can be collected from the necessary sheets. Also when using spreadsheets it is possible to create letters through mail merging.

✓ This will be useful for BBBS as they allow the letters to be generated quickly and would reduce the room for human error. Spreadsheets would also allow Bob to use a lookup facility or filter option to quickly find the available bands based upon the necessary criteria methods. Forms can be set up within the spreadsheets to allow the user to enter the necessary information quickly and easily.

✓ If database software were to be used the information about the entities would be stored in individual tables. The tables can then be linked together with specific relationships. Forms could also be made within a database to allow

the user to enter the required information, similarly to spreadsheets. Also the use of a database would allow the user to carry out queries to find the available bands and booked events. These queries could then be further generated into both screen and printed reports. This can be done easier in a database package than a spreadsheet package. ✓

Both of these would meet the requirements of BBBS as they both allow the required information to be stored in a logical way that can be manipulated to show the views that Bob requires, for example he will quickly to be able to generate a report showing the available bands for a specific type of music. ✓

The main benefit of purchasing an off the shelf package would be that generally it is likely to be much cheaper than a bespoke package. Another advantage would be that this option would also probably take a shorter time to implement. ✓

A disadvantage of an off the shelf package would be that it isn't specifically tailored to meet the needs of BBBS, therefore it might not meet all of their exact needs. Alternatively BBBS may need to use several different pieces of software to carry out all of their tasks. For the fairly simple calculations that Bob needs to carry out a piece of off the shelf software would be able to carry out much more complex calculations and tasks. This may mean that the user will find this kind of software more difficult and confusing to use. ✓

If a programmed solution were to be used the user can define exactly how they want the input forms and output reports to be displayed. A programmed solution would store the information about each of the entities in separate files. The program will then take the required pieces of information from each of the files carry out the necessary processes and save the information back to the necessary files. A programmed solution can also generate the necessary reports both to screen and paper. ✓

An advantage of a bespoke package would be that the software would be specifically designed for BBBS and therefore would meet all of their needs. Also the software itself could be designed around the user, for example the interface could be designed in the way that the user will be able to use it best. ✓

A disadvantage would be that this can be quite costly as BBBS would need to pay someone to program them a new system. Also this could take a long time to implement. ✓

This would also meet the requirements of BBBS as it would allow Bob to store the band details in a way that is easy to use. It would also allow them to generate the required outputs in the format that would best suit them for example using on screen reports or the printed letters. ✓

### Recommended Solution

After looking at a number of possible solutions I would recommend that BBBS implement a bespoke software package. I believe that this would be the most ✓

✓ suitable as it will allow the company to tailor the system to their exact needs. This is also something that could be developed to adapt with the changing of BBBS over time this may however be a difficult task to carry out in a spreadsheet or database package.

✓ The disadvantages of this solution would be that BBBS would be completely reliant upon the company or programmer that they had to create the new system in the first place. The company will have to provide BBBS with the necessary training and ongoing maintenance of the system. The main disadvantage of this system are that the initial costs to purchase and set up the system would be higher than the off the shelf package.

✓ The advantages of this system mean that Bob will have a GUI (Graphical User Interface) which has been tailored to meet his exact needs and laid out in the way that best suits him. Also whilst the initial costs of the system are high I believe that it will save Bob money in the long term because if Bob wants to make changes to the system these can be done gradually whereas if he were to use an off the shelf package this wouldn't be very easy and he may have to create a completely new system from scratch. Another advantage is that the bespoke package wouldn't contain all the advanced features of a database.

✓ This would reduce the room for human error as Bob won't be able to carry out commands by mistake that may lead to data being lost. This will also make the system clearer for the user as they will only see the toolbars and buttons that they need they aren't going to be faced with large toolbars that they may be unsure of their purpose.

## Task D (ii)

### Estimated Costs

After carrying out the feasibility study the estimated cost for all of the hardware and software that will be needed to create the system is £703.17. In addition to this a monthly fee of £12.23 will need to be paid for the ISP. ✓

On top of this cost someone will need to be paid to create the program, this cost will vary depending on the programmer. I have however calculated an estimate; if a programmer is paid £30 an hour and works 20 hours a week for 3 months the total cost would be £7200. *could have been part of Feasibility.* ✓

Therefore in total the cost for this bespoke solution would be around £7903.17. However this doesn't take into account the extra money needed to train the staff. *+ Benefits.* ✓

### Form Designs

The main forms that the system is going to need are forms to;

- Insert a new band
- Insert a new manager
- Insert a new club
- To search for an available band and record new booking ✓
- To calculate and deal with the payments ✓

The system will also need forms to allow the users to login, create or change passwords and a home form that loads at the start of the program. ✓

I created the screen designs in Visual Basic as I have specified a bespoke package for BBBS; although similar designs could be made in a database or spreadsheet package. *Good* ✓

All of the forms use a Microsoft Sans Serif font. I chose this font as I believe it is fairly easy to read particularly for those users that may have sight problems. ✓

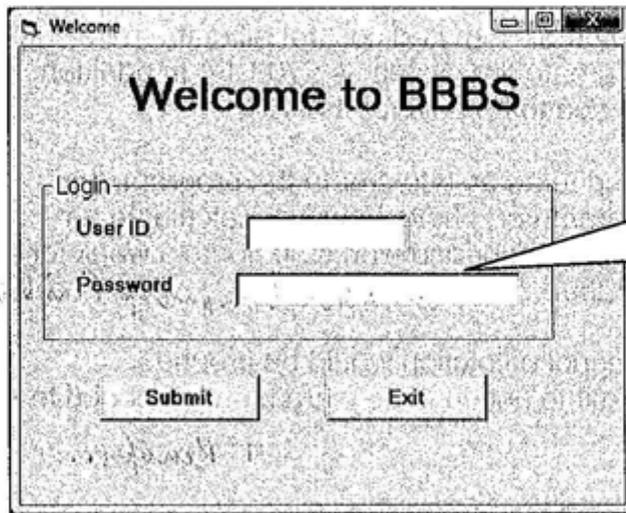
I also chose to use a light coloured background with the use of dark text at the front again to try and make it easier for the user to read. ✓

Whilst the colour choices are fairly plain I thought this was best as some users may have difficulty with specific colours. For example if someone is colour blind they find certain colours dazzling to try and read or decipher text on. Therefore I felt that plain colours would allow many users to be able to use the forms. ✓

*takes account of  
fonts/colours, etc.*

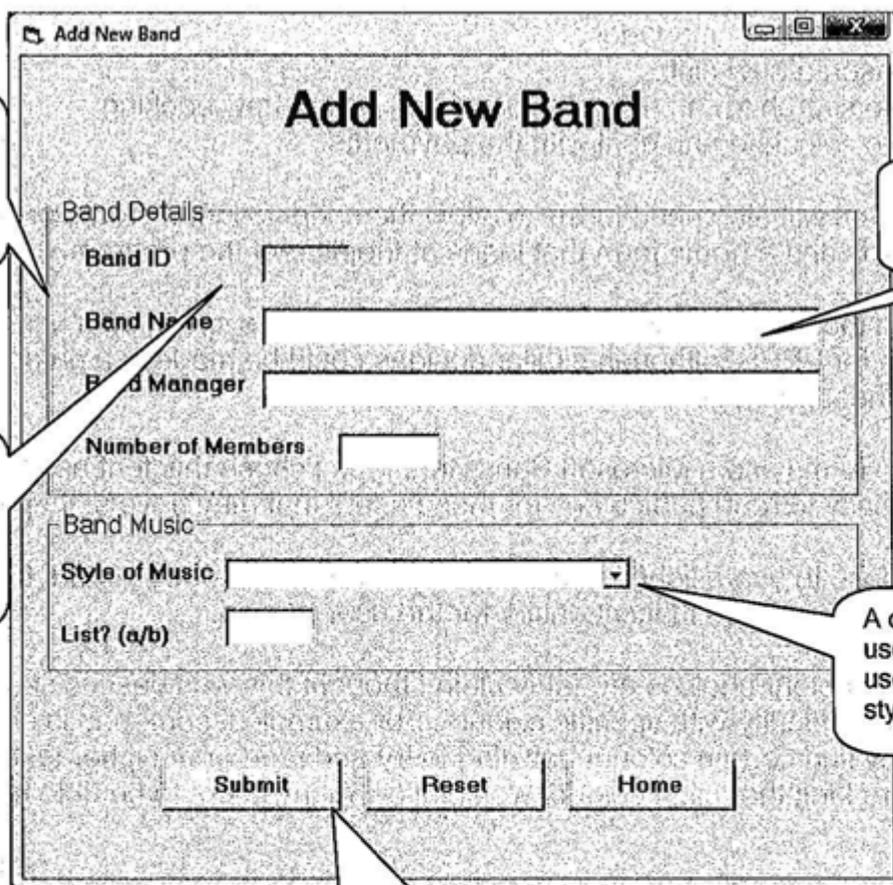
## Input Forms

The first form that will load when the program is executed is the login form.



This form allows the user to input their username and password. When they have entered their login details they select a command button to continue.

This form has been designed to allow Bob to enter information about a new band.



Frames are used on each form to break up the boxes into sections to make data input easier.

Text boxes will allow the user to enter the necessary.

The Band ID is displayed in a label as it is automatically generated and can't be changed by the user.

A combo box will be used to allow the user to select a given style of music.

Command buttons allow the user to navigate between the different screens.

Bob needs to be able to edit the band details as they regularly change between the A and B lists.

This form is similar to the add new band form. The only difference is that the form allows the user to manual type in the Band ID for the band that they want to edit the information about.

This form has been designed to allow Bob to enter the information about the new clubs.

Once again the Club ID will be generated automatically and displayed in a label.

At present all of the address needs to be entered into the form manually. If Bob is going to enter a lot of address' it may be worth him purchasing a licence for a postcode lookup package which finds the rest of the address from the postcode. This cuts down on the amount of data that needs to be entered saving the company more time and also reducing the room for human error. This is something that can be discussed with BBBS and possibly added at a later date.

*Good.*

This form has been designed to allow Bob to enter the information about the new managers.

Similarly to the other forms the Manager ID is displayed in a label.

This form has been designed to allow Bob to make a new booking.

When the user has entered the specific information this command button will start a process which searches for the bands which are the appropriate style and are available at the specified time and date.

The results for the available bands will be displayed in the list box.

This command button allows the user to select the band that they have chosen.

A check box is used to select when the band will be the headlining act or not.

All of the band information will automatically be filed out from the band file.

A combo box is used to allow the user to select the club which requires the booking.

This form has been designed to allow Bob to process the payment information.

When the user enters the Booking ID into the text box the rest of the relevant information is displayed in the labels. It is also from here where the amount to pay the band is calculated and displayed.

The screenshot shows a web browser window titled "Payment". The main heading is "Payment". Below it, there are several sections:

- A "Payment ID" text box.
- A "Club" text box.
- A "Fee for Club To Pay" text box.
- A "Fee Paid?" checkbox.
- An "Email Club Invoice" button.
- A "Pay Band" section with a "Fee to Pay Band" text box and a "Band" text box.
- Another "Fee Paid?" checkbox.
- A "Send Out Payment" button.
- At the bottom, there are three buttons: "Submit", "Reset", and "Home".

When this command button is pressed an internet browser will be loaded with an internet banking site allowing Bob to authorise the out going payment.

The Home form is displayed when the user first logs onto the system.

The command buttons allow the user to navigate between the different forms for both input and output.

The screenshot shows a web browser window titled "Home". The main heading is "Home". The form is organized into three main columns:

- Add New:** Contains buttons for "Band", "Manager", and "Club".
- Process:** Contains buttons for "Booking" and "Payment".
- View Reports:** Contains a button for "Reports".
- On the right side, there are buttons for "Log Out" and "Exit".

By using the log out command button the user will be return to the login form. If the Exit button is used the program will end.

## Output Designs

The outputs that the system are going to need include emails and reports.

The reports that the system is going to need include;

- A report to show the bands that have outstanding payments
- A report to show the clubs that have outstanding payments
- A report to show the upcoming bookings, based on certain criteria.

The report that is going to show the upcoming bookings will need to allow the bookings to be filtered by a number of criteria. This includes; being able to see the bookings for a particular day, seeing the upcoming bookings for a specific band or a specific club.

Excellent

Tabs are used each one containing a different list box to display the list of the information.

Command buttons allow the user to return to the home page or clear the current form.

Combo boxes allow the user to select a specific band or club that they want to see the bookings for.

When the user selects search the information is searched based on the criteria set in the text and list boxes and displayed in the list box below.

Another output the system is going to require is an email to the band managers and clubs. The designs for these can be seen overleaf.

The design for the email to the band manager can be seen below. The attributes will be mail merged into the email to save the user from typing the information again.

Dear <<managename>> ✓	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">BBBS LOGO</div>										
After confirming booking <<bookingid>> with you please find the confirmed booking details below; ✓											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Booking ID</td> <td style="padding: 2px;">&lt;&lt;bookingid&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Band</td> <td style="padding: 2px;">&lt;&lt;bandname&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Club</td> <td style="padding: 2px;">&lt;&lt;clubname&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Date</td> <td style="padding: 2px;">&lt;&lt;daterequired&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Time</td> <td style="padding: 2px;">&lt;&lt;timerequired&gt;&gt; ✓</td> </tr> </table>	Booking ID	<<bookingid>>	Band	<<bandname>>	Club	<<clubname>>	Date	<<daterequired>>	Time	<<timerequired>> ✓	
Booking ID	<<bookingid>>										
Band	<<bandname>>										
Club	<<clubname>>										
Date	<<daterequired>>										
Time	<<timerequired>> ✓										
Please inform us of any problems or queries you may have about this booking as soon as possible.											
Regards BBBS ✓											

The design for the email to the club can be seen below.

Dear <<contactname>> ✓	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">BBBS LOGO</div>										
After confirming booking <<bookingid>> with you please find the confirmed booking details below;											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Booking ID</td> <td style="padding: 2px;">&lt;&lt;bookingid&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Club</td> <td style="padding: 2px;">&lt;&lt;clubname&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Band</td> <td style="padding: 2px;">&lt;&lt;bandname&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Date</td> <td style="padding: 2px;">&lt;&lt;daterequired&gt;&gt;</td> </tr> <tr> <td style="padding: 2px;">Time</td> <td style="padding: 2px;">&lt;&lt;timerequired&gt;&gt;</td> </tr> </table>	Booking ID	<<bookingid>>	Club	<<clubname>>	Band	<<bandname>>	Date	<<daterequired>>	Time	<<timerequired>>	
Booking ID	<<bookingid>>										
Club	<<clubname>>										
Band	<<bandname>>										
Date	<<daterequired>>										
Time	<<timerequired>>										
Please inform us of any problems or queries you may have about this booking as soon as possible.											
Regards BBBS ✓											

Algorithms

The system will need to carry out several calculations during the system. Therefore in the design section I am going to write out these calculations in pseudocode so that they can then be translated into the necessary programming code in the implementation section.

**Calculating the Fee for the Club to Pay**

This calculates the amount to charge the club based upon a number of different criteria.

```

IF list=a THEN
    feetopayclub=400

    IF daterequired=Friday or Saturday THEN
        feetopayclub=feetopayclub+100 ✓
    END IF

    IF headlingact=False THEN
        feetopayclub=feetopayclub-50 ✓
    END IF

    IF regularbooking=True THEN
        feetopayclub=feetopayclub-50 ✓
    END IF

ELSE
    feetopayclub=250

    IF daterequired=Friday or Saturday THEN
        feetopayclub=feetopayclub+50 ✓
    END IF

    IF headlingact=False THEN
        feetopayclub=feetopayclub-25 ✓
    END IF

    IF regularbooking=True THEN
        feetopayclub=feetopayclub-25 ✓
    END IF

END IF

```

### Calculating the Amount to Pay the Band

This is a very simple calculation because it calculates 70% of the money taken from the club to give to the band.

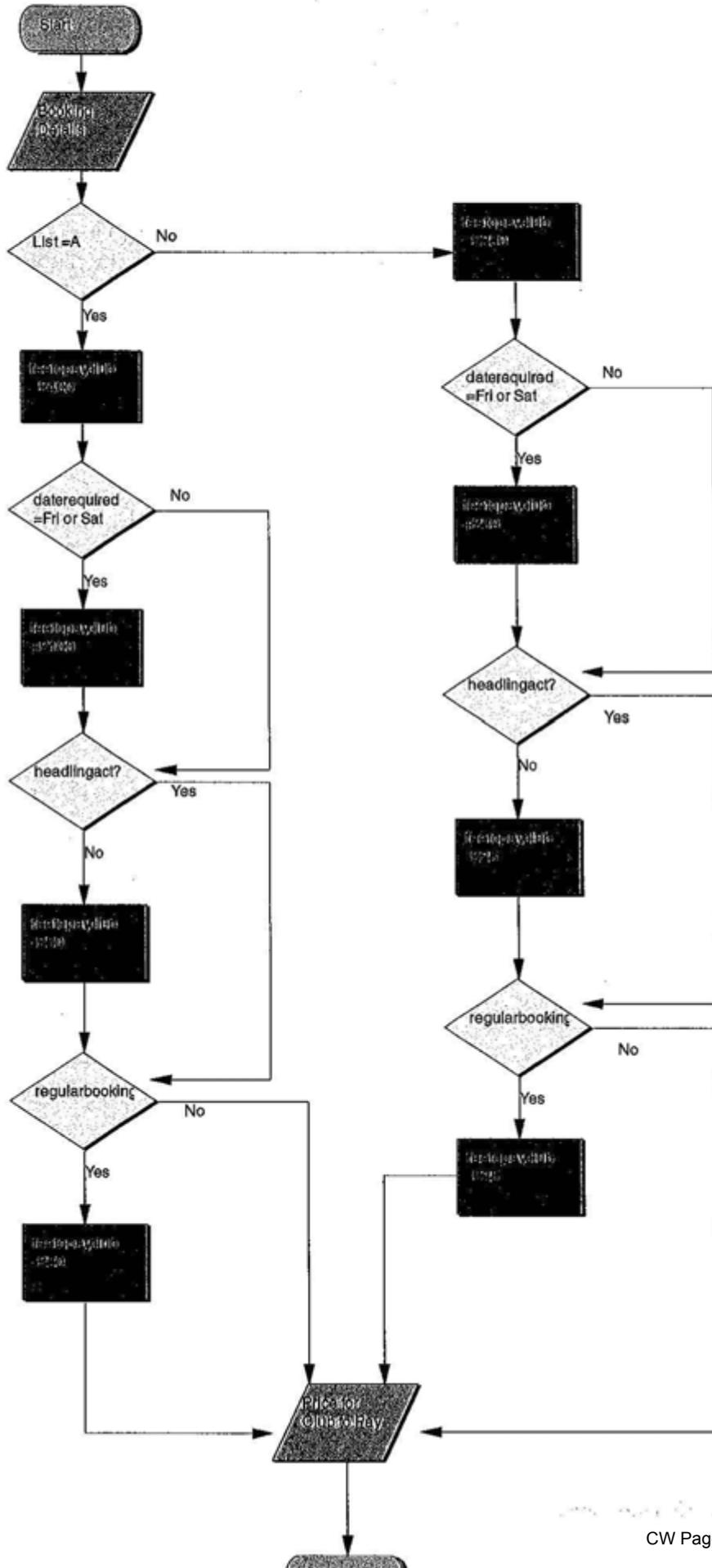
$$\text{feetopayband} = \text{feetopayclub} * 0.7$$

### Systems Flow Chart

As the process to calculate the amount to a charge club is a complicated process I also represented it using a systems flow chart which can be seen over the page.

*Handwritten notes:*  
Not 30%  
... ..

Payments- BBBS



Excellent Design work.

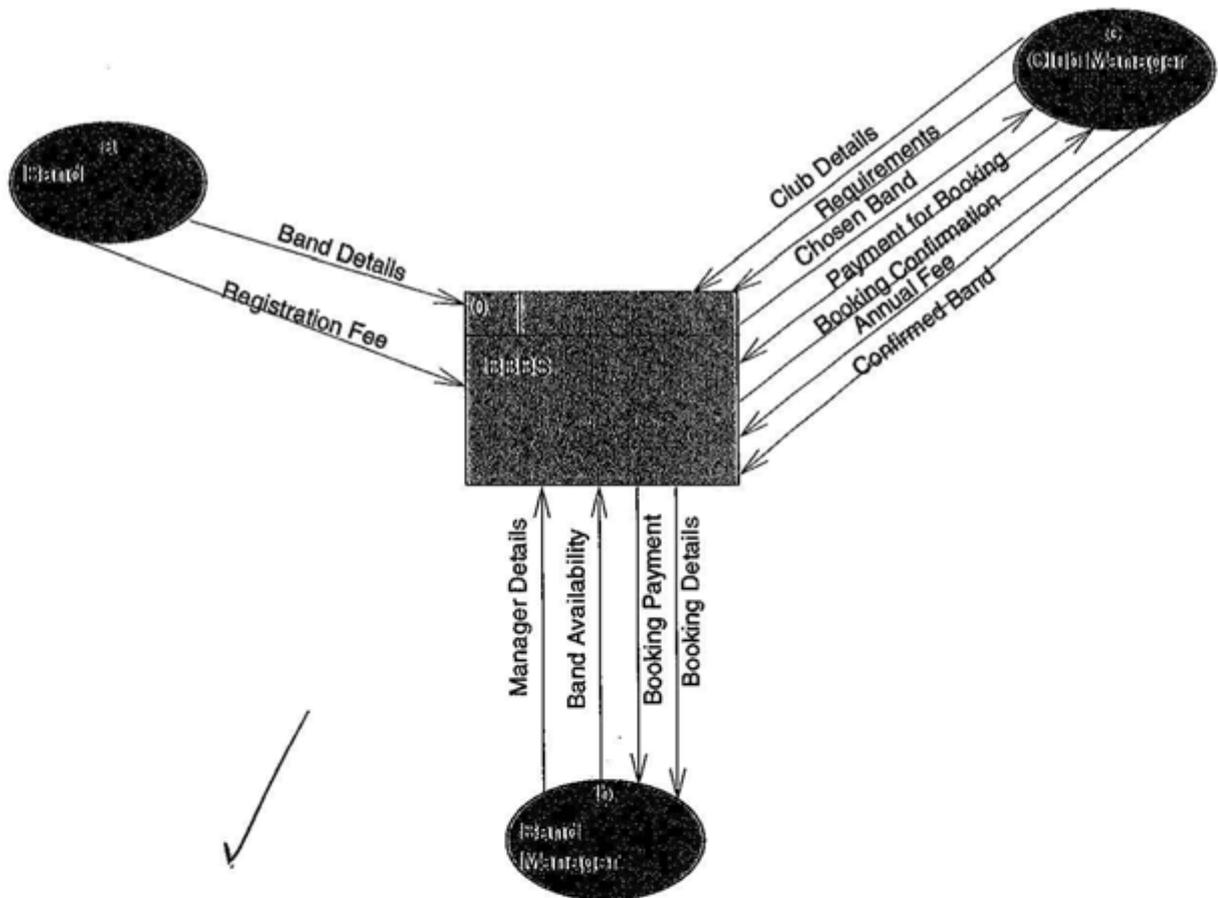
# TASK E

### Task E- Data Flow Diagram

✓ For this task I am going to create a Data Flow Diagram (DFD) to show the current working practises of BBBS.

Each diagram looks at the system in a little more detail than the one before it. All of the diagrams clearly illustrate how the data currently moves around the system. This makes it easier for the systems analyst when designing the new system as they will be able to see the processes that are needed and who needs to receive certain information.

### BBBS - Context Diagram



The context diagram is the most basic of all the diagrams. Here the three entities are shown with the whole system shown in the centre as one process. This shows the main process and how all of the external entities interact with BBBS. ✓

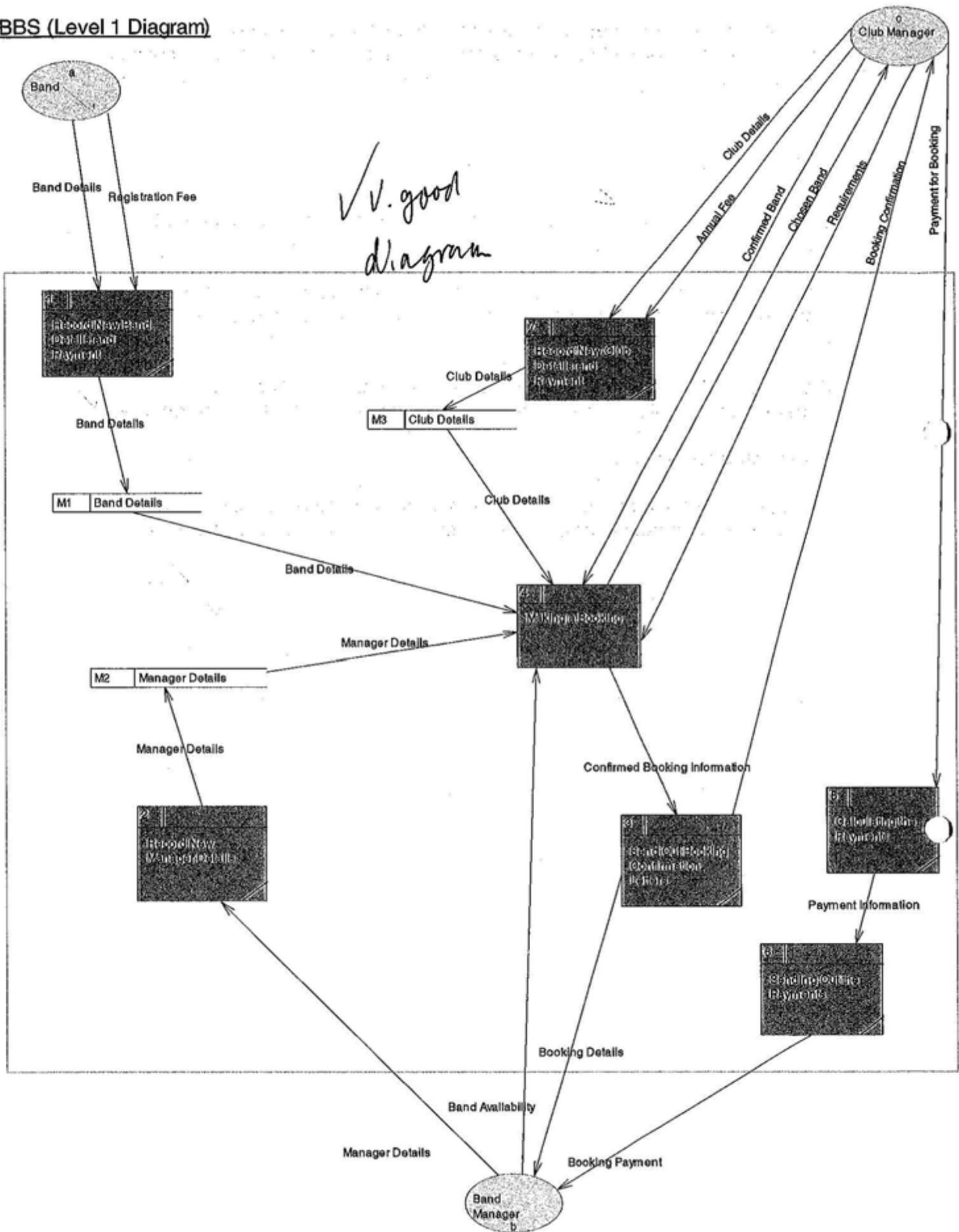
Key for Context Diagram

**Band;** the band needs to pay a registration fee when they first register with BBBS. When they register they also need to give their personal details. ✓

**Club;** the club needs to give their details when they first register. They also have to pay an annual fee. When a club makes a booking they first have to give their chosen requirements e.g. the style of music they would like to be played. When Bob has found an available band the club then has to confirm that they are happy with this choice. BBBS will then send them a letter confirming the booking. Then the club has to pay the fee for the performance. ✓

**Band Manager;** when a manager registers with BBBS they need to give their personal details. When Bob phones to confirm that a band is available the manager must confirm whether they want to do the chosen performance or not. The band manager will receive the letter confirming the booking and the payment from BBBS. ✓

BBBS (Level 1 Diagram)



The level 1 diagram breaks down the main BBBS process into several smaller ones. It also begins to show some of the data stores that are present within the system.

Key for Level 1 Diagram

**Record New Band Details and Payment;** this process deals with collecting the data from new bands and records them by writing a new record card for the band details.

**Record New Manager Details;** this process deals with collecting the data from the newly registered managers and recording them in the manger details record cards.

**Record New Club Details and Payments;** this process deals with collecting the data of new clubs and also collects their first annual payment. At present there is no evidence to suggest that Bob records or even collects the rest of the clubs annual payments.

**Calculating Payments;** this process deals with calculating the total amount to pay each of the bands after a performance based upon certain conditions.

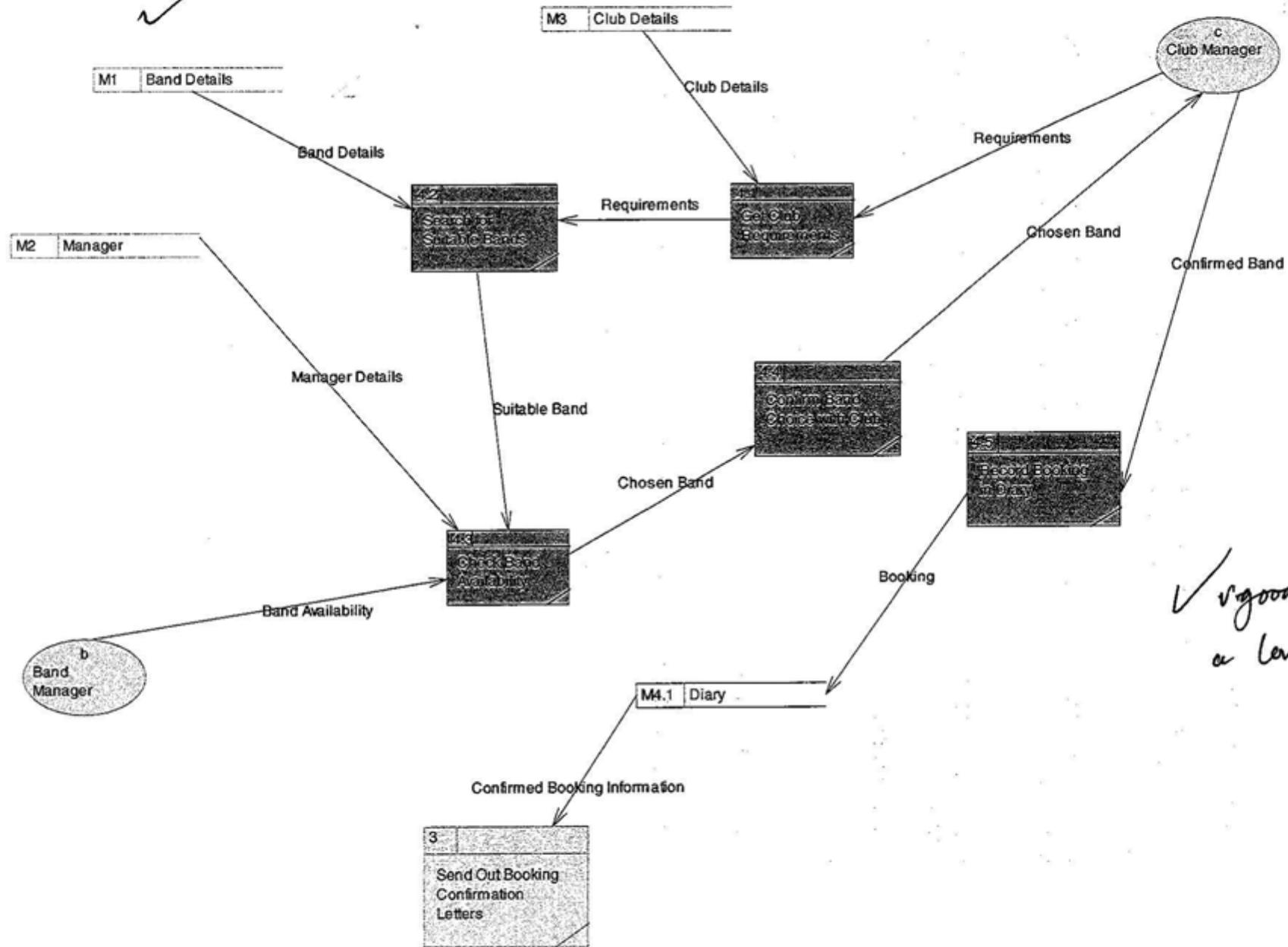
**Sending Out the Payments;** this process deals with sending out the cheques to the bands with the relevant amounts on.

**Making a Booking;** this is the main process within the system. It involves several different processes which can be seen more clearly in the level 2 diagram. Overall this process deals with the necessary booking and confirming the availability of the required band.

**Sending Out Booking Confirmation;** this process is where the necessary letters are generated and sent out to the club and band manager.

The three data stores are all manual data stores. All of the stores in this diagram are record cards where the relevant information can be stored.

Making a Booking (Level 2 Diagram)



✓ good example of a level 2 SFD.

The level 2 diagram looks at one of the processes from level 1 in much more detail. This level 2 diagram is looking at the Making a Booking process. It narrows down the processes involved covering it in much more detail.

### Key for Level 2 Diagram

**Get Club Requirements;** this is where the club make a provisional booking and Bob finds out the date and time of the booking and the type of music they want played.

**Search for Suitable Bands;** this process is where Bob searches through all the index cards looking for a band that plays a suitable type of music.

**Check Band Availability;** when Bob has found a suitable band he then phones the band manager to see if they are available for the date the club had specified.

**Confirm Band Choice with Club;** this is where Bob needs to phone the club to ensure that they are happy with the band that he has chosen to perform for them.

**Record Booking in Diary;** then if the club and band manager has confirmed the bookings the booking can be recorded in the diary.

The final data store in the system can be seen in the level 2 diagram. This again is a manual store and is the diary.

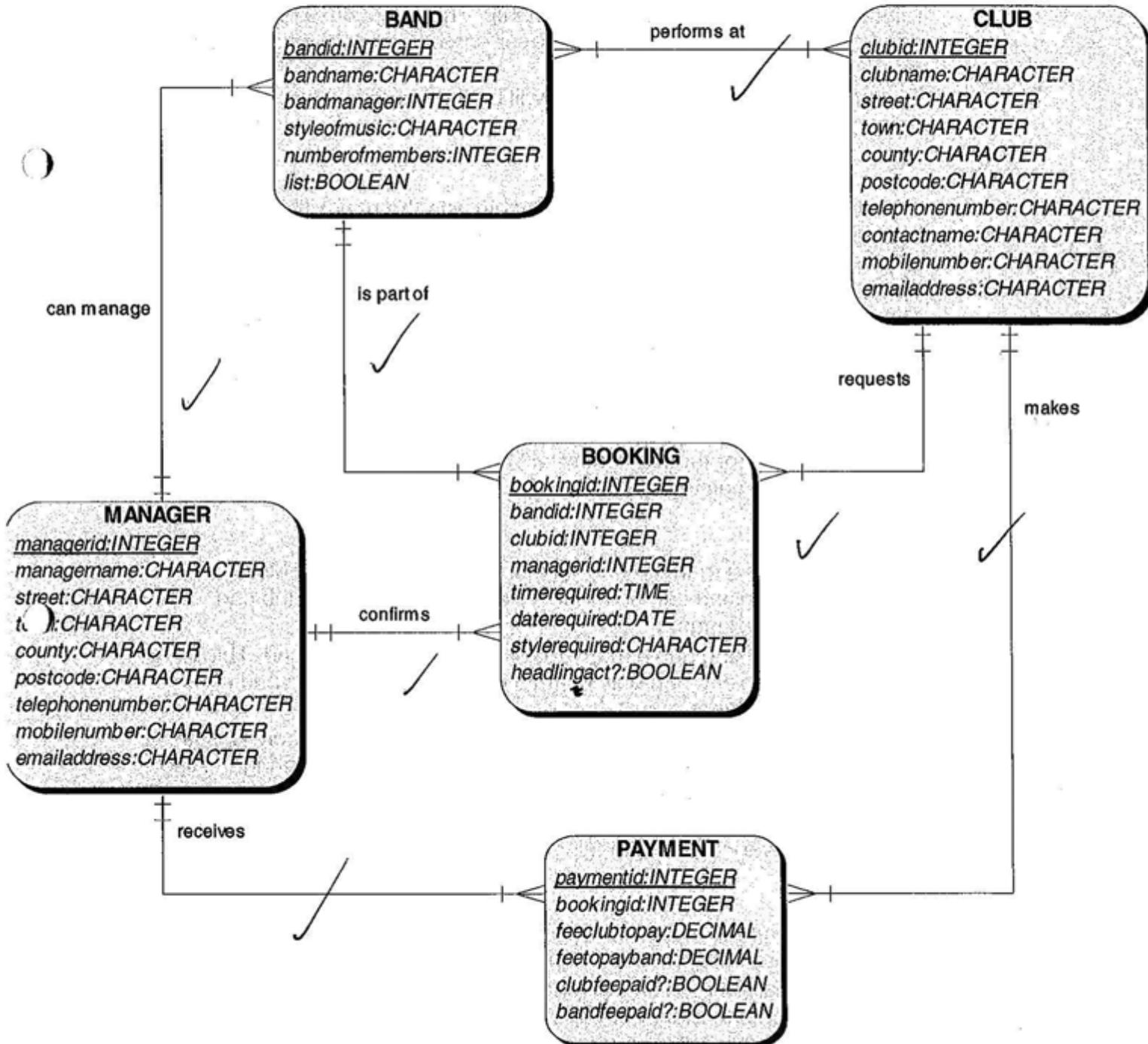


# TASK F

### Task F- Entity Relationship Diagram

For this task I am going to create an Entity Relationship Diagram (ERD) to show how the entities relate to one and other in the system and also the attributes that are going to be stored about them. When listing the attributes this diagram also identifies the primary keys and the data types.

BBBS



Key for Entity Relationship Diagram

**Band**

- The band has a many to many relationship with the club. This is because many bands can play at the same club. Also many clubs can request one band.
- The band has a one to many relationship with a manager. This is because one band can only be managed by one manager. However one manager can manage more than one band.
- The band also has a relationship with the entity booking. This relationship is a one to many relationship. This is because one band can be part of many bookings. However one booking can only contain one band.
- The primary key for the band entity will be the bandid as this will be unique to every registered band.

**Club**

- The club has a many to many relationship with the band. This is because many bands can play at the same club. Also many clubs can request one band.
- The club also has a one to many relationship with the booking entity. This is because one club can make many bookings but one booking can only contain one club.
- The clubs also have a one to many relationship with the payment entity. This is because one club can make many payments but one payment can be made by only one club.
- The primary key for the club entity will be the clubid as this will be unique to every registered club.

**Booking**

- The booking has a many to one relationship with the club. This is because one booking can be made by one club. Also one club can make several bookings.
- Similarly the booking has a many to relationship with the band. This is because one booking can only contain one band. Also one band can play at many bookings.
- The booking has a many to one relationship with the manager. This is because one booking can only be confirmed only by one manager. Also one manager can confirm several bookings.
- The primary key for the booking entity will be the bookingid as this will be unique to every booking that is made.

**Manager**

- The manager has a one to many relationship with the booking entity as one manager can confirm several bookings.
- The manager also has a one to many relationship with the band entity. This is because one manager can manage more than one band but a band can only have one manager.

- The manager also has a one to many relationship to the payment. This is because the one manager will receive many payments from several different bookings. However more than one manager can not receive the same payment.
- The primary key for the manager entity will be the managerid as this will be unique to every manager.

### Payment

- The payment entity has a many to one relationship with the club entity. This is because the club makes many payments but one payment can be paid by only one club.
- The payment entity also has a many to one relationship with the manager. This is because the manager can receive many payments but the same payment can not go to more than one manager.
- The primary key for the payment entity will be the paymentid as this will be unique to every payment that is made.

### Data Dictionary

The tables below show the data dictionary for this system. Each table shows the attributes that need to be stored about each entity. It also shows the format that the data will be stored in and the necessary validation.

#### Band

Attribute Name	Data Type	Description/Validation
bandid	Integer	e.g. '01'- unique, automatically generated
bandname	Text	e.g. 'Cold Play', unique, max 25 characters, required
bandmanager	Integer	e.g. '04'- managers id taken from the manager table
styleofmusic	Text	e.g. 'Heavy Metal', max 25 characters, required
numberofmembers	Integer	e.g. '5', must be greater than 0
list	Boolean	e.g. 'A' or 'B'- required

#### Manager

Attribute Name	Data Type	Description/Validation
managerid	Integer	e.g. '01'- unique, automatically generated
managername	Text	e.g. 'Bob'- max 25 characters
street	Text	e.g. '1 Roman Road'- max 25 characters
town	Text	e.g. 'Dibden'- max 25 characters
county	Text	e.g. 'Hampshire'- max 25 characters
postcode	Text	e.g. 'SO42 7ZN', - max 8 characters
telephonenumber	Text	e.g. '01590612345'- max 11 characters
mobilenumber	Text	e.g. '07732306147'- max 11 characters
emailaddress	Text	e.g. 'ev070383@totton.ac.uk'- unique, max 30 characters

**Club**

Attribute Name	Data Type	Description/Validation
clubid	Integer	e.g.'01'- unique, automatically generated
clubname	Text	e.g.'Reflex', required, max 25 characters
street	Text	e.g. '1 Roman Road'- max 25 characters
town	Text	e.g. 'Dibden'- max 25 characters
county	Text	e.g. 'Hampshire'- max 25 characters
postcode	Text	e.g. 'SO42 7ZN', - max 8 characters
telephonenumber	Text	e.g. '01590612345'- max 11 characters
contactname	Text	e.g. 'Barb'- max 25 characters
mobilenumber	Text	e.g. '07732306147'- max 11 characters
emailaddress	Text	e.g. 'ev070383@totton.ac.uk'- unique, max 30 characters

**Booking**

Attribute Name	Data Type	Description/Validation
bookingid	Integer	e.g. '01', must be unique, primary key, required
bandid	Integer	e.g.'01'- unique, lookup in band table
clubid	Integer	e.g.'01'- unique, lookup in club table
managerid	Integer	e.g.'01'- lookup in manager table
timerequired	Time	e.g.'20:00'- 24hr, required
daterequired	Date	e.g. '15/11/2009'- dd/mm/yyyy, required
stylerequired	Text	e.g. 'Rock'-max 25 characters, required
headlingact?	Boolean	e.g. 'Y' or 'N', required
regularbooking?	Boolean	e.g. 'Y' or 'N', required

**Payment**

Attribute Name	Data Type	Description/Validation
paymentid	Integer	e.g. '01', must be unique, primary key, required
bookingid	Integer	e.g. '01', must be unique, primary key, required
feetopayclub	Currency	e.g. '£300'- max £1000, min £100
feepaidclub?	Boolean	e.g.'Y' or 'N', required
feetopayband	Currency	e.g. '£300'- max £1000, min £100
feepaidband?	Boolean	e.g.'Y' or 'N', required

# TASK G

## Task G - Evaluation

### Recommended Solution

#### Meeting the Requirements

The requirements set out in the analysis section were;

- An electronic way to store the band, managers, clubs and booking details.
- A way to calculate the fees to charge the clubs and to charge the bands quickly and accurately.
- A faster way to process payments, such as internet banking.
- To be able to contact the band and club managers quickly, for example via email.
- A faster way of generating the confirmation and invoice letters.
- A way of reporting the information that is collected. For example reports could be generated to show the clubs which have outstanding payments.
- A way to record the payments that Bob receives and is owed.
- A way of recording when he contacts the bands or clubs.
- To have a way of taking bookings more than a year in advance.

✓ The chosen solution meets the requirements by doing the following. Firstly all of the information about the bands, clubs, managers and bookings are stored in electronic data files.

✓ Also the form that deals with the payments calculates the amount to be paid to the band when the booking ID is entered into the text box. This will hopefully reduce the amount of human error that had been occurring when the payments had been made.

✓ Although not directly solved in the bespoke software itself; as Bob now has a connection to the internet he will be able to carry out internet banking through his banks web site.

✓ Bob now also has a faster way of contacting the band managers and generating the invoice letters. With an internet connection and email client he can now email the band managers when he needs to. He can also generate mail merged letters to send out the invoices to the clubs. This again will help to reduce the room for human error that had been occurring when generating the invoices. It also saved a lot of time as Barb doesn't have to sit and write out each individual letter.

✓ Reports can be generated straight away at the click of a button. This makes it easy for Bob to see which clubs have outstanding payments and which bookings have been made on a specific day or for a specific club.

When a payment is taken it must be recorded on the payment form. This is something the Bob wasn't recording previously. Now when a payment is received it must be checked off, this can be done by using the check box on the payment form. Until this is done the club will appear in the report for outstanding payments. ✓

Whilst there isn't directly a way of Bob recording the times that he is contacting the bands or clubs within the bespoke system, if he is going to contact them via email he will be able to view the emails that he has sent and see when and what he has sent to each of the entities. ✓

Finally the system allows Bob to create bookings for a time more than a year in advance, as no validation rules have been set to the range of the date of the booking. This means that a booking can be made as far into the future as required which couldn't be done previously. ✓

### The Bespoke Solution

I chose a bespoke solution for BBBS as I believe that over time it will be the most cost effective. Although it is the most expensive solution to first implement this solution has the potential to expand and develop as BBBS does. This will mean that the solution has the potential to last much longer than one of the off the shelf packages would. There are however both advantages and disadvantages to this solution. ✓

#### Advantages

The main advantage of this solution is that Bob can create a GUI that specifically suits him. All of the toolbars and menus that can be seen in one of the off the shelf packages would not be necessary in the bespoke package. This would hopefully make the software much more user friendly. Another benefit is that the software can be adapted as the company decide to change and grow. ✓

#### Disadvantages

The disadvantages of this solution include being reliant upon the person or company that is chosen to program the solution. BBBS would be reliant on this company for the initial training and also for the on going maintenance of the system. Another disadvantage of the system is the initial costs to implement a bespoke system is much larger than the off the shelf prices. ✓

### The Off the Shelf Solution

I didn't choose an off the shelf package for BBBS as I felt that this would have too many advanced features that BBBS wouldn't need to use. Another reason that I chose to use a bespoke package is that most of the calculations and processes that need to be carried out are hidden from the view of the user. This means that it would be very hard for the user to change or adapt the calculations or processes in a way that they may then not work. Another ✓

disadvantage of using an off the shelf package is that the forms and reports can not be as easily customised to meet the exact needs of the user. ✓

### Ongoing Costs

There are several ongoing costs associated with the system these include;

- ✓ - A monthly fee for the ISP
- ✓ - The costs of someone regularly coming in to maintain the system
- ✓ - Providing the staff training when the system under goes changes during maintenance
- ✓ - As the pieces of hardware are all electrical components they will need to be PAT tested to ensure that they are safe to be used in the work place
- ✓ - The hardware may need to be repaired or replaced as it gradually becomes worn out
- ✓ - The printer will need to be restocked with paper and ink regularly )

These will all need to be taken into consideration after the system has been implemented. Another factor that may need to be considered in the costs is possibly a subscription to an IT support company that will come and look at any hardware issues that may arise. ✓

### Changes to BBBS

✓ The new system is going to greatly change the way that BBBS is run. Mainly because the way that Bob will record the details of the entities is going to change. In turn this will change the way that the processes within the system can be carried out. For example Bob will no longer have to manually carry out the calculations for payments from the clubs or to the bands, these can all be done for him within the system.

✓ Another change is that Barb isn't going to be needed to create the invoice letters for the clubs. These letters may not even be sent out via post they could be sent out via email. This means that BBBS can communicate with the entities in different ways. This will speed up the invoicing process; similarly the payment process will be sped up as well as internet banking can now be used. )

✓ Another change to BBBS is the allocation of bands to the clubs when they phone up to make a booking. This is because when they phone up Bob then doesn't need to go through the process of finding a band that is suitable manually. This saves a lot of time as the searches can be carried out instantly using the computerised system.

### Benefits to BBBS

The main benefits that will be brought to BBBS are the new system will save a lot of time and also save on the amount of staff that will be needed to carry out the tasks with in the system. For example Bob doesn't need to search through all the record cards as a search can instantly be carried out in the new system. Another benefit is that Barb doesn't have to sit and type up all the individual letters. This saves time and money as less staff are needed. ✓

Another benefit is that the relationship between Bob, the bands and clubs will hopefully improve. This is because the relationships shown in the entity relationship diagram will be improved by trying to reduce the issues that they had with each other. For example the bands were annoyed that they were often sent to the wrong club or arrived at the wrong time due to human error when making the booking. The new system tries to reduce the amount of human error and therefore will improve the relationship between the bands and BBBS. ✓

An indirect benefit of implementing a new system is that the company can protect themselves better against theft or fire. If the record cards were stolen Bob would have to start again. Whereas with a computerised system, back ups of the data can be made and kept off the site. This will prevent BBBS from losing any important files. ✓

With less time needed to process the number of bookings that BBBS currently take they will be able to take on many more bookings, bringing in more business. ✓

### System Maintenance

BBBS will need to stay in touch with the company that program their new system. They will need to regularly make visits to BBBS to ensure that the system is working correctly. BBBS should regularly review this system to see if it could be improved in anyway to make the process more efficient. ✓

### Future Development

The system has the potential to adapt with BBBS as the business grows. Therefore the system could change in a number of ways. One of these ways could be a simple change such as adding another telephone number to the club entity. ✓

Alternatively BBBS may decide to drastically change the process of making a booking. This would involve the programmer carrying out major changes to the booking form. ✓

## Personal Performance

### How I Arrived at this Solution

✓ I developed this system by working through the various stages of the systems life cycle. I first began by finding out what the company would want from a new system. I was given an information sheet outlining the current working practises of BBBS and the various problems that they face.

✓ From this I then moved on to the analysis section and created several diagrams and charts to gain a better understanding of the current working practises of BBBS.

✓ I then went on to look at possible solutions for a new or improved system for BBBS. After weighing up the advantages and disadvantages of the different solutions I decided upon the bespoke solution.

✓ I then went on to the design stage; here I designed the forms for the inputs and the reports for the outputs. All the time when doing this I was thinking about and looking at the requirements of BBBS and tailoring the designs to meet their exact needs. I also planned out the calculations that will need to be carried out in the main process. I did this using pseudocode so that it can easily be converted into any programming language.

### Changes I Made

✓ When working on the design section I realised that I had missed out some attributes that I would need to include to use in the new system. An example of this is the email address for the managers and clubs. This isn't something that BBBS had been using and will be needed if Bob wants to be able to send out invoices or confirmations faster than by post.

### What Parts Were Easy/ Hard

✓ The task that I found easiest during this process was the rich picture. I found it straight forward to display the relationships between the different entities in a pictorial form.

✓ However I don't think that creating the data dictionary went as well as I struggled to clearly define the validation rules that I would need for each of the different attributes and kept thinking of new rules as I was designing the system.

### What Went Well/ Badly

I felt that creating the DFD went well. I thought this because I was easily able to split the main BBBS process up into the smaller processes. I felt that the final outcome clearly shows the way that the data flows around the system. ✓

The task that I felt didn't go so well was creating the data dictionary. I found this difficult as I thought it was hard to work out all of the attributes that need to be stored about the different entities. ✓

### Mistakes Made

The main mistake that I made was not thinking carefully about the attributes that need to be stored about each of the entities. This is because at first I only included the attributes that BBBS currently collect and didn't think about any new attributes such as the email address that they would need to collect about the band manager and club for the new system to be able to work correctly. ✓

### Learnt for the Future

During this unit I have learnt a lot about the various tools and techniques used within the analysis and design sections. I can now successfully create DFD's, ERD's, rich pictures and systems flow charts and I would confidently say that I would be able to apply these diagrams to other systems in the future. ✓

### Tools and Techniques

When creating the diagrams I used a program called 'Superlite'. This is a tool that I was able to use to create DFD's, ERD's and systems flow charts. This is a valuable tool that I would be able to use to create similar diagram in the future. ✓

### How Would I do Things Differently to Make the Process More Efficient

If I were to do this task again I would create a time schedule. This would mean that I can set out enough time to carry out the tasks and would mean that I would not rush through the sections and miss out some of the important features. ✓

A time plan would also help me to stick to the schedule that BBBS had set out. This is because by creating a time plan I would know which tasks I need to complete and when I should be completing them. ✓