OCR ADVANCED SUBSIDIARY GCE
IN INFORMATION AND COMMUNICATIONS
TECHNOLOGY (3838)

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Teacher Guidance

This Teacher Guidance booklet is designed to accompany the OCR Advanced Subsidiary GCE and Advanced GCE specifications in Information and Communications Technology (ICT) for teaching from September 2000.

Contents

1 Introduction

This Teacher Guidance booklet is designed to assist teachers in the delivery and assessment of the OCR ICT Advanced Subsidiary GCE and Advanced GCE specifications. It includes:

- a brief summary of the specification within each Module;

- guidance on each Module (AS and A2);

- possible teaching strategies for each Module (AS and A2);

- a sample project (A2 Module 2516);

- guidance on Written Examination Papers.

2 Module 2512:
Information, Systems and Communications

2.1 Availability

From 2001 this Advanced Subsidiary (AS) unit will be available for assessment. The assessment can take place in January or June. Candidates who wish to retake the unit, to attempt to improve a previous mark, will be able to do so once only. The higher of the two marks will be used towards aggregation.

2.2 Paper Length

The paper will be of 1 hour 30 minutes duration.

2.3 Paper Type

The paper is a written paper containing 10-15 structured contextualised questions requiring short answers. The paper may revolve around a single scenario with the questions contextualised within that scenario, or it may be that each question has its own context.

The assessment of this unit carries a weighting of 30% of the AS assessment and 15% of the A2 assessment. The total number of marks awarded for the paper is 90; of which, 4 marks are given for the Quality of Written Communication.

2.4 Possible Teaching Strategies

2.4.1 Data, Information, Knowledge and Processing

The structure of this section and the content is progressive. It covers the definition of terms - information, data and knowledge and the different methods by which meaning can be represented. The candidates must not only be aware of the differences, but need to explain the differences using examples from the context.

Many of the topics covered in this application area require the candidate to describe many different elements of the learning statement. For example:

Describe the effect of the quality of the data source on the information provided.

This requires the candidate to be aware of surrounding issues, such as timeliness, accuracy, quantity and be able to describe how these have an effect within the context of the scenario. They cannot learn a set of examples and then regurgitate these within the exam.

The application area follows the acquisition of data, coding and subsequent value and use of the resulting information. It can be taught by the use of a scenario that follows the life cycle of a piece of data.

Towards the end of the section the candidates are introduced to the use of computers themselves to make decisions based on the data.

A diagram is required in the final bullet point of this application area. The candidates are required to produce a diagram of input, processing, output, storage and feedback which explains the terms and the relationship between them. Since this application area is concerned with Information, Knowledge and Processing, the terms must be seen within this light. For example, feedback refers to items such as turnaround documents rather than sensors and control systems.

2.4.2   Components of an Information System

This application area is concerned with the more technical aspects of ICT. The two components which are covered are hardware and software.

The 'types of hardware' section is descriptive. The candidates need to be able to describe a variety of devices and components, covering the purpose and typical use. They will have to select devices which are appropriate for a specific context.

The depth of knowledge required of hardware components is not considerable and the emphasis should be placed on suitability for purpose rather than technical specifications.

The candidate must identify different types of software and be able to draw distinctions between different methods of acquiring software – purchasing, writing etc.

This application area is complicated by the fast development of computer peripherals. The candidate must be up to date with the latest input and output devices and have an understanding of their areas of use.

2.4.3   Systems and User Interface

This application area is again primarily descriptive with the candidates being required to select and apply the knowledge to the context.

It is necessary for them to be able to identify the major characteristics of different types of operating system, and by alluding to those characteristics, describe the differences between systems.

There is an implication within this application area that the candidate needs to have an overall idea of how the computer works and what each component does. With this knowledge, they should be able to comment upon changes which can be made to the computer to increase its performance.

Self documenting systems are those elements which assist the user within systems. They include elements such as on-line help, tool-tips, error/help messages and user assistants.

Supplementary user documentation is the documentation supplied to the user upon acquisition of software, excluding the user guide. This may include warranty information, quick start guides and reference manuals.

2.4.4 File and Database Concepts

The structured tasks specifically refer to this section, and it is anticipated that the theory of databases and database terminology is acquired by the pupils before attempting any database related structured tasks.

There is a large element of this section that requires the candidate to apply their knowledge and understanding. They need to know advantages, disadvantages and characteristics of different methods of file access and decide which method is appropriate in a given situation.

The candidates must be able to explain the nature of a hashing algorithm and illustrate what happens if there is a collision.

The understanding of database terminology is essential and the candidate must be able to identify and describe a variety of elements.

2.4.5 The Role of Communications and Networking

This section deals with communications on a very general level. The candidates do not need to have specific knowledge of protocols or an in depth understanding of networks. They are only required to describe characteristics of networks.

The candidate must be aware of the hardware and software requirements necessary for a network to function both in terms of a LAN and a WAN.

The final bullet point in this application area requires the candidate to have a wide range of knowledge and understanding of a variety of communications media. They must be able to describe facilities and discuss relative merits.

In the sample paper the question asked was:

Describe two facilities available on an electronic mail (e-mail) system.

The candidate needs to be aware of what an e-mail system can do and the facilities required within one, such as reply facilities, address book, attachments etc. The candidate could have been asked to look at the merits of sending documents by e-mail or by fax, thus comparing two different facilities of communication media.

2.4.6 The Role and Impact of ICT: Legal, Moral and Social Issues

The nature of the bullet points in this application area has changed from describe to discuss. The candidate should be able to consider both the positive and negative sides of the issue.

The topics covered in this final application area are general and wide ranging. They cover capabilities and limitations of ICT, the changing use of ICT, social impact of ICT, teleworking, and ICT and the disabled amongst others. Candidates should be aware of the implications of ICT and be able to construct a reasonable discussion, imbuing their answer with evidence as required.

The Data Protection Act (1999) is the same as the Data Protection Act (1998). The specification incorporates changes resulting from European Directives and candidates needs to be aware of any updates to the law.

3   Module 2513: Structured Practical ICT Tasks

3.1   Availability

From 2001 this Advanced Subsidiary (AS) unit will be available for assessment. The tasks will be sent to Centres in the September prior to the June in which candidates will submit their scripts. Only one set of tasks will be offered in each academic year. Candidates who wish to retake the unit, to attempt to improve a previous mark, will be able to do so once only. The higher of the two marks will be used towards aggregation.

3.2   Task Length

Candidates may spend as much time as they think appropriate on the module providing their results are submitted for mailing and moderation by the specified date.

3.3   Task Type

The Structured Practical Tasks will contain 3-5 tasks.

There are no restrictions on the software which candidates may use.

Not all questions will involve the use of software. Some, for example, may involve the design of a solution, the production of test data or a test strategy, or the interpretation of a solution.

Candidates need to understand that marks may only be awarded if there is hard copy evidence of solutions. Floppy disks and CD-ROM's are not acceptable.

3.4   Possible Teaching Strategies

3.4.1   Design

Any design of a solution implies that the solution itself is not created. The design may incorporate data structures, hardware and software requirements and any special security measures required. Annotation of the design is useful in explaining why each element is required.

The design section is not limited to any particular software package, but the main areas which will need to be considered are: Databases, Spreadsheets, Presentations, Web Based Products. Designs of data capture forms and reports may also be required.

3.4.2   Software Development

This section requires the creation of the solution. The software tool used to interpret the design into a working solution is open to interpretation, although the task will lend itself more naturally to one family of tools than another.

When producing the evidence of creation, it is essential that all relevant printouts are provided and that there is some indication on these printouts as to what they are and what they contain.

Printouts should encompass all the important elements of the project and this could include spreadsheet formulas, database functions and web based code for example.

Some solutions may involve the tailoring of a software package. This may include the addition of toolbars and menu items.

3.4.3   Testing

If asked to produce data to test a situation, it is not sufficient to produce a table of data with, or without, expected results. Candidates need to explain the purpose of the data. When producing sets of test data, the set must contain all the data, it cannot only contain part of the data used.

If three sets of test data are used, this implies that the sets are to test normal, extreme and erroneous workings of the system.

Test strategies may be required as opposed to the creation of test data. A test strategy should not include the specific data to be used, but should identify methodologies for testing.

3.4.4   Implementation

The test data and test strategy prepared in the section above is used to test the software solution. It is important that there should be an explanation of the results and, in the case of failure, the reason for an incorrect result. Screen dumps are acceptable as evidence that the data has been used.

It is vital that the evidence shows that the results are genuine, not that they have been produced, for example, by a word processor.

User documentation which is produced must be usable. Most user documentation contains a title page, contents page, the purpose of the documentation and instructions on use. Screen dumps are on their own are not useful but need to be labelled and annotated.

4 Module 2514:
Practical Applications of ICT using Standard / Generic Applications Software

4.1 Availability

From 2001 this Advanced Subsidiary (AS) unit will be available for assessment. The assessment can take place in January or June. Candidates who wish to retake the unit, to attempt to improve a previous mark, will be able to do so once only. The higher of the two marks will be used towards aggregation.

4.2 Paper Length

The paper will be of 1 hour 30 minutes duration.

4.3 Paper Type

The purpose of this unit is to give a practical understanding of the concepts studied in module 2512 using a range of standard application packages. In addition, some new concepts are introduced, the intention being that they should arise through the study of ICT applications.

The assessment of this unit carries a weighting of 30% of the AS assessment and 15% of the A2 assessment. The total number of marks awarded for the paper is 90; of which, 4 marks are given for the Quality of Written Communication.

The assessment is by written examination with 4 - 6 structured questions based on a short scenario.

4.4 Possible Teaching Strategies

The questions in the examination papers are below A level GCE standard. They will all be short answers based around a common theme that will last for the whole length of the paper. The questions need not be answered in the order they are presented on the paper but it would be more advantageous for the candidate to do so.

This part of the specification is divided into four sections. The examination will cover aspects of all four sections although not all learning outcomes will be assessed every year.

4.4.1 Characteristics of Standard Applications Software and Application Areas

This section will deal with the common features found in standard applications software which are found in business, commerce and education. They include style sheets, templates and wizards. The section also covers the advantages and disadvantages associated with tailoring applications software to specific applications (eg style sheets for a particular company) and the transfer of data between applications (eg transferring data from comma separated format into a spreadsheet).

4.4.2 Applications Software used for Presentation and Communication of Data

This section deals with the techniques used for presenting information either in printed form or as a presentation using slideshow software. The presentation could be in the form of a book or to an audience in a hotel. Common techniques used in creating presentations will be assessed such as using standard documents, importing and exporting text and images, clipart galleries and image libraries, and mail merging. In general they will be the techniques used in creating any presentation. Also assessed will be the tools used to prepare presentations such as word processing and desktop publishing tools, graphics tools and effects, and multimedia and hypertext tools.

4.4.3 Standard/Generic Applications Software for Modelling Data

This section deals with the characteristics of modelling software. Candidates should be aware that other modelling software exists and not solely concentrate on spreadsheets. Candidates should know about variables, formulae, functions and rules, graphs, charts and the customisation of worksheets.

4.4.4 Relational and Online Database Management Systems

This section deals with the characteristics of database management systems and includes relational and on-line database systems. Included in the assessment will be normalisation of relational databases up to third normal form (3NF), the organisation of the entities and the components of a data dictionary. Candidates will also be expected to be able to create data entry forms both on paper and screen, perform both simple and complex queries (a complex query involves the use of either an OR or an AND or both), evaluate the use of both static (database on a CD-ROM) and dynamic data sources (databases on the Internet) and have a knowledge of software filters and search engines.

4.5 Practical Skills Required

The candidate should have practical experience of the specific software necessary to study this module. The candidates should study the different application areas which require the different software. It may be found useful to visit a local organisation which uses ICT to experience some of the content of this module first hand.

5 Module 2515:
Communications Technology and its Application

5.1 Availability

From 2002 this Advanced (A2) unit will be available for assessment. The assessment can take place in January or June. Candidates who wish to retake the unit, to attempt to improve a previous mark, will be able to do so once only. The higher of the two marks will be used towards aggregation.

5.2 Paper Length

The paper will be of 1 hour 30 minutes duration

5.3 Paper Type

This is a written examination consisting of 4-6 structured questions which will not be based around a common scenario. There are sections of the unit where the pupil should be able to give their answers from within the context of a scenario (5.4.2). The total number of marks awarded for the paper is 90; of which, 4 marks are given for the Quality of Written Communication.

This unit is an A2 standard module and will be based not only upon the material in this module but also upon the knowledge, understanding and skills covered in modules 2512 - Information, Systems and Communications and 2514 - Practical Applications of ICT Using Standard/Generic Applications Software, and will develop concepts encountered in these two modules in greater depth. This module is concerned with three main areas – communication between computers, interaction between humans and computers, and ICT and data communications.

5.4 Possible Teaching Strategies

Teachers should note the meanings given to key words such as "*explain*", "*describe*", "*discuss*" and "*identify*" as indicated in the specification.

This part of the specification is also divided into four sections. The examination will cover aspects of all four sections although not all learning outcomes will be assessed every year.

5.4.1 Features of Networked Systems and the Systems Cycle

The bullet points in this section begin with describe, explain and discuss. This indicates that the pupils will need more than factual knowledge. Since ICT changes so quickly, particularly the area of networks and communications, it will be necessary to follow developments and include them in the teaching as there are some "catch all" statements in this section, such as "discuss the effects of new communications technology". This is very unspecific, and includes any new developments that have occurred since the specification was written.

It is not necessary for the students to know the layers of the OSI model, an explanation of its benefits is all that is required.

The systems life cycle needs to be considered in relation to an information system – the students need to be able to relate the section of the life cycle to an example. Specific reference is made to the User Centred Approach to systems analysis, but this dos not preclude reference to other methodologies.

5.4.2 Communication and Networked Systems

The students need to have studied this section from within the context of a scenario and any questions may be also set within a scenario and the students responses will be expected to reflect this.

The focus of this section is on knowledge and the application of that knowledge – the students are being asked, for the majority, to explain and describe.

5.4.3 The Role and Implications of Systems

Higher level skills are required for this unit – questions concerning implications require the student to discuss. This needs them to have knowledge of advantages and disadvantage and to be able to apply that knowledge and understanding to the question.

There are areas of this unit where the student would benefit from seeing a system in practice – for example, problems of open networks resulting in access control, firewalls, auditing of access, design of good human computer interfaces and dialogue with the computer.

Students will not be expected to know any specific details of encryption or authentication techniques.

5.4.4 Applications of ICT

As with 5.4.1, this section has elements that are concerned with new technologies, and the applications of those technologies – "discuss new developments resulting from the converging ICT" for example and "discuss the … facilities of the information superhighway", an area that is constantly under change. This requires the students to have an up to date knowledge and understanding of what is going on in the world of ICT.

5.5 Practical Skills Required

There is no specific practical knowledge required for this paper as detailed in the specification, however where the pupils have had practical experience it will be evident in their answers and will lead to a better understanding of the topic.

If the students have started Module 2516 the practical experience of doing the project will give candidates a better understanding of the systems life cycle. This links to 5.4.1.

Mobile telephones and satellite/digital and interactive television are part of 5.4.2. These are easily accessible areas where the pupils can experience the practical applications. 5.4.4, although not specifically a practical area, can include practical elements from society, such as virus's, press coverage of ICT systems and the use of the internet.

Controlling an open network has many areas that can de demonstrated to a pupil, as can communication with the computer – both areas of 5.4.3 that can be developed and taught from both a theoretical and a practical aspect.

As many of the elements in this module require the students to have up to date knowledge of events and changes in ICT, the use of the internet as a research tool is invaluable.

6   Module 2516: ICT Project

6.1   Availability

From 2002 this Advanced (A2) unit will be available for assessment. The assessment can take place in January or June. Candidates who wish to retake the unit, to attempt to improve a previous mark, will be able to do so once only.   The higher of the two marks will be used towards aggregation.

6.2   Paper Type

This is a practical module. Candidates will need to produce a written report as evidence that the task was carried out. The teacher marks the project using the 'Guidance on Marking' as detailed in the back of the specification. After which moderation takes place according to OCR procedures. The paper should demonstrate the candidate's knowledge of user interfaces and interactive systems, either stand-alone or networked.

6.3   Recommended Prior Knowledge

This module is an A2 standard module and will be based not only upon the material in this module but also upon the knowledge, understanding and skills covered in modules 2512, 2513, 2514, sections 5.4.1, 5.4.3, 5.4.4 from module 2515 and section 5.6.2 from module 2517.

6.4   Guidance on Setting and Marking Information and Communications Technology Projects

The Project should:

- allow candidates to demonstrate their knowledge and understanding of ICT systems and the skills in the assessment objectives;

- encourage the sensible use of computers and communications systems to produce a solution, which is non-trivial and solves a problem sensibly, within the constraints of resources available to candidates. Prototypes of larger systems are not themselves likely to cover the required skills;

- show the successful completion of a whole task from definition involving a third party to acceptance and evaluation by that user. Projects which involve much repetitive design, analysis or implementation, leading to unwieldy reports, are to be discouraged;

- involve all elements of the skills of definition, analysis, design, development, testing, documentation, implementation, and evaluation. Projects need not be 'stand alone': the enhancement or modification of an existing system provided that all these elements are covered, is more likely to be a real world situation;

- involve a third party user, who will provide information for the analysis, use the implemented solution and contribute towards its evaluation. The third party user is likely to be a user (or potential user) of a computer-based information system in business or in other organisations in the community. Whilst a teacher could act as the third party user, this arrangement is far from ideal. Candidates should be encouraged to look beyond school life into businesses and organisations in the community of the surrounding area for their projects; involve the organisation and present them with a report on the work which has been carried out, including an evaluation of this work.

Candidates should make the final choice of context for the Project, although guidance about the suitability, and throughout the stages of the Project, should be given by the supervisor. This should include guidance on the appropriateness of an implementation on a stand-alone or networked small computer-based information system or other available facility. In a well-organised Project candidates will focus on the production of an overall system analysis and design. The solution may be implemented using one or more of: a standard generic applications software package, pre-written modules and toolkits/authoring/publishing software and interface/client software (including HTML/JAVA). Brief descriptions of any software used, together with reasons for their selection, should be included in the report. Candidates should always tailor any software used to the needs of the user and may need to implement small macros in order to adapt navigational tools or present an interface which is designed appropriately and with regard to the theory studied. It is therefore necessary to:

- Annotate software listings;

- Explain each selection of the listing;

- Define variables/data structures by name, type and function where appropriate;

- Define clearly, and identify the purpose of: functions, subroutines and procedures;

- Justify development methods used to tailor a good user interface and offer appropriate functionality.

Test data should be devised and used systematically to test the package thoroughly. The choice of test data used, and the reason for choice, should be included. A description of the methods of testing should also be included, together with evidence of testing.

This should contain the title, a contents list, a description and justification of investigation, analysis, design and methods used, an evaluation and bibliography. Pages should be clearly numbered. The report must be supported by appropriate evidence of implementation, such as screen dumps or photographs of screen layouts and printouts, paper based user documentation and a letter from the third party user to say that the implementation has been made. Candidates should not submit video recordings, magnetic or optical media as supporting evidence but can make references to web pages available over the Internet.

Candidates should choose, in conjunction with their Centre, a well-defined user driven problem of an appropriate size, which enables them to demonstrate their skills in Analysis, Design, Testing, Implementation and Evaluation. The Project should involve the skills attained by studying the other units of this subject. This means that the Project should demonstrate the skills of providing and communicating information, possibly to a wide and varied audience. In this instance the user could be a sector of the general public, clients or business users.

The Project will seldom involve programming or the installation of hardware but will probably involve the choosing of the type of hardware that will be needed to implement the solution.

Some possible ideas are given below, all of which have been presented by candidates in previous examinations. However, it is important for candidates to realise that the Project chosen should be user driven. This means that candidates must understand that they should find possible users of ICT systems and find out their needs before developing an idea.

The examples do not show the analysis of the problem nor do they give all facilities, which may be required by the user. For example, the staff who run the school bank may well require many other facilities which can only be ascertained by interviewing the appropriate staff and, possibly, some of the pupils who use the bank. The examples only give a few ideas of the type of project, which could provide candidates with the opportunities to demonstrate Advanced GCE ICT skills and an understanding of solving real life problems.

6.4.1   Example 1

The School has a bank that is used by a large number of pupils. The staff who run the bank must keep details of pupils who use the bank as well as details of individual accounts. It is useful to have a list of all the pupils who use the bank together with addresses and so on, which help the staff to contact the pupils. Sometimes the staff need to contact a pupil urgently.

Pupils need bank statements from time to time. This occurs when a pupil asks for a statement or when the statement contains 20 entries.

The bank statements must give details of each transaction such as cheque/deposit number, amount withdrawn, amount deposited and an up-to-date balance. It should also show any interest payments and charges incurred.

The staff have to be able to create a separate statement for each pupil and it must only be accessed by the pupil's account number. Sometimes pupils forget their account numbers and the staff must be able to provide them on proof of identity. If a pupil overdraws the account, the staff need to be able to send a standard letter informing the pupil of the amount overdrawn and asking the pupil to deposit some money so that the account is in credit.

It is planned that eventually the system will be run across the school intranet with strict access and security codes so that pupils can access some of their bank details, including the last week's transactions and current balance. No deposits or withdrawals will be made on line initially. The design should consider the user interface, communications/networking/intranet issues, and of course, security measures. Candidates would be expected to produce a tailored solution with an appropriate interface. Limitations and extensions should be suggested.

6.4.2 Example 2

A local hotelier wants to have a web site to advertise the facilities available at the hotel.

You are to design a computer-based information system that could be used by the hotelier.

This would involve the student in analysing the problem, collecting the necessary information and designing a solution, which would include a full implementation of the site.

Candidates should be aware that, on one level, this is a fairly trivial problem. The examiner will be looking for detailed analysis of the problem, and design solutions, which involve the hotelier at all stages. It will also be necessary to ensure that some of the implementation is at more than a basic level. Examples could include the ability to download documents like the hotel brochure from the site, and the ability to book rooms and pay for them in advance through the site.

6.4.3 Example 3

Ms Johnson has a small newsagent's shop and employs eight people to deliver the papers. She wishes to be able to produce delivery lists for each morning round and each evening round. At the moment she does not deliver Sunday papers, but may wish to in the future.

She wants to keep details of her customers, including which morning papers and which evening papers they have, and which delivery round they are on. Some customers only have one morning and one evening paper; others do not have both a morning and evening paper. Some customers have weekly magazines, some fortnightly magazines and some monthly magazines.

Ms Johnson would also like to be able to produce a weekly paper bill for each customer.

You are to design a computer-based information system that could be used by Ms Johnson including the facility to browse on-line for information.

6.4.4 Example 4

The student is asked by the head teacher of a school to develop an information system for use in classrooms and public areas. The information needs to be on computer screens, which can be attended from a central location.

The student is involved in analysing the problem in respect of site of screens, user interfaces, types of information, pass-wording to allow users to edit only their pages.

You are to design a computer-based information system that could be used by the School.

The implementation of the system is relatively straightforward, using a piece of authoring software. However, the candidate can enlarge the scope of the project by including, for instance, a budgeting system so that individual departments are allocated a set amount of time, or an accounting system so that departments can be billed on a monthly basis. Another extension might be to include an archiving system to store messages for future inspection.

The examiner would be looking for a detailed analysis of the requirements and a measure of extension to the basic problem, which would illustrate the candidate's ability to integrate the information into other software.

6.4.5 Guidance on Marketing Information and Communications Technology Projects Incorporating Sample Projects

The project is awarded marks according to its stages. These are:

(a)	Definition, Investigation and Analysis	[25 marks]
(b)	Design	[21 marks]
(c)	Development, Testing and Implementation	[35 marks]
(d)	Documentation	[24 marks]
(e)	Evaluation	[15 marks]
	Total	**[120 marks]**

The definition, investigation and analysis, and evaluation sections are analysed with samples from different projects. This analysis is not supposed to be a complete project but sections from several projects.

6.4.5.1 (a) Definition, Investigation and Analysis   [25 marks]

(i)   Definition - nature of the problem solved   [5 marks]

A candidate should not expect the examiner to be familiar with the theory and practice in the area of the chosen system. There should be a brief description of the organisation (for example, firm or business) involved and the current methods used in the chosen areas that may form the basis of the project. A clear statement of the origins and form of data should be given. At this stage the exact scope of the project may not be known and it leads to the arranging of an interview with the user.

Mark Range:

1   A vague description of the organisation.

2   Some description of both the stages of study and organisation involved.

3   A good description of either the area or organisation with some description of the other.

4   A clear description with one element missing (for example, origins of data).

5   An excellent description with all elements present.

Sample Project

The sample below is an example of work worth the full 5 marks.

Nature of the Problem to be solved

I have been approached, for this project by Professor N. Myers of Green College, at Oxford University to aid him in a particular problem he has in his line of business and day to day life. Prof. Myers is a lecturer at Oxford University and is based in Headington, Oxford where he has an office, from which he bases his business. As well at being a lecturer, he is also a researcher and writes articles for various magazines all over the world, on matters of environmental science. Currently he employs two people who are also based in his office to maintain his research and to cover his administration. He has a research assistant, who is there to assist in his research and also to organise his numerous commitments and he has a secretary who covers his administration and finances.

It is common that his work involves him travelling to many places to conduct his research and lecturing. It is important, therefore, that his whereabouts during the course of a year are considered, as it is common for him to be travelling both domestically and abroad at least once a month. Due to the frequency and nature of his trips, it is vital that information, such as his location on a particular day and what he is doing on that day, is stored in his office so that he always has access to it and he always knows what events are occurring in the coming days, weeks or even months. So basically he has a diary if you like, but one requiring a great more detail and information on his coming commitments throughout the year, and one which is vital to the running of his business as a professor. The problem he has found is one where he feels the use of a computer program would be most beneficial. At the moment, he finds documents of his commitments, either being misplaced, being out of order or being accidentally damaged and it is crucial to his business that this kind of event is kept to a minimum in order to keep his commitments in order.

The Current Method

At the moment, the procedure by which his numerous commitments throughout the year are stored, is a major responsibility of his assistant. Without a clear and logical organisation of his actions, he would lose track of what he is doing or going to do, at a particular point in time. The process at hand is one where any documentation on Prof. Myers future commitments is interrogated and from there information is extracted from sources such as letters from universities, and is arranged into a ring binder. It may not just be information about university trips that needs to go in the file, but also any informal meetings as well, such as a doctor's appointment which may need to be noted.

When his assistant receives any documentation, she is asked to extract the relevant information from the document in order to form a detailed itinerary of that event so that all the required information is in that ring binder. It is often the case that a new document needs to be produced of each event and then that document needs to be placed in some logical order in the ring binder in order of date or place name for example. The type of data that is handled in this case may take many forms from being the name of a place that he is going to visit to the date the event to the purpose of the visit and many other forms of data that I guess would be required to create a suitable itinerary. This process is always done by hand, where his assistant has to rewrite certain information on a new piece of paper and sometimes there is a great deal of

repetition which can add further time to the process. It is done in this way as I have been told that Prof. Myers has yet been unable to find any other suitable method of performing this process.

Problems with the Current Method

Time

It has been found that this process represents a significant amount of his assistant's time during her normal working day, while there are other activities that need to be addressed concerning her other responsibilities in the business. It is her opinion that it has to be done on paper that the process is a lengthy one.

Copying and correcting mistakes

As this process is one in which a lot of information is being transferred from one source to another, there is bound to be the occasional copying error and there may be a case where a document is put in the wrong place in the file therefore adding time for when it comes to finding the relevant information in the future.
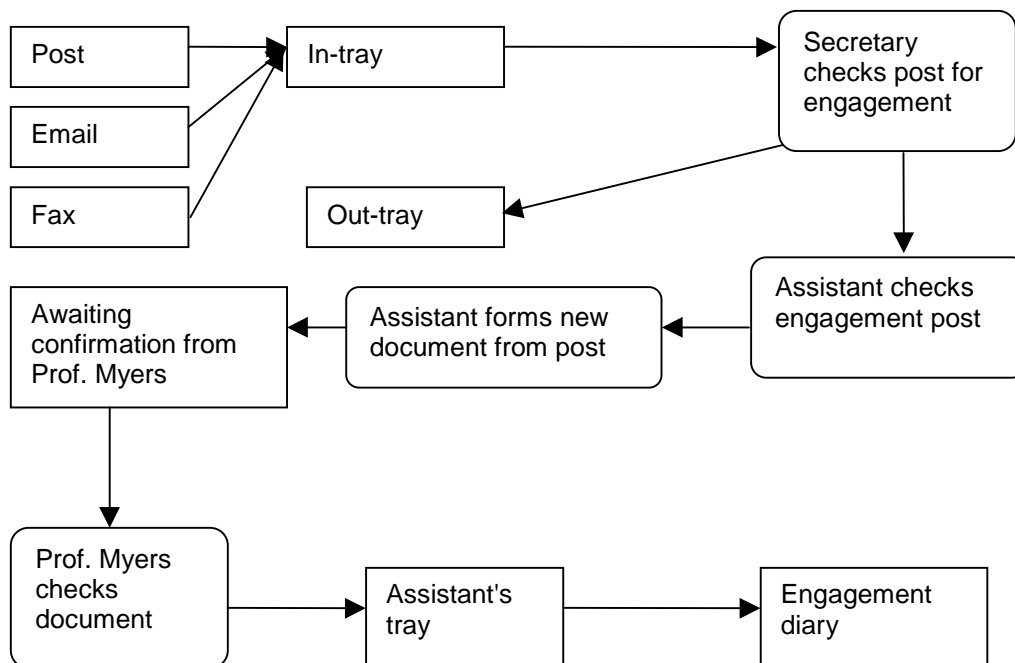
Accidental damage.

There is always the risk that a document may become damaged in some way, for example it may become torn or may have a drink spilled over it, therefore requiring another copy being made to add to the folder.

Searching for information

When it comes to a point where the folder needs to be interrogated, if the folder has not been sorted in a logical manner it may been that more time is required when searching for the information.

Data Flow Diagram of current method

In order to understand fully, just how this current process is performed, I visited Prof. Myers office on a typical working day and viewed a typical use of this process. After making brief notes on the various stages of this process, I have now drawn a Data Flow Diagram (DFD) of the process in order to explicitly understand just what would be required from a potential program. I feel that this is a good method of learning the process as the DFD's give a clear, visual depiction of just how a system works and I feel that if I have a clear, detailed outline of the process, I have a source of information to go to if I come to a point where I'm unsure of the purpose of the system.

```
Post ──┐
        ├──▶ In-tray ──────────▶ Secretary checks post for engagement
Email ──┤                                    │
Fax ────┘         Out-tray ◀─────────────────┤
                                             ▼
Awaiting          Assistant forms new    Assistant checks
confirmation ◀─── document from post ◀─── engagement post
from Prof. Myers
   │
   ▼
Prof. Myers ────▶ Assistant's ────▶ Engagement
checks document    tray              diary
```

Data enters the process either from normal "snail mail", email or by fax and from the post box or the computer, a hardcopy is put in the In-tray. The secretary checks the post for post that can be put in the engagement diary. Post that cannot be put in the diary is put in the Out-tray. The assistant takes the post and from there forms a new document to go into the diary. The document is then put into Prof. Myers' tray to be checked. Once the document has been checked it is then put into the assistant's tray, then into the engagement file.

(ii) **Investigation and Analysis** **[20 marks]**

This section is the 'systems analysis'. The question is not how a system performs detailed tasks, but rather how the project progresses from the original data to the results. The candidate should describe how the user requirements were ascertained (possibly by long discussions with the users; question and answer sessions should be recorded and outcomes agreed). A clear requirements specification should be defined. Alternative outline solutions should be discussed and evaluated against one another.

Mark Scheme:

1 - 5   Some elements have been discussed but little or no user involvement.

6 - 10   Some evidence that an attempt has been made to interview the user and some recording of it has been made. Attempts at some of the other items have been made. An attempt has been made to develop a requirements specification.

11 -15   Good user involvement and recording of the interview(s). Most of the necessary items have been covered including a detailed discussion of alternative approaches. However, one or two items have been omitted. A requirements specification is present but with some omissions.

16 -20   Excellent user involvement with detailed recording of the user's requirements. Alternative approaches have been discussed in depth. All other items must be present, showing a thorough analysis of the system to be computerised. A detailed requirements specification has been produced.

Sample Project

Here is a continuation of the same project at a good standard.

Investigation and analysis

In order to determine whether this real-life problem I have been approached to relieve, is a suitable one to be undertaken by this project, I have conducted an initial interview with Prof. Myers, his assistant and his secretary, as each person is likely to be using this system and would like some input into this project.

Initial meeting

Time / Date   16:30pm, 24th June 1998

Location   Prof. Myers office, Headington, Oxford

Persons present: Prof. Myers, Mrs J Kent and Mrs K Bradley

Aims: To obtain information for possible improvements to the present system.

Questions

1   What is the problem at hand?

PM -   When I go away on business trips, a lot of paper work is stored, containing details of my trip. When I'm on these trips, I may need to know certain details at a certain period of time. Often when I phone up the office, there is a delay finding this information as it is stored in no particular order so it takes someone to stop what their doing and find the relevant papers.

2   How is the process performed at the moment?

PM -   Information is stored in folders in the office and at the moment it is not logically organised, when I need some data, I have to use the folders in a sequential manner. This takes time which obviously takes time to do and could be used on perhaps an equally if not more essential activity.

3   Typically, how long does this take?

JK -   Obviously it varies, but the time period can range from a couple of minutes for a simple piece of information, but can take up to maybe half an hour for a large, detailed amount of information which needs to be used for various purposes.

4   What are the advantages of performing the process using the current method?

PM -   I guess the main advantage is the fact that we always have access to it, it couldn't ever crash like computer software, it is always in a hard copy form, in the folders.

JK -   Also, I guess it is also there as an archive so when anything needs photocopying, it is always there in those folders.

---

5 What are the disadvantages?

KB - I think the main one is the risk of fire. If there is a fire, it would all be lost and then we could have serious problems in trying to retrieve that information from the various sources. There is also the risk that someone may damage the information either on purpose, i.e. a burglary or accidentally, like spilling a cup of tea on the papers for example.

6 In your opinion, how would a computer program help with this problem?

PM - In my opinion, it would save a lot of time and effort for my colleagues here. in the long run. Information could be found easily and could be easily stored in a logical manner and there is always the advantage that data from the program could be merged with another program on the computer, for example my word processor, WordStar for Windows.

7 Are you sure that there are no other commercial programs, which at the moment could not perform this process?

JK - I have seen some organiser programs in electrical stores, but to be honest we need a program that is specialised to our business and we don't want to pay for a commercial program that contains all these extra functions that we may never use.

8 If and how is this process not able to be performed by a commercial program?

PM - Again with commercial programs, they can be costly and most of the time we need something specialised to our purposes. There are also some functions or processes that I have in mind that I am sure could not be performed by these programs in the manner that I want them to be done.

9 Could you estimate how much time lost a program could save if used with this process?

JK - Well this can vary from day to day. On some days when I or Prof. Myers might just require to see what he has on for that day, it can take around 5 minutes, but with something major like a lecture trip it can take up to 45 minutes. Time which could possibly be used for another purpose.

10 Do the people who are likely to he using the program have any experience with the use of computers and if so to what extent?

JK - I have about 3 years experience with computers and with a few of the major commercial programs on the market, so I think that I should easily become accustomed to the program.

PM - I also have similar experience and regularly use computers for various tasks in the office.

11 Do you have any way, at the moment, of being able to use a piece of software, i.e. do you own a PC and if so what are its capabilities?

PM - As a matter of fact we have two PC's in the office, both with Windows '95 if required and with Hard Drives of around 1 Gigabyte in size, which I think would be ample, but if any additional hardware or software is required, there is funds available to purchase them so I don't think that there is a problem there.

Summary

At the end of the interview I genuinely thought that there was a suitable problem here, to undertake in my project. I found that the problem here was Prof. Myers organisation of his time and he found problems with his current method that I feel are ones that could be solved or at least alleviated by the use of a computer program. The problems I have found in this interview were generally due to the fact that all the necessary information was formed and stored as paper which is prone to many arising problems, but if the information is on computer then it can resolve these problems and perhaps create a few benefits that do not occur with his current method, e.g. sorting and searching of data. As evidence that I feel this problem has potential I have arranged another interview to get more detail of the problem, how a program could help with this problem and the functions that Prof. Myers feels need to be included in a possible program. From that interview, I am hoping that I could move on to the next stage of the project.

Second interview

Now that I have determined that this real-life problem is a suitable one for this project, it is now the time to conduct another meeting, following on from the initial interview but focusing more on what the customer would like the program to do and look like. It is from this interview that I hope I will have gained enough information on the customer's requirements, that I could then produce a draft form of the specification.

Second meeting

Time / Date   17:00pm, 26th June 1998

Location   Prof. Myers office, Headington, Oxford

Persons present: Prof. Myers and Mrs J Kent (Research assistant).

Aims: To obtain enough information to derive system specification.

Questions

1   What kinds of procedures would you like the program to perform on any entered data?

   PM - I would like the option to add data to the program, to delete data at an appropriate stage, to search through the program for a certain piece of data and perhaps sort some aspect, for example by date so that I could have a list of my engagements in order of date. I would also like to be able to view any record at any period of time, just as easily, if not more easily than when I browse through the folder, using the current method. There could also be the option of a password as some of the data that I would be storing is quite vital and confidential, and so if there was a burglary, there is no chance of that information being viewed.

2   Of these procedures which are CORE FUNCTIONS?

   PM - Of those procedures that I have mentioned, I feel that the ability to be able to add, delete, view and search through data are the most vital functions of the program, if you were to consider just the essentials. I think that these definitely need to be in the program, if possible.

3   *Which of these functions are SHOULD HAVES?*

PM -   The function which I feel is necessary but not vital to the program is the ability to sort a particular item of data. It could be useful to be able to do this as it could save a lot of time in browsing through the records, but it is not what I would consider as being essential to the program. Another function which I feel is necessary but not vital is the use of a password, as security is always on my mind as I have experienced quite a few break ins since I have been here. It would be nice to feel that my data is safe, but it is not vital if time and skill constraints are placed on you as you are writing the programmer.

4   *Which of these are COULD HAVES?*

PM -   Thinking about it there are not many other functions that I would consider to be useful in this program, however the option of sorting could slip into this category and perhaps the use of a password, but if you were to discard one function it would be the sorting function.

5   *How would you like the screen to appear when you input data and view a record?*

PM -   I'm not really concerned with how the program looks, just how it operates and that it runs correctly. As long as the screen is clearly laid out and that it is clear where the user might input data into, then that is my only concern. Obviously, when I view a record, I would like for the contents of that record to be laid out in an organised manner, so that I or one of the other users can clearly distinguish between data.

6   *If you wanted to search through the records, which field or fields would be the ones that you would want to carry out the search by?*

PM -   At the moment, I guess you could say that the current method is much like a diary. As with any diary, the user is usually either searching by date, month, year etc. or in some cases by person or place name. This is really I would like to carry out a search if at all possible as these are the fields which I consider to separate each appointment or engagement from any other one. I feel that something like that would be most beneficial when browsing for certain items of information.

7   *When it comes to you inputting data into a record, what would the components or fields of each record be?*

PM -   Now this is really the crucial question as this can vary with each type of appointment from a simple doctor's appointment to a university lecture trip abroad somewhere, so there will need to be one sort of record that can hold all the relevant fields I might need for whatever purpose. I guess the main ones that come to mind are date, date from and to, time, location, purpose, persons involved, persons contact number, e-mail address and there are probably other fields as well which cover some major engagements like university trips, which I will have to get back to you on.

8   *How would you like the record to be organised?*

PM -   I have discussed with the other users, namely Mrs Kent and Mrs Bradley about this matter and we have all agreed that we would like it to be set out in a spreadsheet manner, like having the fields names above the relevant information because this is what we are used to with other programs such as spreadsheets and databases and I think it would save time in getting used to a fairly familiar format with this program. Basically we would be grateful if you could set the records out like that, but if you

find trouble in doing that due to your inexperience with programming then something similar would be fine.

9 *What kind of data would go into each field?*

PM - I think that the names of such fields that I have given are fairly self -explanatory into what type of data would go into them, but I'll go along with whatever you find most suitable concerning each data type and the size of them as you have probably had experience with estimating sizes of files and the like.

10 *Will all users have equal priority and access to the system?*

PM - I would like to feel that I can trust my two employees, so I don't think that this is an issue here, so I think all three of us should have the same access because most of the time I am not here and if I wanted some vital information when abroad on the phone and someone like Mrs Kent couldn't access the program then we would have a problem.

11 *Would you need a password option available?*

PM - Obviously some of the data that would be stored on the computer, I would like to keep confidential, but if there is a chance that you could incorporate a password facility on the program, then that would be useful, even though I mentioned earlier that a password is not a core function of the program.

12 *With reference to the layout of the screen would you require one which is beneficial to a user who has minimum computer experience?*

PM - As Mrs Kent and myself are the only likely users of the program and people who have had at least three years of experience with computer software such as Microsoft Office and Windows '95, I don't really have any problems with how you decide to set up the screen layout, as long as it is clearly legible to the user and that someone like me and Mrs. Kent could easily navigate through the screen.

13 *Once data has been entered into a record what is the chance that data would need to be manipulated at a later stage?*

PM - There is always a chance that data may be entered incorrectly, so if and when this happens, I think that it would be a good idea for some sort of option where I could edit a record or go back to a particular item when I'm entering the data.

14 *Do any of the potential system users have any disabilities or conditions which could require attention in the program?*

PM - To my knowledge I don't think so, however I would like the text to be clear and bold on the program so that information can be seen clearly. If this means have contrasting colours concerning the text and background, then I would appreciate some consideration.

To summarise, I feel that from this interview, I have generated enough information of the system from which to go onto the next stage of the project, where I can devise a potential draft specification for the program, and then, a data dictionary.

Initial System Specification

After my two discussion sessions with Prof. Myers over the nature of the problem and the ways in which he would like the potential program to function, I feel that this stage is a crucial point in the project, where it is necessary to layout an initial specification. This is mainly a document that lays out exactly and explicitly what the program must do and how it does what it needs to do, but also represents an agreement between Prof. Myers and myself that my ideas for this project are compatible with his ideas and that is why I have asked for his signature of agreement at the end of the document.

Section 1 - User functions

1.1   All users can perform the following functions:

1.1.1   Open the program

1.1.2   View a record

1.1.3   Create a record

1.1.4   Delete a record

1.1.5   Edit a record

1.1.6   Close the program

Section 2 - Appointment record

2.1   Each appointment record should contain the following information for each appointment

2.1.1   Date of start of appointment

2.1.2   Date of end of appointment

2.1.3   Place of appointment

2.1.4   Address of appointment

2.1.5   Phone number of appointment

2.1.6   Purpose of engagement

2.1.7   Tune/s of engagement/s

2.1.8   Names of contacts available

2.1.9   Phone numbers of contacts

2.1.10   E-mail address (if available of contact)

2.1.11   Date of flight (if applicable)

2.1.12   Number of flight (if applicable)

2.1.13   Departure time of flight (if applicable)

2.1.14   Name of departure airport (if applicable)

2.1.15   Notes

Section 3 - System

3.1   The system on demand must:

   3.1.1   Open a record

   3.1.2   Create a record

   3.1.3   Delete a record

   3.1.4   Allow editing of a record

In addition, to score the full marks for this section, alternative outline solutions should be discussed and evaluated against each other.

6.4.5.2 (b) Design [21 marks]

(i) Nature of the solution [13 marks]

A detailed systems design (including diagrams as appropriate) should be produced and agreed with the users. Proposed data structures should be described and design limitations should be included. Design of the user interface is of paramount importance and should be documented in detail in the form of data capture forms, input formats (with examples of screen layouts if necessary) and output formats should be included here where relevant. A detailed summary of the aims and objectives should also be included. These items are the design specifications that should be agreed with the user.

Mark Scheme:

1 - 2   Some vague discussion of what the system will do with a brief diagrammatic representation of the new system.

3 - 6   The major objectives of the new system have been adequately summarised, but omissions have been made. There is a brief outline of a design specification, including mock-ups of inputs and outputs, task model described (including any diagrams). However there is a lack of completeness with omissions from the task model, inputs and outputs. Data structures have been identified but there may be inadequate detail.

7 - 10   A clear set of objectives have been defined and a full design specification is included but there may be some errors or logical inconsistencies, for example validation specified may be inadequate or field lengths incorrect.

11-13   A clear set of objectives with a detailed and complete design specification, which is logically correct. The are also detailed written descriptions of any processes/modules and a clear, complete definition of any data structures. The specification is sufficient for someone to pick up and develop an end result using the software and hardware specified in the requirements specification.

Sample Project

Background To The Problem:

A Video Store currently uses a manual database to store details of the videos, the members and who has what video. They want to replace this with a computer database. The database would also calculate fines.

Although on the surface a fairly simplistic problem, there is a lot of detail which must be analysed and designed prior to implementation. The design shown below is only a sub set of what would be required. Only one section of the design has been included. When it is therefore awarded a mark in the band that requires no omissions, professional judgement needs to be used to visualise the rest of the project.

For an A grade project it must extend beyond the single application. In this project this might be the inclusion of mail merge letters to customers regarding overdue videos, fines or lapsed membership, or even internet access to their files to see fines and what videos they have out.

The project also lacks a reservation system, this could be either added in, or possible a complete project including shop and internet reservation with letters/e-mails being sent when the video requested is returned.

In the design specification, it is not reasonable to expect the input screens to be drawn with pen and pencil when software packages such as Visual Basic and MS Access include the ability to mock up screens. These mock ups of screens can be used in the design specification

Nature of the Solution

Major Objectives

The system should:

- Contain a list of members
- Contain a list of videos
- Link Master and type of video
- Produce a list of which member has which video
- Show overdue videos
- Show outstanding fines
- Track fine payments
- Show members who have not used the club for six months
- Hold at Least 1,000 members and 5,000 videos
- Not allow members with fines to borrow videos
- Mail merge of members with fines, overdue videos and who have not used the video club for six months or more
- Be able to add genre and age groups
- To have access from the Internet to see what videos are on hire

For each of the design specifications listed above, they should be individually detailed and discussed. Two have been completed below for exemplar purposes. The degree of information required is very detailed. It must be possible for a third party to take this specification and create the solution from it.

Contain list of members:

The system needs to be able to add, delete and edit members. New members join the club and they must be added. The system needs to make sure that the member does not have the same name and address as an existing member before adding them. Members details change and they need to be edited – they may move house, or change name. When a members card is lost or the member no longer wishes to be a member of the club, they must be deleted.

Contain a List of Videos:

Videos also need to be added and deleted as appropriate. The video addition has two elements. Each video has a type – a global concept of that particular video. For example, a video store does not just have one copy of a title but many copies. The title of the video is stored along with the information about the video – age, genre cost and then each specific video is linked to the video type. Individual videos and specific videos need to be added and deleted as appropriate.

The first stage is to input a global type. Some of the information for this is looked up in other tables – the age and the genre and the record is given a unique key. Once a global type has been established, an individual video can be associated with the type. The link is done through the primary key.

Design Specification

Four forms have been shown below, they are mock–ups in Access of what the forms should look like. There is some comment where appropriate. For a completed project, all appropriate forms should be included.

Inputs:

Member entry form:

MemberForm

Forename	Harry
Surname	Adams
Address1	The Grange
Address2	Hollywell Street
Town	Kingsrade
County	Kent
Postcode	TN35 Y67
Telephone	01234 56890
DateLastUsed	

Close Form

Entry of main video Type:

Video

Name	
Price	£0.00
Age	
Genre	

Drop down boxes to choose age and genre for video

	IndividualVideoID	Location	Hired
▶	(AutoNumber)		☐

Record: I◀ ◀ 1 ▶ ▶I ▶✳ of 1

The ages and genres of the videos are selected from a drop down box. As each video type can have more than one specific video (for example, a video shop may have ten copies of a video) the sub form shows all the specific videos linked to that main video type.

Entry of specific videos

Individual Video Details

Drop down boxes to choose
Video Title

VideoID

Location

This is where details of the specific videos are entered in. The drop down box links to the main video and the user can select a title.

Hire of Video:

Hire Form

VideoID		CustomerID	
DateTakenOut		DateDueBack	Close Form

MemberID

Forename

Surname

Address1

Address2

Town

County

Postcode

Telephone

IndividualVideoID

VideoID

Location

This form is where a video is selected and linked to the member who is taking out the video. When a video ID is selected from the drop down box, the name and location of the video will be automatically filled in. Likewise, when a Customer ID is selected from the drop down box, the customer details will appear and can be confirmed.

Processing

The processing can be done in the form of an algorithm, or as a paragraph of text. Only one processing element has been covered below, although in a completed project all processing requirement would need to be completed.

The processing listed below is for the return of a video.

When the return video form is opened:

A filter is applied which only shows those videos which have been hired.

The correct video is selected by scrolling through the list, or by entering the video number.

The return video button is selected.

The return date on the hire record is checked against the current date. If it is before the current date then a fine is due.

The video is recorded as not being on hire and the customer record is recorded as having returned the video.

If a fine is due:

The video record is found and the price of hire established.

The number of days overdue is calculated and multiplied by the daily fine to give the total fine.

The customer is given the option to pay the fine.

If they do the fine is cleared.

If they do not, the fine is recorded and they are flagged as not having paid a fine.

Outputs

The outputs are completed in the same way as for the inputs and therefore have not been included here. It is important to note that sometimes, an input can be used as an output in a different context, for example in the hire form, the member form and the video form are being used as outputs to confirm the identity of the member and the correct video details.

Task Model

The task model is not complete, it does not go into enough detail about the specific tasks –this would therefore get in the 6-10 mark range. If this was completed without the predecessor column, then it would get in the 3-6 mark range. The predecessor implies an indication of the need for more than a number order but a completion order as well. To get higher, each task would have to be broken down into its respective sub tasks.

Task Number	Task	Date Started	Date Ended	Predecessor
1	Create Member Table	Wed 30/08/00	Wed 30/08/00	
2	Create Genre Table	Wed 30/08/00	Wed 30/08/00	
3	Create Age Table	Wed 30/08/00	Wed 30/08/00	
4	Create Individual Video Table	Thu 31/08/00	Thu 31/08/00	"2,3"
5	Create Hire Table	Fri 01/09/00	Fri 01/09/00	"1,4"
6	Create Fine Table	Mon 04/09/00	Mon 04/09/00	
7	Create Member Form	Mon 04/09/00	Mon 04/09/00	
8	Create Specific Video Form	Mon 04/09/00	Mon 04/09/00	
9	Create Individual Video Form	Tue 05/09/00	Tue 05/09/00	8
10	Create Hire Form	Wed 06/09/00	Thu 07/09/00	"7,9"
11	Calculate date due back on hire form	Thu 07/09/00	Thu 07/09/00	
12	Create switchboard	Fri 08/09/00	Fri 08/09/00	10
13	Program Switchboard	Mon 11/09/00	Mon 11/09/00	12
14	Create Return Form	Mon 11/09/00	Mon 11/09/00	
15	Create Search Query	Mon 11/09/00	Mon 11/09/00	
16	Create Append Query for Fine	Tue 12/09/00	Tue 12/09/00	15
17	Create Pay Fine Button	Wed 13/09/00	Wed 13/09/00	16
18	Create Delete Query Button	Thu 14/09/00	Thu 14/09/00	17

This could also be completed in the format of a hierarchical diagram.

Data Structures

This section is one of the most important elements in the design. For each file in the project the information given below should be included in one form or another. The information can be used later in the estimation of file sizes.

Two files have been listed below to give an example of what would be required.

File Name: TMember

Purpose: To hold details about the individual members

Field name	Description of contents	Data type	Size	Sample values / range / set	Type of validation expected
MemberID	Primary Key	Autonumber	3	100	Automatic
Forename		Text	50	Adam	None
Surname		Text	50	Smith	None
Address1	First Line of Address	Text	100	10,	None
Address2		Text	100	The Grange	None
Town		Text	50	Holden	None
County		Text	50	Kent	None
Postcode		Text	8	TN6 7YG	Input Mask
Telephone		Text	10	01233 12345	Input Mask, Numbers only
Date Last used	The last date they hired a video	Date	8	10/07/00	Date, automatically created

Size of Individual Record:	429	bytes (maximum)
Maximum Records Stored:	1000	
Total size required for data:	429,000	bytes
Overheads (10%):	42,900	bytes
Total size required:	471,900	bytes

File Name:	THire				

Purpose: To hold details about video hire

Field name	Description of contents	Data type	Size	Sample values / range / set	Type of validation expected
HireID	Primary Key	Autonumber	3	45	Auto-generated
MemberID	Who has taken out the video	Number	3	121	Looked up
VideoID	What the video is they have taken out	Number	4	1065	Looked up
Date Out	When they took it out	Date	8	15/08/00	Calculated as today
Date Back	When it is due back	Date	8	18/08/00	Calculated as Date Back + 3 days

Size of Individual Record: 26   bytes (maximum)

Maximum Records Stored: 5000   (number of videos in shop)

Total size required for data: 130,000   bytes

Overheads (10%):   13,000   bytes

Total size required: 143,000   bytes

Queries:

If you choose a database as the major project, it is necessary to design and explain any queries you might have used. Two such queries are listed below for exemplar purposes.

Return Hire Query

This is a delete Query, when the video is returned the entry for that hire needs to be found within the hire table and the entry deleted.

All the fields from the Thire table need to be included (as the whole record will be removed) and the criteria is from the TindividualVideo table - the IndividualVideoID with the value being obtained from the return of video Form.

Take Video Out Query

This is an append query to make a video unavailable. When a video is taken out, the query is run and it sets the hired value to true (1). The query has the hired table, the hired field, and it searches for the video ID from the FTHire table, and the IndiviualVideoID field. Once the record has been located, the hired field of the query is updated to 1 (true) and it is then registered as being taken out.

Relationships

As it is a database that is being created, the relationships need to be specified. It would be expected that the final diagram presented has been normalised to 3NF and the relationships details and explained. Only part of the relationship diagram has been presented below as an example, although for the completed project, each relationship should be identified.

TAgeTMainVideo

TAge	TMainVideo
Age	Age

RelationshipType: Indeterminate

TgenreTMainVideo

TGenre	TMainVideo
Genre	Genre

RelationshipType: Indeterminate

TMainVideoTIndividualVideo

TMainVideo	TIndividualVideo
Video	Genre

RelationshipType: One-To-Many

TMemberTfine

TMember	Tfine
MemberID	MemberID

RelationshipType: One-To-Many

TIndividualVideoTfine

TIndividualVideo	Tfine
IndividualVideoID	IndividualVideoID

RelationshipType: One-To-Many

TMemberTpasswords

TAge		TMainVideo
MemberID		MemberID

RelationshipType: One-To-Many

TIndividualVideoTHire

TIndividualVideo		THire
IndividualVideoID		IndividualVideoID

RelationshipType: One-To-Many

TMainVideoTIndividualVideo

TMainVideo		TIndividualVideo
VideoID		VideoID

RelationshipType: One-To-Many

TMemberTHire

TMember		THire
MemberID		MemberID

RelationshipType: One-To-Many

Software and Hardware Requirements

Software Requirements:

The software required is MSAccess to create the database, including tables, forms, reports and macros. The mail merge links required a word processing package, MSWord and the internet links require a browser – Internet Explorer 5.0 or higher.

An Operating system is required: Windows 98.

Hardware Requirements:

Hardware to run the software is necessary:

- Processor: 500 MHZ

- 128 MB RAM

- 1 GB Hard Disk Drive

- Mouse, Keyboard

- 15" SVGA VDU

- Floppy Disk Drive

- CD Drive

- CD Writer for backup

- Modem to connect to internet server

Laser printer for mail merge letters

There are elements of 11-13 marks in the above. Not all of the design has been completed, but there is enough in each of the sections to give an idea of what is required for a complete A grade project.

For 11-13 marks:

A clear set of objectives with a detailed and complete design specification, which is logically correct. There are also detailed written descriptions of any processes/modules and a clear, complete definition of any data structures. The specification is sufficient for someone to pick up and develop an end result using the software and hardware specified in the requirements specification.

(ii)   Intended benefits   **[3 marks]**

There should be some discussion of the relative merits of the intended system and of the previous mode of operation. This may include any degree of generality beyond the original scope of the system.

Mark Scheme:

One mark should be awarded for each valid benefit up to a maximum of three marks

---

Benefits of the System

Benefit 1:

The company knows who has what video at any one time.

Benefit 2:

The existing system makes it difficult to know if a video is overdue and then to identify who has that particular video. If a card is placed in the wrong box it may be some time before the fact that a video is overdue is picked up. It is also difficult to find out if an individual has not returned a video before they take out more. It may be that the individual has many fines outstanding and if this is so, should not be allowed to take out videos. The new system will look at fines and flag any member who tries to take out a video without paying off their fines.

Benefit 3:

The members of the video store will be able to search for videos by Genre.

Benefit 1 gets no marks,   Benefit 2 gets 1 mark,   Benefit 3 also gets no marks.

Benefit 1   *does not get a mark, because although correct, there is no discussion, no comparison with the previous system, in fact no way of knowing that it is a benefit.*

Benefit 2   *gives the previous system, the new system, the changes and the benefits.*

Benefit 3   *does not get a mark because there is no discussion, and it can be seen that the benefit does not exist. It was already present in the existing system. If this was not enough to not justify the mark, the "benefit" listed is also listed in the section below as a limitation. It cannot be both. It is important to read and to mark the project as a complete piece and not each section as a standalone element.*

(iii)   Limits of the scope of the solution   **[5 marks]**

This may include volume (sizing limitations), limitations imposed by the interface and/or limitations of the facilities used. For full marks there must be some estimate of the size of the storage space required for the implemented system.

Mark Scheme:

1   A vague discussion of what the system limitations are.

2 - 3   The major limitations of the system have been adequately summarised, but omissions have been made.

4 - 5   A detailed description of the system limitations has been given, including the estimate of the size of the files required for the implemented system.

Limits of the scope of the solution

For each system the limitations are going to be different. Some may be based on the type of hardware being used, or on the user of the system. 1 mark is given for a vague discussion – little more than identification of limitations. 2-3 marks are awarded for a good discussion of the limitations, but not all covered. This is going to need awareness from the teacher of the problem and what they perceive as the limitations – have they all been covered by the candidate? If they have not, then the candidate stays in this band, if they have then the mark lies on the top band. For 4-5 marks, all the limitations must be covered (by all, teacher discretion is required). If they are all there and no file sizes have been mentioned, then 4 marks, if file sizes have been discussed, are correct and easy to follow, 5 marks, else 4 marks.

1:   A vague discussion of what the system limitations are

The computer system needs to be working otherwise there is no backup.

The system cannot search by actor/actress or genre to find a specific film.

The system does not check age of the video against the member automatically.

There are three limitations identified, however the discussion of them is extremely vague – they have merely been identified with no explanation of how and why they are limitations. Therefore, although correctly identified, they are only worth one mark.

2-3:   The major limitations of the system have been adequately summarised, but omissions have been made.

A problem with any computer equipment is the problem of power cuts or equipment failure. Although backups of data can be made so that no information is lost, the Video store would have to write videos and membership numbers on paper or close the store until the equipment is operational.

A lot of customers come into the shop looking for a specific video. The system is, at the moment, an administrative system and although it stores the location and genre of videos, there is no way for the customer to access these. The customer still has to look at the shelves and there is no guarantee that the video is not out. A search system would allow them to find out where the video is they are looking for, if it is out and when it is due back, and even to reserve it.

The system relies on the employee checking the age on the card and the age on the video. Frequently people do not bring additional identification with them to the video store and it can lead to confrontations over age.

The major limitations have been listed (as for 1 mark), but they have been expanded and some additional information has been given – why they are limitations of the system. However, there are omissions therefore full marks cannot be given. The candidate has not given an estimate of the size of the storage space required for the implemented system and without this full marks cannot be obtained. This therefore falls into the middle band – 2-3 marks.

The decision is whether to award 2 or 3 marks. In this instance, there are several omissions, but the major limitations have been summarised and there is some attempt at reasoning. This is therefore awarded 3 marks.

4-5: A detailed description of the system limitations has been given, including the estimate of the size of files required for the implemented system.

A problem with any computer equipment is the problem of power cuts or equipment failure. Although backups of data can be made so that no information is lost, the video store would have to write videos and membership numbers on paper or close the store until the equipment is operational. A backup generator could be used but this has time limitations associated with it. It is more useful for eliminating power surges.

A lot of customers come into the shop looking for a specific video. The system is, at the moment, an administrative system and although it stores the location and genre of videos, there is no way for the customer to access these. The customer still has to look at the shelves and there is no guarantee that the video is not out. A search system would allow them to find out where the video is they are looking for, if it is out, when it is due back, and even to reserve it.

The system relies on the employee checking the age on the card and the age on the video. Frequently people do not bring additional identification with them to the video store and it can lead to confrontations over age.

With many video stores, the main cardholder is an adult, but other family members will also use the card. This leads to a difficulty of identify. There needs to be a system of including all the family members on the card so that they can be identified. This would allow their ages to be included and help with the age problem listed above.

If the customer wanted to pay off a fine, they would only be able to pay off the entire fine in one go. They cannot pay individual fines. This is a disadvantage if the fine is large, as the customer cannot take out a video until the fine is paid and would have to make sure they had the full amount.

Estimate of the size of files required of the implemented system:

This information comes from the "Nature of the Solution" and may not necessarily be included separately as long as there is a reference as to where it can be found. In the projects which achieve the highest marks, there should be some reference made to the scalability of project and the file sizes taking into account the potential expansion of the solution.

File Name	Description	File Size
Tmember	Member Details	471,900
Thire	Hire details	143,000

This answer is in the top band. It adds detail and reasoning to the limitations, and includes omissions made in marks 2-3. There is the estimate of file sizes which is required for a full mark answer in the mark scheme.

As to 4 or 5 marks, the file sizes are complete and broken down and easy to follow, the explanation of the limitations is good and some thought has been made as to solutions or ways to overcome the limitations. There is no indication of scalability of future expansion. For these reasons, 4 marks.

6.4.5.3 (c) Development, Testing and Implementation [35 marks]

(i) Development and Testing [18 marks]

A technical description of how the solution relates to the design specification produced and agreed with the user should be included. It is the responsibility of the candidates to produce evidence of their development work and for producing a test plan for the system. It is vital to produce test cases and to show that they work. To do this, it is necessary not only to have test data, but to know what the expected results are with that data.

An attempt should be made to show that all parts of the system have been tested, including those sections dealing with unexpected or invalid data as well as extreme cases. Showing that many other cases of test data are likely to work - by including the outputs that they produce - is another important feature. Evidence of testing is essential. Comments by teachers and others are of value, but the test plan must be supported by evidence in the report of a properly designed testing process. The examiner must be left in no doubt the system actually works in the target environment. This evidence may be in the form of hardcopy output (possibly including screen dumps), photographs or VHS video.

Mark Scheme:

1 - 4   Evidence of tailoring of a software package or integration of interface software is tailored into a system and is provided in the form of printouts but with no annotation or relationship to a test plan or test run. The developed solution does not fulfil the design specification. A collection of hardcopy test run outputs with no test plan, or a test plan with no hardcopy evidence may also be present. A teacher may award up to 2 marks if they have been shown the system working satisfactorily and there is no hard evidence in the project report.

5 – 8   Evidence of tailored software packages/tailored interface software/tailored client software etc are provided in the form of printouts. Data structures are illustrated as part of the listings where appropriate, detailing their purpose. There is some annotation evident to illustrate how the package was tailored for a particular purpose or to indicate the purpose of sections of code in a program listing. The developed solution has logical flaws and does not fulfil the design specification. There is little evidence of testing with a badly developed test plan with clear omissions. There is no description of the relationship between the structure of the development work and the testing in evidence.

9 - 13   Evidence of tailored software packages/tailored interface software/ tailored client software are provided in the form of printouts. Data structures are illustrated as part of the listings where appropriate, detailing their purpose. There is some annotation evident to illustrate how the package was tailored for a particular purpose or to indicate the purpose of sections of code in a program listing. The developed solution partially fulfils the design specification. There should be at least eight test runs together with a test plan and hardcopy evidence. However, the test plan has omissions in it and/or not all cases have been tested (i.e., have no evidence of testing).

14 - 18 Technical evidence is provided in the form of printouts. Data structures are illustrated as part of the listings where appropriate, detailing their purpose. There is a full set of printouts showing input and output as well as data structures. All hardcopy is fully annotated and cross-referenced. The developed solution completely fulfils the design specification. A full test plan, with evidence of each test run is present in the report, together with the expected output. The test plan should cover as many different paths through the system as is feasible, including valid, invalid and extreme cases. Marks may be lost for lack of evidence of a particular test run or lack of expected results.

The situation used for this sample is one that is familiar to many people, that of the Video Store. For the purposes of this sample project, the requirements are for a system to record videos, members and hiring of videos. There are requirements for letters to be produced, the internet to be used to search for a particular video and for a member to see what videos they have outstanding.

There are areas of the project that are incomplete – it is not intended to be a complete project but to give guidelines about what would be required. Complete documentation is not included here, only enough to give guidance as to what should be included. In particular, testing is not extensive as once a general direction is given, teachers can extrapolate to fill in the rest. The other area where this project is incomplete is in the analysis of components. Some of them have been completed to give an indication of requirements and in a complete project, the expectation would be for all of them to have been covered. The marks are given on the basis that the project was completed.

The project utilises a database, word processor and the internet. This is not a requirement of all projects, you may use alternative software. It is important to take on board the fact that a project which is to achieve the top level should not be isolated within a single piece of software, but should utilise at least one other piece of software.

This project is a sample only, and it fails to meet the recommendations in one critical area – that of being a real world problem. There is no video club and therefore no real end user. Any evaluation is made up. As indicated in Appendix B of the Specification, problems should involve a third party user.

The specific area that will be exemplified is the hire and return of videos (including the calculation and direct payment of fines). The data entry screens and menus will not be examined here, but in a complete project should be.

Technical description of how the solution relates to the design specification

The design specification is from the design section – the main relevant statements are extracted for use here and it only covers hire and return of videos.

Design Specification	Technical Description
To select a MemberID who hires a video	There is a drop down box on the hire form and from this the name of the hirer is selected. Once the screen appears, the first letter of the name can be selected and the selection will jump to that letter.
To Select a Video for them to hire	There is a drop down box on the hire form and from this the name of the Video is selected. Once the screen appears, the first letter of the video name can be selected and the selection will jump to that letter.
To Hire the Video out	When the Member and Video have been selected the video can be hired out. When the button is pressed, the query VideoOut is run and the video is set to being hired. The record of the member, the video and the date hired are appended to the hirer table, and the date due back is calculated.
To select a video to return	When a video is returned, the video ID is selected and the hirer table is searched to return the Hirer and the date due back.
To calculate if a fine is due	If the date due back is prior to the current date, a fine is due. If a fine is due, the video ID is looked up to find out the price of hire. The number of days overdue is calculated and the two are multiplied together to get the fine and this is transferred to the form.
To pay the fine (if appropriate)	If there is a fine, the pay fine button is enabled and when selected, the fine form appears and the option to pay fine is given. When selected, the fine for that customer is removed form the fine table.
To reset the video to be present	The video record is reset so that it is not hired. This is done through an update query

Technical Evidence (Screenshots and Data Structures)

The technical evidence is a very important part of the project. It should contain every screen (both input and output), reports, and any code written. The technical evidence is the evidence of creation of the project. No screenshot should be included unless it is annotated or cross referenced. A screenshot is only useful if it is referenced and the reader is able to understand how it fits into the project as a whole.

The collection of elements within the database are listed below and their use summarised. They are examined specifically later on in this section when the inputs processes and outputs are recorded and analysed.

Teacher Guidance   **49**   © OCR 2001

ICT   Oxford Cambridge and RSA Examinations

Tables:

🔲 Create table in Design view		
🔲 Create table by using wizard		
🔲 Create table by entering data		
🔲 Switchboard Items	Switchboard Items	Holds Main Menu item
🔲 TAge	Tage:	Holds Age of Videos
🔲 Tfine	Tfine:	Holds details of fines
🔲 Tgenre	Tgenre:	Holds Genre of Videos
🔲 THire	Thire:	Holds Hire Details
🔲 TIndividualVideo	Tindividualvideo:	Holds individual Video Details
🔲 TMainVideo	Tmainvideo:	Holds Parent Video Data
🔲 TMember	Tmember:	Holds Members details
🔲 Tpasswords	Tpasswords:	Holds Passwords for Web access

Queries:

🔲 Create query in Design view	
🔲 Create query by using wizard	
🔲 QAllFines	Displays all the fines on record
➕! Qappendfine	Appends a fine to the Tfine table
✗! QDeleteFine	Removes a fine from the Tfine table when a fine is payed
🔲 QFineID	Holds the MemberID for appending a fine
🔲 Qindividualfines	Searches for individual fine when video returned
🔲 Qmailmergefine	Creates data required or mail merge
🔲 Qoutstandinghire	Finds all people with outstanding hires
🔲 Qpriceforfine	Calculates the video hire price for the fine
✗! Qreturnhire	Deletes hire record when video is returned
🔲 Qsixmonthsold	Finds all people who have not used the store for 6 months or more
🖊! Qtakevideoout	
🖊! Qupdatedatelasthired	Updates hired date in member form
🔲 QVideoDueBackMailMerge	Finds outstanding videos for mail merge
🔲 QVideosIn	Query of all videos in stock
🔲 Qvideosnothired	Query of videos in stock (test query not removed)
🔲 QVideosOut	Query of videos currently out

Forms:

📲	Create form in Design view	
📲	Create form by using wizard	
🔳	FAllFines	Form showing all the fines
🔳	Fhire	Form showing videos which are currently hired
🔳	Freturnhire	Return of video – has Fhire as a subform
🔳	Ftage	Form for ages
🔳	FTgenre	Form for genres
🔳	FTHire	The main hire form –comprising Ftindividual video and Ftmember as subforms
🔳	FTIndividualVideo	Used in Fthire form
🔳	FTIndividualVideo1	Form of individual videos
🔳	FTMainVideo	Form for controlling parent videos
🔳	FTMember	Used in Fthire form
🔳	FTMember1	Form of members
🔳	FTpasswords	Form for web passwords
🔳	Qsixmonthsold	Form showing people who have not used the store for six months
🔳	QVideosIn	Form of videos in
🔳	QVideosOut	Form of Videos out
🔳	Switchboard	Main Menu
🔳	TMember	Form showing fines for each person

Macros:

🖼	Autoexec	Autoexec	Opens switchboards and maximises it (as requested in user testing)
🖼	Mmailmerge	Mmailmerge	Runs Word for mail merge

Reports:

📲	Create report in Design view		
📲	Create report by using wizard		
📘	All Fines	All Fines	Report of all outstanding fines
📘	Member Details	Member Details	Report of all members held on file
📘	Video Titles	Video Titles	Report of all video titles in the store

This section will look at the hire of a video only, but it should give a basis for the rest of the section.

The Form FTHire is based on the table THire. When the form is opened, it creates a new record. The form contains two subforms, FTMember and FTIndividualvideo. Both of these exist as individual form and are combined into FTHire.

There are two manual inputs into this form – the ID of the video and the MemberID – both of which can be entered through a drop down box. The Date Taken Out and Date Due Back are calculated on the form itself.

When the MemberID is selected, the database checks to see if they have outstanding fines. If they do this is flagged and they may not hire a video.

The whole of the processes required are based on the close button form:

```
'**************************************************
'HIRE FORM
14/09/00
Version 1.1
Writer: A.N.Other
'**************************************************


Option Compare Database

Private Sub cmd_closehireform_Click()

'document name to open set to query
stDocName = "Qupdatedatelasthired"
'Query run
DoCmd.OpenQuery stDocName, acNormal, acEdit

'second query named
stDocName = "Qtakevideoout"

'second query run
DoCmd.OpenQuery stDocName, acNormal, acEdit

'error handling generated by access
On Error GoTo Err_cmd_closehireform_Click
```

```
DoCmd.Close

Exit_cmd_closehireform_Click:
    Exit Sub

Err_cmd_closehireform_Click:
    MsgBox Err.Description
    Resume Exit_cmd_closehireform_Click

End Sub
```

The code above is run from the close form button. Two queries are run:
> **Qupdatelasthired**
> **Qtakevideoout**

```
Private Sub MemberID_Change()
'use dlookup to run query to check if fines outstanding.  Result held in loustandingfines
loutstandingfines = DLookup("memberID", "QfineID")

'use dlookup to run query to check if hires outstanding.  Result held in loustandinghires
loutstandinghire = DLookup("memberID", "Qoutstandinghire")

'if there are fines, they cannot hire a video
If loutstandingfines <> "" Then
labletohire = False
Else
    labletohire = True
End If

'if there are hires, they cannot hire a video
If loutstandinghire <> "" Then
    labletohire = False
Else
    labletohire = True
End If

'if unable to hire, message box generated
If abletohire = False Then
    MsgBox "This member may not hire a video, Check Fines and overdue loans", vbCritical,
"DO NOT LOAN VIDEO"
End If
End Sub
```

**When the member ID box is changed, the query FineID is run usng the
Dlookup function. This returns two values – whether they have
outstanding fines, or outstanding hires. If they do, messages appear
flagging this.**

Queries being Run

The first query which is run off the close form button is Qupdatelasthired:
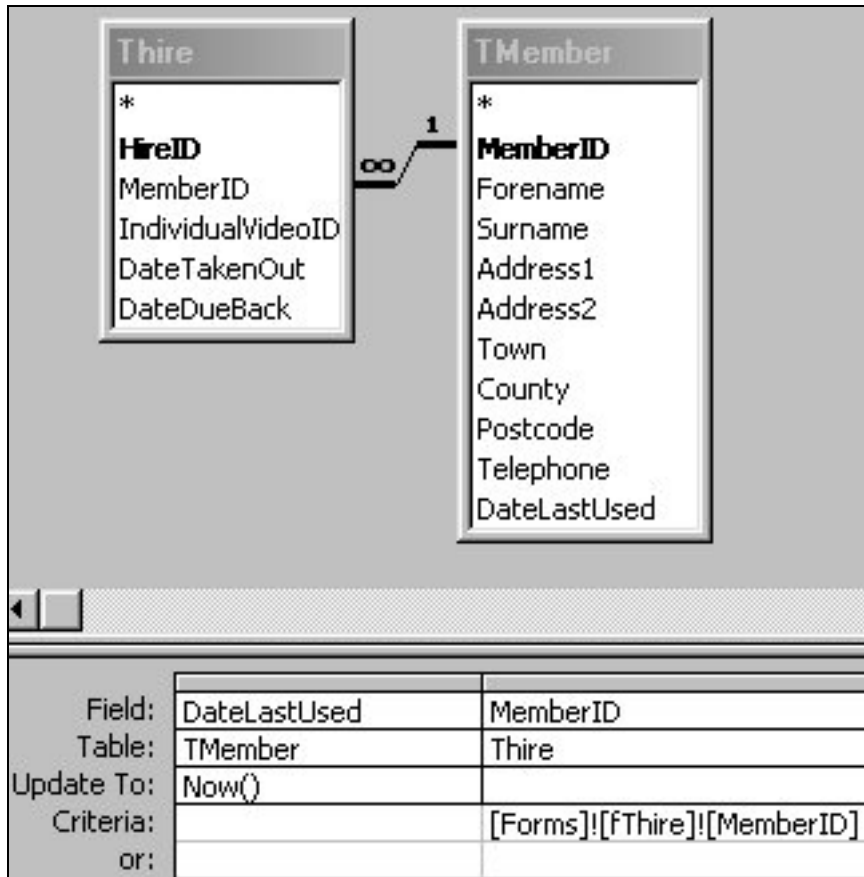
This takes the MemberID from the form, finds that member in the TMember table and updates the datelastused field to todays date.

The SQL for this is:

UPDATE TMember INNER JOIN Thire ON TMember.MemberID = Thire.MemberID SET TMember.DateLastUsed = Now()

WHERE (((Thire.MemberID)=[Forms]![FTHire]![MemberID]));

Once this query has been run, the query Qtakevideoout is run. This query finds the ID of the video being taken out and sets the hired value to true.

Field:	Hired	[Forms]![FTHire]![IndividualVideoID]
Table:	TIndividualVideo	
Update To:	1	
Criteria:		[TIndividualVideo]![IndividualVideoID]
or:		

The video ID is acquired from the FTHire form and the hired value is set to 1 which is true.

The SQL for this is:

UPDATE TIndividualVideo SET TIndividualVideo.Hired = 1

WHERE (((([Forms]![FTHire]![IndividualVideoID])=[TIndividualVideo]![IndividualVideoID]));

Test Plan

The test plan has not been included in full. The hire of video has been tested only to give an indication of what would be required in a complete project. Not all tests have outputs, and some tests an be grouped together into one output. Not all tests are successful – these tests need to be redone at a later date once they have been corrected..

The test number is used to cross reference the test against the printouts which follow. There are printouts for all tests where there is an output. Tests which fail have been shaded.

Test No	Description of Test	Data Used	Expected Result	Actual Result	Output
1	Choose Hire video menu option	None	Hire Menu Form Opens	Same as Expected	N
2	Choose Video ID 5 From drop down box	5	Video box filled in with "Priscilla Queen of the Desert"	Same as Expected	Y
3	Choose Customer ID Smith	Smith	Details for Smith entered into Customer Box	Same as Expected	Y
4	Hire Form adds date taken out an date due back onto hire form	None (automated)	Today's date and today date + 3 days entered on form	9/9/00 entered and 12/9/00 entered	Y
5	Click Close Form Button	None	Query Datelasthired run an customers account updated with date video hired. Query Takevideoout –Hire details added to hire table	All results as expected	Y
6	Video ID Number Typed	4	Video Box filled with "Hamlet"	Same as Expected	Y
7	Video ID Number Typed of a video which does not exist	36	Error Message appears	New record for video created	N
8	Video ID Letter Typed	Hamlet	Error Message Appears	Same as Expected	Y

Output of Tests

Output for Tests: **Hire Form**

2,3 and 4

VideoID	5
DateTakenOut	09/09/00

CustomerID	Smith
DateDueBack	12/09/00

Close Form

MemberID	1
Forename	Simon
Surname	Smith
Address1	Brambwell
Address2	Lower Grange
Town	Lifton
County	Kent
Postcode	TN45 O98
Telephone	01432 45642

Record: 14 < 1 > 14 14 of 1

IndividualVideoID	5
VideoID	Priscilla Queen of the Desert
Location	C14

Record: 14 < 1 > 14 14 of 1

Output for Test 5

	HireID	CustomerID	VideoID	DateTakenOut	DateDueBack
▶	23	Simon	5	09/09/00	12/09/00

Output for Test 5

	IndividualVideoID	VideoID	Location	Hired
+	5	Priscilla Queen of the Desert	C14	☑

Output for Test 5

		MemberID	Forename	Surname		DateLastUsed
	+	1	Simon	Smith		09/09/00

Output for Test 6

IndividualVideoID	4
VideoID	Hamlet
Location	T32

Output for Test 8

> **Microsoft Access**   [x]
>
> ℹ **The value you entered isn't valid for this field.**
>
> For example, you may have entered text in a numeric field or a number that is larger than the FieldSize setting permits.
>
> [OK]

On the mark scheme, this piece of work would score in the 14-18 category. There is technical evidence and data structures. Listings have been given and their purpose described.

There is a full set of printouts (in a complete project) and hardcopy of annotated.

The test plan is not completely accurate as it does not enable an outsider to utilise it as there is no start point for the tests. This loses marks.

The other area where marks are lost are in the naming of variables and the annotation of code, which is not always as complete as it should be and the header is on the form and not the individual procedures.

For these reasons, if the rest of the section was present, a mark of 15 out of 18 would be awarded.

(ii)   Implementation   [10 marks]

It is recognised that the user organisation (preferably 'third party') may not fully implement the system, although this is the ultimate aim. However, to score any marks in this section there must be some evidence that the person for whom the system was written has seen the system in operation. This can be done in a number of ways: such as by inviting the user to see the product and allowing the candidate to demonstrate the system, or by taking the system to the user involved. There should be an implementation plan written, including details of system changeover, training required and details of user testing.

Mark Scheme:

0   No evidence that the third party user has used the system. No written implementation plan

1 - 4   Details of system changeover have been documented with some recognition that the user(s) will require training. Some evidence of user testing is given, usually by questionnaire or written comments by fellow students or others who were not directly involved in the development of the system.

5 - 7   A good implementation plan with details of training required. There is written evidence available from the third party user indicating that they have seen the system in operation.

8 -10   A clear and detailed implementation plan, including detailed stages of user testing. All aspects of user testing, user acceptance, implementation and system changeover have been documented. There is written evidence available from the user that the system has been fully tested.

The sample project concerning the video store is continued:

Implementation is the introduction of the completed system into the environment for which it was designed.

Direct Changeover

This would involve a complete placing of trust in the new system as it stands. If there were any errors, then it may not be possible for the Video Store to know who has what video, or how much people owe in fines. Although with small scale systems direct changeover is sometimes applicable, in this case because of the necessity for a backup it is not the most appropriate solution.

Phased Changeover

There are three elements to the program: the recording of loans and fines, the production of letters and the internet access. However, they are intrinsically linked and it is not possible for one to be introduced independently of the rest. This would result in direct changeover which has been ruled out for the reasons given above.

Pilot Changeover

If the solution was developed for a chain of shops then Pilot changeover would be a preferred method, however, for a single establishment, there are no advantages to using this method of changeover.

Parallel Changeover

This involves running the current manual system alongside the new system and the results from one checked against the other. This will give a backup of the new system and allow time for staff training. Once they are confident in the system and the results are accurate, the paper based system can be ended.

Implementation Plan

Demonstration of System

Once the system has passed the internal tests using valid, invalid and extreme data, it is to be demonstrated to the management of the Video Store. This will take place in the Video Store using the system running on a laptop and a portable printer. The internet side of the system will be demonstrated on the laptop using PWS (Personal Web Server) to emulate the remote web server. A questionnaire will be given to each of the members of the management present and they will be required to complete this based on their impressions of the system. These questionnaires will be analysed and the comments taken into account before User testing continues.

Once successful, the demonstration will be extended to include all staff in the Video Store and their comments will be noted, and if necessary changes made prior to implementation.

Although an introduction to the demonstration of system, in the full project the questionnaires would need to be created, filled in by the end users and results analysed.

User Testing

The system will be tested throughout the development process with the user being shown mock-ups of screens and commenting on them. The user will be consulted on all cosmetic aspects of the database. The layout of menu's and positioning of controls on the page will also be tested by the user.

The user is consulted throughout the design and development process, and in particular at the following stages:

Initial paper based designs

- The user will be consulted over the paper based designs. They will be shown several designs and, with consultation, an overall layout for the screens will be chosen.

Prototypes of screen designs

- Based on the paper based designs, the users will be shown a prototype of the screens. This will include buttons, options, and colour schemes.

- Basic processes required

- Menu items

- Format of output letters

- Web Page design

- Test data

For each of these stages, the user involvement needs to be detailed and their input documented. Some details has already been given and this needs to be expanded.

Towards the end of the project, a full user test was conducted. This has been detailed below:

Item To Be Tested	Comments
Main Menu Appears Automatically	Maximize the main menu on start-up
Titles of Video can be added	Works as requested
Specific Videos can be added	Works as requested
Members added and deleted	Can a delete button be placed on the member form and a confirmation before deleting?
Videos Returned	Works as requested
Fines automatically calculated	Works as requested
Be able to Pay fines	Can a member pay off part of a fine?
Three sets of letters generated	The date inserted into the letter is a full date, can this be changed to a short date.
Change member web passwords	Can the members change their own passwords via the web.
Layout of Controls	As requested
Colour Scheme	As requested

The above items were tested by the staff of the video store. Initial comments have been recorded, but I also requested that the management discuss the testing and reply officially. A copy of the letter received has been included below:

OCR Video Store,
Haddington,
Kent
ME67 7YH

15st August 2000

Dear Mr Smith,

With reference to the computerised system which we tested on the 12th August, I have discussed the system with my colleagues and as requested by yourself, have highlighted the following areas for improvement/alteration:

The main menu appears in a box with the background of Access showing, can the main menu be maximised so that it takes up the full screen?

The only way to delete a member is via the menu and there is no confirmation.
Can this be changed so that there is a button for deleting a member and it cannot be done accidentally – it asks for confirmation.

At present a member can only pay off all the fine, it may be that they want to pay off part of a fine.

The date inserted into the letter is a full date, can this be changed to a short date?

In the system, we at the store have to change members passwords for the web, is there some way the members can change the passwords over the web?

I hope these comments are of use.

Yours Sincerely,

M. Jones

Manager, OCR Videos

The comments made by Mr Jones match those recorded from my observations of testing and where possible, have been implemented.

Some of the changes have not been made but are scheduled for implementation at a later date, these include members changing their passwords on the web and the part payment of fines. The inclusion of a short date instead of a long date has not yet been solved.

User Acceptance

User acceptance is based on the system achieving the objectives laid down for the system in the design specification. A letter is required from the Store Management accepting the system and has been included below.

OCR Video Store,
Haddington,
Kent
ME67 7YH

31st August 2000

Dear Mr Smith,

With reference to the computerised system you have developed, I would like to take this opportunity to thank you for the time and effort you have put into the system and wish you well with your A level.

The requirement for the system was to:
- Contain a list of videos in stock;
- Contain a list of videos rented;
- Contain a list of members;
- To know who has rented what video;
- Calculate Fines;
- Send out letters for fines, overdue videos and members who have not used the store for six months or more;
- Allow users to access their records from the internet.

On 28th August you demonstrated the system to myself and my employees and I am pleased to say that it fulfilled all the criteria required. I am happy to accept the system for use in the Video Store.

Please contact my secretary at your earliest convenience to arrange a time when the system can be implemented.

Yours Sincerely,

M. Jones

Manager, OCR Videos

Implementation

The implementation of the system will take place in phases. There are two data entry phases – the entry of the videos in the Store and the members. The hire data is transient and cannot be done off site. The web based system will be implemented in advance but database itself will not be placed on the server thus restricting access. The data entry will take place on the machine which the store will use.

Once data entry has been completed, the hardware needs to be installed in the store. This will be done overnight – once the shop has closed and prior to its opening the following morning.

System Changeover

Initially, the systems will run in parallel for a period of one month. At the end of each week, the data will be compared – videos on hire, last hire dates, overdue videos and fines. If this data is in agreement then the system can be said to be working. If there are any problems with the weekly reports, the fault can be researched and found – it cannot be assumed that it is the computer system which is at fault, it may be the manual system.

If there are continuing problems which take time to solve, the period of parallel changeover can be increased. Once there is satisfaction from the staff that the system works, then the manual system will be signed off.

Training

The staff will be provided with training prior to implementation and a full user guide will be supplied.

The above section covers areas from all the mark ranges but does not get full marks. For full marks there needs to be a clear implementation plan (included) and detailed stages of used testing (not included) The section on user testing is very light and would need more detail to be in the higher mark range.

The section fits into the 1-3 mark range and has elements of 8-10. Training is light and but included and there is third party evidence of use, therefore it fits into 5-7, towards the upper end of the mark range. If training and user testing was covered in more detail it would be in the higher band.

Some discussion of the suitability of methods and any product (e.g., hardware or software) used for the particular system should be included. Some recognition and discussion of the problems encountered and actions taken when appropriate should also be included. A log of such problems could be kept. Suitability for subsequent maintainability and extendibility.

Mark Scheme:

1 - 3   Some attempt at discussing either the suitability of the hardware and software, or the problems encountered.

4 - 7   A complete discussion of the hardware and software available and how they were suitable in solving the given problem, together with a good, informative explanation of the problems encountered and how they were overcome.

This is a continuation of the Video Example

Hardware and Software Available

It is necessary for the end user to be running MS Access 2000 and Word 2000. The system has been developed and tested using these pieces of software and although it is possible to save to a previous version, this is not recommended. The HTML pages utilise the Microsoft Access driver for data access. This is not required on the local station as the database access is provided through the remote server.

The combination of the two elements of the Office suite of programs allow for easy transfer of data between them. Because the applications are of the same family, the transfer of data between them has been simplified and there is code built into the programs to simplify the process.

The wizards within the software were used to initially create the basic outline of the forms and the switchboards. This allows the basic structure of the pages to be similar and therefore present a unified approach to the user. The coding of the buttons by the wizard removes a lot of time and effort and automatically adds error procedures.

The combination of the Microsoft Office packages allows transferable knowledge to be utilised. If the user has knowledge and understanding of one of the Office Applications, they can transfer that knowledge to the other packages. For example, the menu structures and commands are similar in MSAccess and MSWord and if the user is unsure, they can use the knowledge from one to assist with the other.

There is a lot of help available (Books, Internet, Newsgroups) which can be utilised As the Office applications are widely used, there are many avenues of assistance available. These come in the form of books – which range from those targeted at beginners to advanced use. There are newsgroups on the internet where questions can be asked and replies analysed. There are also many web pages where I can research office applications and find answers to problems.

Additional software requirements include ISP software for internet access, and FTP software to upload the database.

Hardware Specification:

The Video shop requires a single terminal in the shop. This is at the checkout point. The hardware requirements include:

Hardware Required	Reasons
Mouse	The software is windows based and requires a mouse to move around the screen and select options.
Keyboard	Data entry is done via the keyboard.
Floppy Disk Drive	This is required to transfer small amounts of data between computers.
CD Writer	This is needed to make backups of the database. The CD Writer can also be used as a normal CD Drive to restore the data.
Hard Disk Drive (5 GB)	The operating system is required as well as the office applications. Storage space is also required for the database. Although 5GB will leave a lot of unused space, this is the minimum available.
17" Monitor	The large monitor allows three forms to be displayed on the screen at once – the hire form, members form and video form.
Processor (500 MHz)	This processor will minimise the amount of time spent waiting for the programs to load and the speed of searching will increase.
RAM (128 MB)	The RAM will increase the speed of searching and loading.
Laser Printer (HP Deskjet 1060)	In order to print the letter, a printer is required. For quality and speed and the absence of colour, a laser printer is the best option.
Modem	A modem is required to upload the database to the web server for internet access.

Problems Encountered

The database achieves its goal, although there were problems encountered on the way.

Reading the results of a query (DLOOKUP)

In order to find out the amount to pay for a fine, it was necessary to run a query. However, once the query was created, it became difficult to find a way to run the query and then return the result to the form.

The difficulty with this is that it requires a physical action to run the query and then a secondary action to record the values from the query on the form. This involves shifting the focus from the form to the query and then back to the form without the user knowing.

To make the changes invisible proved difficult until I came across the DLOOKUP command. This command allows MSAccess to run the query from within the code window and pass the result of the query back to a variable. This variable can then be used, again within the code window, to pass the value to the form. This does not involve passing the focus to any other form or query and the user is unaware of what is occurring.

Creating a DNS Less database link

The internet element of the database requires access to the underlying database. Initially this was achieved creating a DSN link to the database from within control panel. The database worked as intended on a local level however when uploaded to a remote server, the DSN was looking towards the name stored on the local machine – this did not exist on the remote server therefore the code could not find the database.

The solution involved rewriting all the web database access code. Instead of hard coding the database path, it became necessary to link directly to the database when the code was run. This was done through a DSN-Less connection – the connection string identifies the path to the database on the remote server as opposed to merely identifying the name of the database and letting the operating system identify the path through the ODBC data source.

These are not all the problems encountered but should give an example of what is required. The discussion should include the problem, and the solution.

Suitability for maintenance and extendibility

Maintenance

The Databases has separate forms for the Age and the Genre. This allows the user to add, delete and edit fields. The price of videos is also easily maintained.

The addition, deletion and editing of information can be done via the switchboard menu and the subsequent forms. It should not be necessary for the user to have to go behind the switchboard and forms to the code in order to maintain the database.

Extendibility

The system can be extended to include searches for specific video titles and then the ability to reserve the title against a MemberID.

It may also be that a customer cannot pay off all of a fine, but only some of it. At the moment this is not possible, they can either pay it all or none.

Validation of input is currently reliant on the in built validation from MS Access. Not all the messages from MS Access are easily understood, so the system can manually override the system and provide user friendly error messages and validation.

There is currently no on-line help system attached to the forms or controls. This could be implemented at a later date.

Adding bar codes to the videos and member cards will enable them to be automatically scanned into the computer. This will eliminate the possibility of incorrect data being entered into the system.

This falls into the highest band, with a complete discussion of the hardware and software available and how they were suitable in solving the given problem, together with a good, informative explanation of the problems encountered and how they were overcome.

6.4.5.4   (d)   Documentation   [24 marks]

(i)   Technical   [10 marks]

Much of the documentation will have been produced as a by product of design and development work and also as part of writing up the report to date. However a technical guide is a standalone document produced to facilitate easy maintenance and upgrade of a system. The contents of the guide should, where relevant, include the following: data structures used and/or database modelling and organisation including relationships, screens, reports and menus; data dictionary, where appropriate; data flow (or navigation paths through the interface); annotated software details in the form of printouts; detailed flowcharts/transition diagrams as necessary; details of any functions, procedures, macros etc and any formulae used. All parts of the guide should be fully annotated since this is very important for subsequent development of the system. The specifications of the hardware and software on which the system can be implemented should be included.

Since the system in the technical guide will differ from one project to another, professional judgement as to what would be necessary for another analyst to maintain and develop the system has to be made.

Mark Scheme:

1 - 2   Some items are present but little annotation.

3 - 6   One or two major omissions, but the rest is fully annotated.

7 - 10   No major omissions, with all parts fully annotated. Marks will be lost for inadequate items of documentation e.g., non-specification of hardware on which the system can be implemented. For full marks the guide should be well presented rather than just a collection of items.

Technical Documentation

The technical documentation will differ from project to project and will utilise elements of the design stages. It may be that you will find that sections have to be repeated in both the design and the technical documentation.

The difference between 3-6 marks and 7-10 marks is in the completeness of the guide and the presentation. A complete, well presented guide is worth 10 marks, but if there are minor omissions then the marks begin to go down. If there are any major omissions or only a partial structure to the guide then the lower mark band must be considered. If there are many omissions and the guide is a collection of items then 1-2 marks should be awarded.

The technical guide is to enable the maintenance and development of the system. It must allow another analyst to be able to reproduce the current system and understand how it works.

Below is part of a technical user guide. There is a contents page listed to demonstrate what would be expected in the technical documentation for this project.

For exemplar purposes, there is some discussion of queries used, annotation of screen shots, and details of coding for various elements. A full set of technical documentation would include those elements as part of the contents listed below. The way in which the technical documentation is laid out will differ according to the specific projects. It may be more appropriate to write the technical documentation from the perspective of the users, by following the navigational path through the software.

It is not sufficient to use the wizard to analyse the database and then present that as the technical documentation. Parts of it may be used, but additional annotation would be required.

OCR Video Database

Technical Guide

Discussion of Queries

The query which is looked at here is QappendFine. This is one of sixteen queries in the database and for full and complete documentation all must be analysed and documented in the same way.

Type of Query:	Append Query
Purpose of Query:	To add the details of a fine to the Fine Table.
Underlying Table(s):	Appended to the Tfine table.
Tables Used in Query:	It acquires data from the Thire table (via the FreturnHire Form and the FreturnHire Fine subform)
Fields Used in Query:	Field appended are the MemberID, the IndividualVideoID and Fine. The fields used to append are the Thire.MemberID and Thire.IndividualVideoID. The third field- Fine is created by a procedure within the Freturnhire form.
Query called by:	FreturnHire form
SQL Used:	INSERT INTO Tfine (MemberID, IndividualVideoID, Fine) SELECT THire.MemberID, THire.IndividualVideoID, [Forms]![Freturnhire]![fine] AS Expr1 FROM THire;
Screenshot:	

Field:	MemberID	IndividualVideoID	Expr1: [Forms]![Freturnhire]![fine]
Table:	THire	THire	
Sort:			
Append To:	MemberID	IndividualVideoID	Fine
Criteria:			
or:			

Annotation of Screenshots

The screenshots presented and annotated below are for list of people who have not used the Video Store for six months or more. This is a single example and for full and complete technical documentation all of the screens seen by the user must be presented and annotated.

Presentation of Users Who have not used the Store for Six Months or more.

From the main menu, the user can select the option for reports and from the reports menu they can select "List Six Months Old" This option will list all the people in the system who have not used the store for six months or more.

This will allow the store to send them a letter (utilising Mail Merge) which will ask them to reply if they still wish to keep their membership. The list could also be sued to send them offers to tempt them to use the store again.

Design of Form:

The names of the elements are listed above. The form is a tabular form with the rows of data being displayed in the Detail section. The Form Header contains the headings of the rows and the Footer contains the Button to close the form. *The code for the button would be listed and analysed here.*

The form is based on the query: Qsixmonths and was created using the form wizard and then manually edited.

Form Containing Data:

There is only one record displayed but the layout and data can be seen.

Details of Coding

Details of coding should give the code and explain what is happening. It should also give an overview of how the form/code fits into the program as a whole.

Form Return Hire

The following code is from the return hire form. This form is run when a video is returned. The form has three buttons.

The first is to close the form.

This closes the form and allows the main menu to be displayed.

The second is to pay the fine

This button is enabled is there is a fine to pay and calls the fine form and opens it with the ID of the member who has to pay the fine

The third is to return the video.

This removes the hired from the video and calculates if there is a fine to pay.

This procedure is run when the form is closed.
 	
It runs an error procedure which is auto generated by using the Access create button wizard.
	``
	Option Compare Database
	
	Private Sub cmd_closereturnhireform_Click()
	On Error GoTo Err_cmd_closereturnhireform_Click
	
	    DoCmd.Close
	
	Exit_cmd_closereturnhireform_Click:
	    Exit Sub
	
	Err_cmd_closereturnhireform_Click:
	    MsgBox Err.Description
	    Resume Exit_cmd_closereturnhireform_Click
	
	End Sub
	``

This procedure is run when the Pay Fine button is clicked.
 	
This sets up the Form to run
 	
This is the filter to be used when opening the form – it find the record of the customer which matches the customerID field on the form
	``
	Private Sub cmd_payfine_Click()
	
	    Dim stDocName As String
	    Dim stLinkCriteria As String
	
	    stDocName = "FAllFines"
	
	    stLinkCriteria = "[MemberID]=" & customer
	    DoCmd.OpenForm stDocName, , , stLinkCriteria
	
	End Sub
	``

This is the return video button. A variable customer is set to the value of Member ID.	Private Sub cmd_returnvideo_Click() customer = Forms![freturnhire]![Fhire]![MemberID]
Date Due looks for the ldatedueback field and ten calculates how many days have elapsed.	ldatedue = Forms![freturnhire]![Fhire]![DateDueBack] ldatedue = FormatDateTime(ldatedue, 2) ldaysoffine = DateDiff("d", ldatedue, Now)

If a fine is due it looks up the price of the video using DLOOKUP on the qpriceforfine query and multiplies this by the days to get a total for fine.
 	
This is then formatted to currency.
The value is written back to the form.
	If ldaysoffine > 0 Then
	   lamounttopay = DLookup("price", "qpriceforfine")
	   lamounttopay = lamounttopay * ldaysoffine
	Else
	   lamounttopay = 0
	End If
	
	lamounttopay = FormatCurrency(lamounttopay)
	Me.fine.Value = lamounttopay

If there is a fine then a message box is displayed and the amount, and the member ID is written to the fines table using the append query Qappendfine	If lamounttopay > 0 Then
	MsgBox "Fine To Pay"
	   stDocName = "Qappendfine"
	   DoCmd.OpenQuery stDocName, acNormal, acEdit
	   cmd_payfine.Enabled = True
	End If

The video is no longer hired, therefore the hired value is set to false and the record updated using the Qreturnhire append query.	Me.Hired.Value = 0 stDocName = "Qreturnhire" DoCmd.OpenQuery stDocName, acNormal, acEdit MsgBox "Video Has Been Returned"
A message telling that the video has been returned indicates the end of the procedure.	End Sub

This falls into the highest mark band. It is organised and not a collection of objects, there are no major omissions, with all parts fully annotated. All items listed on the contents page would have to be completed.

(ii) User [14 marks]

Clear guidance, as friendly as possible, should be given to the user for all operations that they would be required to perform. These would include input format with screens displays, print options, back-ups (file integrity routines), security of access to data and a guide to common errors that may occur. (Note the candidate would not be required to copy out large volumes of any underlying software's user guide, but to produce a non-technical and easy to follow guide for someone with little computer knowledge). Some mention here of the relationship between items of software and the data they deal with may be relevant. The user guide should be well-presented with an index and, where necessary, a glossary of the terms used. Alternatively, an electronic guide could be based around hypertext links (screen dumps will be required).

Mark Scheme:

1 - 2   An incomplete, badly produced guide. No screens displays/interface mock ups. Some options briefly described but difficult for the user to follow.

3 - 4   A standalone guide has been produced which, though incomplete, contains details of the required input and output and some error conditions. Some screen displays are present in the guide.

5 - 9   All but one or two options fully described (e.g., back-up routines not mentioned). In the main the options are easy for the user to follow with screen displays.

10 - 14   A full user guide with all options described, well-presented (possibly as booklet) with an index and a glossary. No omission of any of the options available (including back-up routines, guide to common errors). Marks may be lost for inadequate descriptions of some options. For full marks, good on-screen help should exist.

The user guide is for the day to day running of the system. It is not a user guide of the software that has been used to produce the system, but of the system itself. The guide must include all aspects of operation and errors that may occur. It should be logical in its layout and presentation and easy to follow.

For 1-2 marks   a guide which is incomplete and badly produced will have been presented. It will have none or very few screen shots.

For 5-9 marks   the majority of the options need to be covered. The guide must be easy to use and to follow.

For 10-14 marks   there must be no omissions. Marks are lost if some of the descriptions are not adequate enough. There must be an index and a glossary.

The guide does not have to be paper based but can be on line. In any event, there should be some on-line help available, such as tool-tips, hyperlinks to help pages etc. and these need to be documented.

Presentation is important as the audience must be considered and the guide must be usable. It is not enough to display screen shots on their own. They must be explained.

Included below is the contents page for the user guide with the options listed that should be included in the full guide. The page numbers are not correct since the full user guide does not exist. The user guide for the hiring and returning of videos is included as an example.

OCR Video Database

User Guide

Hiring A Video

There are two steps required when hiring a video. The first is to make sure that you are allocating the correct video, the second is to make sure that it is being given to the correct member.

It is also necessary to ensure that you are satisfied that the individual is of a suitable age for the video they are hiring, and in the case of adults hiring videos, to remind them of the age range of the video and that it should not be shown to minors.
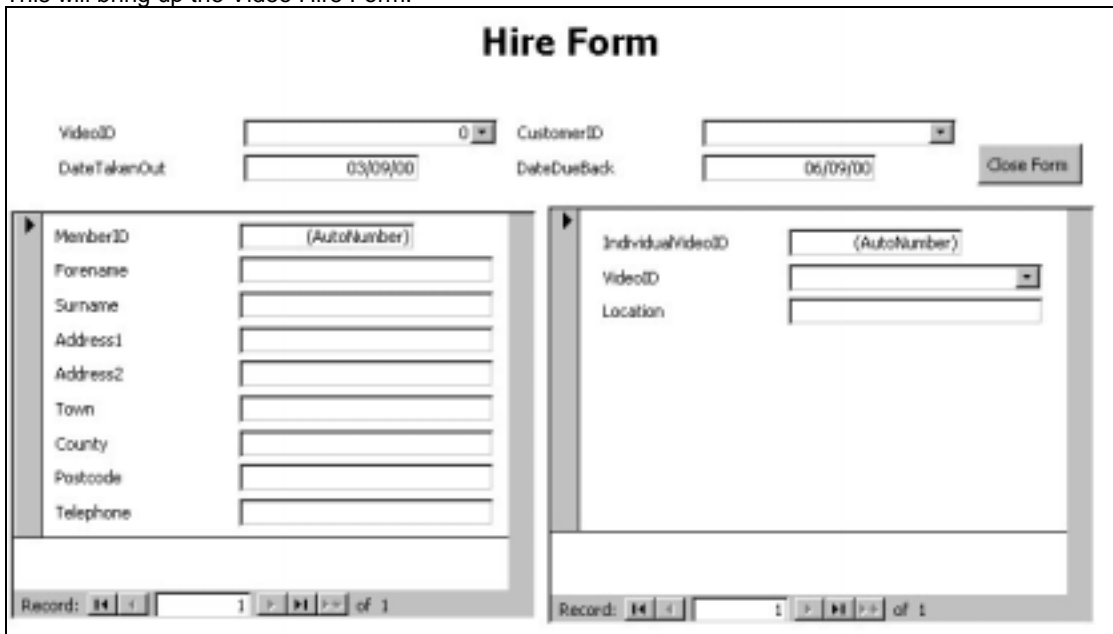
Prior to hiring a video, it is assumed that the person wishing to hire the video is already a member of the club. If they are not please refer to Page 4 of the User Guide: Adding New Members.

From the Main Menu, select Hire Video:

▦	Return Hire
☐	Hire Video
☐	Add New Member
☐	Edit Member
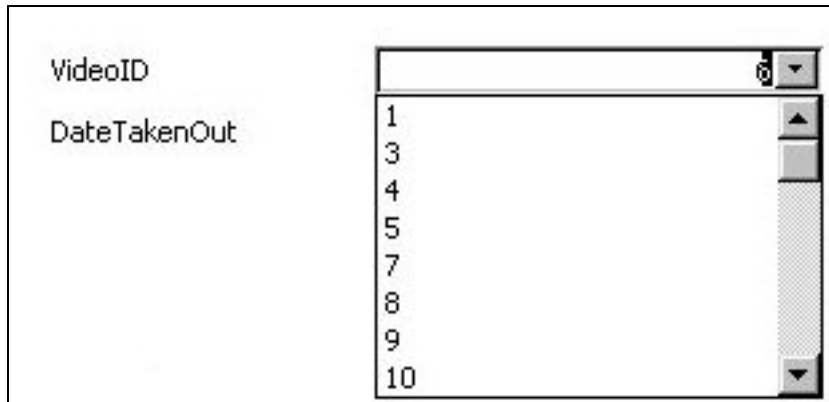
This will bring up the Video Hire Form.

Hire Form

| VideoID | 0 ▾ | CustomerID | ▾ | Close Form |
| DateTakenOut | 03/09/00 | DateDueBack | 06/09/00 | |

MemberID	(AutoNumber)
Forename	
Surname	
Address1	
Address2	
Town	
County	
Postcode	
Telephone	

Record: ◄◄ ◄ 1 ► ►► ►* of 1

IndividualVideoID	(AutoNumber)
VideoID	▾
Location	

Record: ◄◄ ◄ 1 ► ►► ►* of 1

The Top of the form is where you enter the data, the bottom of the form gives you confirmatory information.

From the Video ID drop down Box, select the Video ID on the video which is handed to you by the Member of the Video Club

VideoID	
DateTakenOut	1
	3
	4
	5
	7
	8
	9
	10

Once you have selected a VideoID the details of that Video will appear on the bottom right of the screen. You can then confirm the Title and the age of the film

Once the Video has been selected, you need to select an ID of the Member who is going to hire the Video.

You do this by selecting the Member ID on the right hand drop down box. This ID will confirm the name and postcode which is on the Members card which they must have.

CustomerID	Price		
DateDueBack	Jons	Philip	TN35 U87
	Price	Maureen	TN87 H78
	Phillips	Nancy	TN35 G89
	Smith	Simon	TN45 O98
	Alison	Lucy	TN35 E45
	Porter	John	TN23 L98
	Parker	Peter	TN35 P89
	Jungs	Michael	TN35 K87

Once the form displays the correct video, the correct member and you have confirmed the age, the video can be hired out.

To do this, select the Close Form button. This will hire the video out and take you back to the main menu.

Close Form

Returning A Video

There are two ways in which a video might be returned:
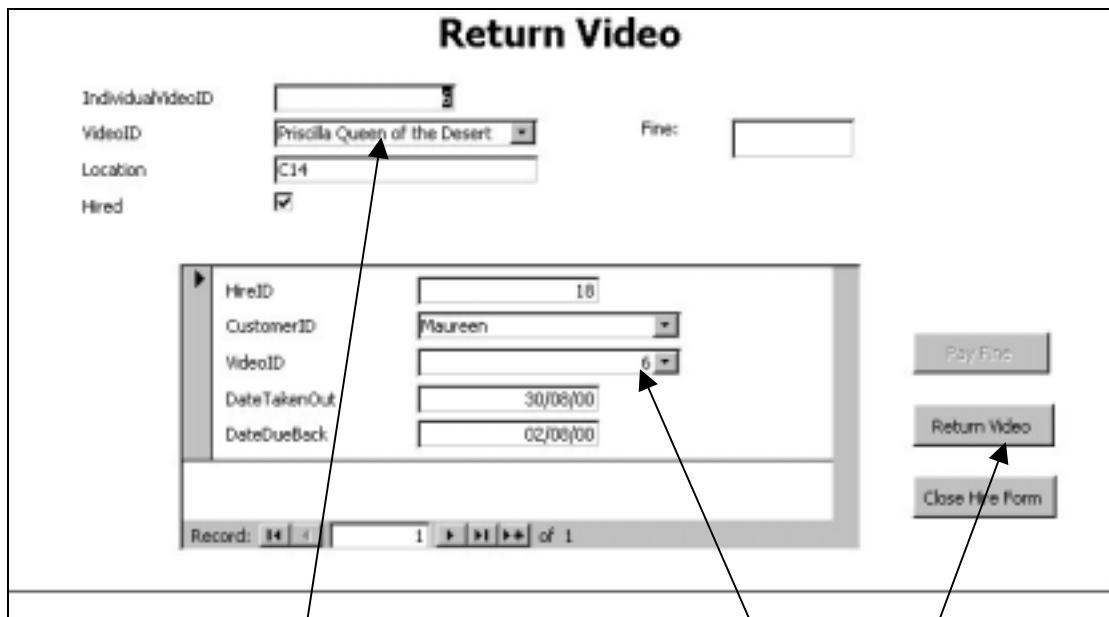
1   By posting through the letterbox when the shop is closed

2   Returned in person when the shop is open.

Both methods are treated in the same way by the computer system.

From the Main Menu, select Return Hire:

This will bring up the Return of Video Screen:

Displayed will be the videos which are on hire. In the Individual Video ID Box type in the number of the video and press enter.

This will bring up the Video to be returned and the ID of the Hirer. Press the Return Video Button

There are two possibilities which may occur at this point, the video is returned with no fines, or the video is overdue and there is a fine to pay.

Once the Return Video Button has been clicked, a confirmatory dialog box appears:

Choose OK

If there is a fine to pay (if the video is overdue) you will be notified by a message box:

Microsoft Access ☒

Fine To Pay

[OK]

Choose OK

In the Fine Box on the Return Video Screen the amount of the fine to pay will appear:

Fine: £70.00

This is information only.

If there is a fine, the Pay fine button will become active.

Inactive: [Pay Fine]

You will only need to click on the Pay Fine Button if the person returning the video is prepared to pay the fine at that moment.

Active: [Pay Fine]

For the payment of Fines, see Page 11 of the User Guide.

This user guide, if all sections in the contents page had been completed, would be in the highest band. It must be presentable and easy to follow. In a complete project, the technical and the user guides would be presented as booklets. Without on screen help, the top marks cannot be awarded, and as there is no mention made of it, the above guide would be awarded 12 marks. .

6.4.5.5 (e) Evaluation   [15 marks]

(i) Discussion of the degree of success in meeting the original objectives. [6 marks]

This discussion should demonstrate the candidate's ability to evaluate the effectiveness of the completed system. The original objectives stated in requirements specification should be matched to the achievements, taking into account the limitations. User evaluation is also essential and should arise from a questionnaire or, preferably, direct user evaluation. For full marks it is important that the user provides sets of data as they are likely to occur in practice, and that the results arising from such data be given. This data is typical data rather than test data and it may show up faults or problems that the candidate's own test data failed to find.

Mark Scheme:

0   No discussion present.

1 - 3   Some discussion about a number objectives, but some omissions or inadequate explanation of success or failure.

4 - 6   A full discussion, taking each objective mentioned in a (iii) and explaining the degree of success in meeting them, (indicating where in the project evidence can be found to support this) or reasons why they were not met.

The example below would obtain full marks in this section:

Objective 1 - Create a record

This is the first procedure from the Main Menu, whereby the user can input certain amounts of data into certain fields, resulting m an appointment entry, whose contents are then subsequently saved. The aim of this procedure is to allow the user to create a new entry into the system by entering data into fields of their choice and by then having the option whether to save the entered data in that record or not. The way that I implemented this aim was that the user would firstly choose the option from the Main Menu. From there they would be presented with a prompt that would indicate to them the course of action for the procedure. They would then be taken to a new screen, faced with another prompt indicating that the process is about to begin and then presenting them with the first field entry prompt. With each prompt, there is an indication of the type and range of data that can be entered, into each field. After the user has entered all of their data, they are then presented with a prompt that the data in that record will then be saved permanently.

For the majority of the aims for this procedure, I would say that I have met their requirements, such as providing a prompt for each entry and providing a systematic way of working through the fields. There is evidence of this m my source and most importantly, m my screen captures of the Create Record procedure in the User and Technical guides. As you can see, the user is given an indication of the required type and range of the data, for each field entry and the user is taken through each field, as they scroll down the screen.

However, where I have not succeeded in meeting the aim of the procedure is by not presenting the user with a choice of whether to save the record or not. As you can see, I have just simply presented them with a notification that the record has been saved. The reason why this is so is because, really of my lack programming skills and also the lack of time. Really, I though that this would be quite a minor problem, and that the user will simply have to re-enter the data, if an incorrect entry has been made.

Objective 2 - View a record

This is the second option which the user can choose from the Main Menu, whereby the user can choose to view any record from a list of records which currently have data stored into them. The aim of this procedure is to show the user a list of all the records which currently have data stored in them, then present the user with a prompt of which record number that they wish to view and to then go to a new screen and present the contents of that record that they chose. As with the first procedure, I Implemented this procedure by firstly presenting the user with a prompt, as soon as they have chosen this action from the Main Menu, indicating the what is required of them in this case. They are then taken to a new screen which lists the record numbers which currently have data m them and also the purpose of each record, so that the user can identify which record they wish to view. At the bottom of this screen there is a prompt which asks the user which record number they wish to view the contents of Having chosen a record, they are then taken to a new screen where the contents of that record are then presented on the screen.

On the whole, I would say that I have fully met the aim of this procedure by presenting the user with a list of all the records with data in them, ask them which record to present and to then show the contents of that record on the screen. Again, evidence of this success can be seen in the screen shots, in the Technical and User guides where a few of the screens involved in the procedure, can be seen. Perhaps one additional function would be to ask the user whether they Wish to View another record after seeing the first one, but this is a minor problem, as long as the user can view the record of their choice, quickly and accurately which is evident in simply using the program. This is perhaps the only procedure m the system where I have fully the objective of the procedure, mainly because this procedure is perhaps the most simple to program using Turbo Pascal.

Objective 3 - Delete a record

This is the third option from the Itinerary Main Menu. This procedure is useful for when the user has made a mistake m some record entry and therefore wants to delete that record or simply because that record is now out of date. The aim of this procedure is to firstly present the user with a new screen after choosing the option, whereby all the records with data in them are shown so that the user can determine which record to erase. After presenting the user with this screen, they are then to be presented with a prompt, asking them which record that they wish to delete from the list. After entering a record number, a warning message should appear asking them if they are sure that they want to erase the record that they have chosen. If they choose to do so, then that record should then be permanently deleted.

In order to do this, I firstly did what I have done with all of the procedures, by showing the user a prompt first of all, which explains the nature of the procedure and what is expected of the user. Having received this prompt, the user is then presented with another screen, which shows a list of all the records with data in them, identifying them by showing the purpose for each individual record. At the bottom of this screen there is another prompt, asking the user which record number they wish to delete the contents of, with a warning that after doing this procedure, that all of the contents M that record will then be erased, permanently. Haven chosen a record number, they are then shown another screen which indicates that that record has now been erased.

As with the Create Record procedure, I feel that I have I covered most of the aims for this procedure by presenting the user, firstly with a list of the records with data in them and then presenting them with a prompt, asking them which record to delete, but where I haven't achieved success is where I haven't asked them to confirm the deleting process. By this I mean that I haven't asked them whether they are sure that they want to delete the record, which could be a major omission, but I feel by presenting them with a warning first of the effect of the procedure on the chosen record, that this somehow makes up for the omission. I guess that I have done by simply not considering the process of data verification for this procedure and for most of the other procedures, which perhaps could be corrected in any extensions or future versions of the Itinerary program.

Objective 4 - Edit a record

This is the final procedure from the Main Menu, whereby a user can edit a record of their choice, either because it is incorrect in some way, or that it is simply out of date and that they want to create more disk space for the system. The aim of this procedure is to act as a facility where the user can change an individual record m some way, by asking them which record they wish to over - ride and then presenting them with the data entry fields again, so that they can go over any incorrect data that may exist in a record. Having entered in the data again, the user should then be asked whether the data that they have entered is correct and whether they now want that record to be saved over the existing record.

This procedure, I feel is the most challenging of the procedures to code because it requires the changing of data in a record that already exists and then the over - riding of the old entry, with the new one. The way that I implemented this procedure was to present the user, again with a prompt indicating the nature of the procedure, and then taking them to the new screen where the purpose of each record with data in them, is shown. This was done so that the user can uniquely identify an individual record that they wish to edit in some way. Having seen this screen, the user is then asked which record number it is that they wish to edit, by receiving a prompt. After the user has done this, they are then asked to go through the data entry process again, whereby they can go over any incorrect data. When this process is complete, there is then a prompt, to the user, saying that the process is now complete and that the new record entry Will now be saved over the old record, that they chose to edit.

As I said earlier, this procedure was the most difficult to code, so this meant that I had to employ a lot of ways of getting around this problem, that might not necessarily have been the most efficient. This is also the procedure where most of my programming problems lay, however I was able to allow the user to choose a record number and then enter data that can then be saved over the current data in that record. Where I feel that I haven't succeeded is where I haven't allowed the user to edit individual fields in a record, with my method, the user has to re-enter all of the data again which could prove tedious and time consuming to the user. As I said before, my programming skills were quite limited and I think that I have covered only the bare aims for this procedure. Another place where I feel I have not done well is that I haven't asked the user whether they want to save over the old record or not, at the end of the process. If the user entered data in again incorrectly with this procedure the user will have to go through the whole procedure again, which could again prove a major problem which could prove very time consuming, if this was to occur.

(ii)   Evaluate the users' response to the system   [5 marks]

It is important that the user is not assumed to be an expert in computer jargon, so some effort must be made to ensure that the system is friendly. It will be assumed that the user will have considerable knowledge of the underlying theory of the business being computerised. Clarity of menus, clear on-screen help and easy methods of inputting data are all examples of how the system can be made user-friendly. Here marks are awarded for the degree of satisfaction that the user indicates in the acceptance procedure. Could the system, or its results be used? Was the system specification achieved? Do any system faults still exist? The candidate should evaluate the users' response to the final version of the system.

Mark Scheme:

1   Some effort has been made to make the system user-friendly, but the user still has difficulty using the system

2 - 3   The system is, in the main, user-friendly, but there is room for improvement (e.g., no on-screen help has been provided). The user indicates that the system could be used but there are some faults, which need to be rectified

4 - 5   A fully user-friendly system has been produced. The user indicates that the system fully meets the specification given in section (a), and there are no known faults in the system.

The example below would score full marks as the user indicated that although there were some desirable extensions the system works without fault.

12th December 1998

Dear Mr Kent,

RE Acceptance of Itinerary Program

Having received your letter, here enclosed are a few comments concerning the system that was designed for me. Concerning the correlation between the system specification that was set out and the actual functions of the final system, I am satisfied that the system performs the procedures set out to an acceptable standard. By this, I mean that having used the system for a number of days, it is clear that the system is able to carry out each of the four functions that are laid out in the specification. When first using the system, I was pleased with the ease at which I could follow the prompts in each of the functions in order to carry out such tasks, such as the entering of data and the subsequent viewing of a file and there were very few occasions in which I had to consult the provided user manual in order to complete a task. Of what I read of the user manual, I was pleased with the amount of relevant information that was contained in order for me to implement the system onto my one computer.

However, I do have a few concerns over two aspects of the system itself. I found that after each use of a procedure that having followed the information on the screen, that I was always taken back to the opening screen of the program and not the menu itself, which, after a while, I could see could become a concern with the element of time. One minor suggestion would be that in the procedures where you are asked to enter data sequentially, you are asked to do this in a manner whereby the user has to go through each entry in order. Perhaps, a more efficient method would be for the user to choose which items to enter data into, instead of having the task of going through each entry procedure at a time.

However, I feel that these are quite minor concerns which do not affect the overall use of the system and the correlation between the specification and the functions, of the Itinerary program. Generally, I feel that the program has fulfilled its aim in matching the objectives in the specification, to the extent that I was able to utilise and implement the system on my own computer.

Thanks again and good luck for the future,

Prof. Norman Myers

(iv)   Desirable extensions   **[4 marks]**

As a result of completing the system, the candidate should identify the good and bad points of the final system highlighting any limitations and necessary extensions to the system, indicating how the extensions could be carried out.

Mark Scheme:

1   The candidate identifies the obvious good points of the system and possibly some bad points or limitations

2   The candidate identifies clearly good and bad points and any limitations

3   The candidate clearly identifies, good and bad points of the system, limitations and possible extensions

4   The candidate clearly portrays the good and bad points of the system indicating the limitations, possible extensions and how to carry out the extensions

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Sample

Desirable Extensions

Having now completed this major project, there are a few ways in which I feel the system could be improved or extended. Perhaps the main consideration of an extension would be a possible adaptation of the systems entry fields so that it could possibly be used by a wider range of organisations and firms. By this, I mean that it could be necessary to alter and/or add further entry fields to the system, hopefully making the system more generic to a wider range of users. Because this project is designed to solve an individual's problem, I was not required to think generically, so it would be an interesting extension to in effect make the system more applicable to more different types of people. This would not be that great a task in itself, it would just mean a further allowance of time, on my behalf, where I would simply have to add further entry fields to the data entry procedure. This consideration might even become reality, depending on the further success with the initial customer and the possibility of further version of the system.

Another possible extension to the system would be the ability for the system to interact with other pieces of software on the users computer such as a database or word processor which would save a lot of time in the future in not having to re-enter current data into a different system. This in effect would reduce the problem of transcription errors and generally make the system a more user friendly piece of software that wouldn't necessarily rim independently from other items of software. I feel however that this task would not be as feasible as the previous extension as it would require a great deal more programming skills which I would have to research further into in order to do this. If I was to do this however it would make the system, potentially more productive, but again this extension is one that does sound desirable in theory, but one which, for a programmer of my experience, could prove a challenging task.

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7 Module 2517:
ICT Systems and System Management

7.1 Availability

From 2002 this Advanced (A2) unit will be available for assessment. The assessment can take place in January or June. Candidates who wish to retake the unit, to attempt to improve a previous mark, will be able to do so once only. The higher of the two marks will be used towards aggregation.

7.2 Paper Length

The paper will be of 1 hour 30 minutes duration

7.3 Paper Type

This is a written examination consisting of 4-6 structured questions which will not be based around a common scenario though the application areas 5.6.3 and 5.6.4 may be scenario based. The total number of marks awarded for the paper is 90; of which, 4 marks are given for the Quality of Written Communication.

This unit is an A2 standard unit and will be based not only upon the material in this module but also upon the knowledge, understanding and skills covered in modules 2512 Information, Systems and Communications, 2514 Practical Applications of ICT Using Standard/Generic Applications Software and 2515 Communications Technology and its Application. Fifteen percent of the examination paper will contain questions of a synoptic nature.

7.4 Possible Teaching Strategies

Teachers should note the meanings given to key words such as "*explain*", "*describe*", "*discuss*" and "*identify*" as indicated in the specification.

This module consists of four main sections or application areas and these are expanded below.

7.4.1 Information and the Organisation

The organisation is taken to be any system which would use ICT to exchange information. The fact that different types of organisation have different needs. The organisation should be taken as a system which may interact with its environment and may consist of subsystems. The division of labour between the individuals in the system should be known. Strategic planning and decision making along with effective management of information may need to be explained.

7.4.2 Designing Computer-based Systems

This is the systems analysis section and allows the candidate to explore the design of different systems for a given application. The stages of systems analysis should be described and the roles and responsibilities of those within the system need to be identified. Various modelling techniques should be described and the user interface design tools. The 'Model Human Processor' developed by Card, Moran and Newell refers to the system described in:

Stuart K. Card, Thomas P. Moran, Allen Newell, The Psychology of Human-Computer Interaction, Lawrence Erlbaum Associates, 1983. It is also referred to in the Zorkoczy, P. & Heap, N text referred to elsewhere in this section.

7.4.3 Implementing Computer-based Systems

This section is scenario based, and the student should be able to describe the steps involved in producing a purpose-built system and the various advantages and disadvantages of the system within this scenario. They should also be able to explain the upgrading, installation and maintenance of a system.

7.4.4 Implications of ICT

This section is also scenario based. The way in which the rapid change in the world of ICT and the way in which this effects the organisation should be discussed. Applications at the cutting edge of technology such as chip implants in the human body, may be based on current advances in ICT and may not be specifically mentioned in the specification.

References to the Japanese 'fifth generation project' and the European IT programme can be found in the recommended text for general reading, Zorkoczy, P. & Heap, N. Information Technology: An Introduction. Pitman Publishing.

7.5 Practical Skills Required

There is no requirement for candidates to have practical experience of any specific hardware or software to study this module. Candidates should study the difference between the organisation and the use of ICT of small businesses and large companies. It may be found useful to visit a local organisation which uses ICT to experience some of the content of this module at first hand.

7.6 Sample Examination Material

The sample examination material supplied with this documentation is scenario based. In general this will **not** be the case.

8 Guidance on Written Examination Papers

Examiners take into account the following factors when creating an exam paper.

- Covering a wide range of the specification without going beyond the stated content.

- Avoiding concentration on one particular area of the specification.

- Varying the nature of the questions over a period of time.

- Meeting the needs of the assessment objectives.

- Ensuring accessibility and readability for the target group of candidates.

- Designing questions which can be marked consistently by the examining teams.

The examples given below illustrate the point under consideration. They are often taken from the specimen questions but these may have been modified to emphasise a specific point.

8.1 The Key Words in a Question

There is a list of acceptable answers in the mark scheme. However whilst the setters of the question papers are bound by the specification the candidates' answers are not. A correct response should gain the stipulated number of marks.

Example

> The manager of each shop uses a mail-merge process to produce reminders for each customer that owes money on account. Generic application software is used for this task.
>
> Give **two** advantages of using generic application software rather than a tailor-made software package in the running of a newsagent's shop. **[2]**

The mark scheme might say that acceptable answers are readily available software and the software is tried and tested. However the candidate writes down that the software has a large user base so there are many users to give help and advice. The candidate's answer is just as correct and should be given credit.

In some cases the question will tell the candidates how many responses are required. The candidate should not give more, or less, than the required number of answers.

Example

> Describe **two** facilities available on an electronic mail (e-mail) system. **[4]**

The mark scheme asks for any **two** of the answers:

- forward messages (1) to another recipient (1)

- multiple recipients (1) mailed to simultaneously (1)

- hold delivery (1) until predetermined time (1)

- auto-acknowledgement (1) from recipient (1)

- blind copying (1) to suppress recipients (1)

Clearly if the candidate give only a single description then the two marks for the second description will not be available. Also if the candidate gives more than two descriptions then time has been wasted since the candidate can not gain more than four marks for the question.

In some cases the questions will ask the candidate to give a long answer. The candidate would be advised to look at the mark required by the question and to make at least that number of different points in answer to the question.

Example

> A trainer uses a software package to design and produce a presentation for use in a training workshop. The presentation consists of slides that are projected on to a screen during the workshop. The software provides the use of
>
> *Master slide, Transition, Buttons, Hotspot, Slideshow*
>
> Explain how these features may be used to present an effective presentation. **[10]**

The number of marks allocated points the candidate to the number of statements in the answer.

State

The candidate has to make a simple statement of fact. This is the only time a one word answer would be acceptable.

Example

> A spreadsheet package can be used to manipulate data held in tables. For example, data can be sorted.
>
> State **three** data manipulation functions, other than 'sort', commonly available on a spreadsheet. **[3]**

The answer should be three from: filter, search, index, look-up.

A single word from this list is all that is required. Other correct answers are possible and the candidate would gain marks from these.

Give

The candidate has to provide the marker with more information than a mere single word statement.

Example

Head office is worried about the increasing possibility of crime since the company has also decided to provide on-line services on the Internet.

Give **two** examples of ICT crime. **[2]**

The candidate's answers should include two statements from

- fraudulent use of data

- hacking into restricted files

- intercepting credit card details

Just putting the one word answer 'fraud' down would not gain any marks since the candidate has not told us what the fraud is related to.

Other correct answers are possible and the candidate would gain marks from these.

Describe

The candidate has to demonstrate the ability to select an answer which is appropriate to the question and context within which the question is phrased. A description is worth at least two marks depending upon how complex it is.

Example

Describe the main features of a spreadsheet package which allows models to be set up.

The answer should relate everything to the ability of the spreadsheet to perform modelling tasks. Features of a spreadsheet, such as rows and columns, are not relevant.

Example

A word-processing package is used by both a technical author and an office secretary. The author uses it to produce scientific books, the secretary for letters to customers.

(a) Describe **two** features of the word-processing package that would be important to the author but not necessarily to the secretary. **[4]**

(b) Describe **two** features of the word-processing package that would be important to the secretary but not necessarily to the author. **[4]**

The answers to part (a) should include any two of thesaurus, special symbols, technical dictionary, page numbering and autoformat for subheadings.

For part (b) the answers could include any two of mail-merge, standard letter templates, images (the author would not put images in - the publisher would).

The candidate would be awarded marks for stating what the feature was e.g. thesaurus and for describing what it was used for e.g. looking up synonyms of words.

Other correct answers are possible and the candidate would gain marks from these.

Explain

The candidate has to provide both advantages and disadvantages to show both sides of an argument in the specified situation.

Example

> A newsagent's shop has at least two electronic tills, including a processor and file storage, linked to a local file server in the shop.
>
> Whenever prices change or offers occur, updates are made on the local server, which then sends data to the tills. Only the manager of the shop is allowed to update the prices, not the sales assistants. Every few minutes the tills send data to the local server giving details of the sales.
>
> Explain the advantages and disadvantages of each electronic till having its own processor and backing store. **[4]**

The candidate's answers should include

Advantages:

- faster access to data

- individual record at each till in event of failure

Disadvantages:

- more expensive hardware

- server does not always have totally up-to-date data

The candidate should give an answer which will give the good and bad points of a situation.

Information provided as advantages should not be repeated as negative facts under disadvantages.

Example

> Explain the advantages and disadvantages of digital and analogue watches.

Advantage: The digital watch does not need winding up.

Disadvantage: The analogue watch needs winding up.

Other correct answers are possible and the candidate would gain marks from these.

Discuss

A discussion is an extension of an explain-type answer but the candidate also has to include a relevant conclusion.

Example

Many of a newsagent's customers are gaining access to the Internet. This allows them to read a wide range of on-line newspapers and magazines.

Discuss the increasing availability of on-line newspapers and magazines. **[8]**

The answers expected include a discussion of both the advantages and disadvantages. Themes for discussion are:

- up-to-date news

- global news not just national news

- less chance of bias e.g. state control of media

- undermining of censorship laws

- levelling out of style to fit browser displays

- less capital needed to publish

- more variety of reading

- greater access to marketplace

- copyright of images/texts harder to police

- multi-media

- hyperlinks to follow threads

- not easily portable

- feel of real paper lost

- links with TV and other media

- less need for traditional newsagent

- automated cuttings services

- customised newspapers

with a statement in conclusion which gives the view of the candidate.

Other correct answers are possible and the candidate would gain marks from these.

Using Source Material

The candidate may have to use a scenario created by the question in order to provide an answer.

Questions such as 'With reference to' or 'Relating your answers to ABC plc' give specific instructions to the candidates and answers to questions containing these phrases should be related to the scenario.

Example

> A newsagent's shop is one in a chain of 500 shops. Each shop typically offers for sale supplies of twelve daily newspapers, six Sunday papers with supplements and eighty monthly magazines. Details of each newspaper are held on the computer in a flat file with fixed length records. The *primary key* in each record is a two-character code representing the title of the newspaper or magazine.

There would then follow a number of questions related to this scenario. The scenario may reflect a real situation or not as the case may be. Even if the candidate has never come across the given scenario it should be used since this is what is done at the present. Each question should be answered within the context of the scenario. General answers should not be given.

Expressing an opinion

Higher order questions, where a large number of marks are available, expect the candidate to express (and maybe justify) an opinion.

These are more open-ended questions and candidates need to think carefully about how to structure their answers to obtain all the marks available.

The use of examples and fully developed responses considering all aspects of the question asked is often essential if candidates are to convince the examiner that they understand the topic.

At no time will a question be asked such as 'What do you think ...' This is because the answer must always be correct since it is the candidate's opinion!