

IGCSE

London Examinations IGCSE

Information and Communication Technology (4385)

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Specification

London Examinations IGCSE

# Information and Communication Technology (4385)

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### *Acknowledgements*

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Authorised by Elizabeth Blount

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# Introduction

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This specification is designed as a two-year course combining elements of both the London Examinations Ordinary level GCE in Computing and Edexcel's GCSE in Information and Communication Technology. It aims to encourage the exploration and study of Information and Communication Technology (ICT) in a variety of contexts: home, community, business, industry, recreation and education. In any given situation students will be given the opportunity to acquire competence, ability and critical skills through the implementation, use and evaluation of a range of ICT systems. Students can develop their interests in, enjoyment of, and critical reflections about ICT as an integral part of modern society.

## Key features

- based on the GCE Ordinary level Computing and GCSE ICT specifications
- tiers of entry allow the full range of ability to be examined
- coursework, with a weighting of 30% of the total assessment, is compulsory and externally assessed. It is based on a pre-released case study and one project
- external examination composed of structured questions
- extensive guidance and exemplar material for all aspects of the course
- ICT work carried out by students in other areas of the curriculum can be used as the basis of a coursework project
- provides a solid basis for GCE AS and Advanced Computing courses or equivalent qualifications.

## Availability of examination sessions

The specification will be examined twice a year, in May and November.

## Summary of scheme of assessment

Paper/ component	Mode of assessment	Weighting	Length
1	Examination Paper 1F, targeting grades C – G (Foundation Tier)	70%	1½ hrs
2	Examination Paper 2H, targeting grades A* - D (Higher Tier)	70%	1½ hrs
3	Coursework, common to both tiers, consisting of a project (15%) and set tasks based on a case study (15%). Coursework will be marked externally.	30%	—

Students take **two** components.

**Foundation Tier candidates** take examination paper 1F and component 3, coursework.

**Higher Tier candidates** take examination paper 2H and component 3, coursework.

# Specification aims and assessment objectives

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## Aims

The specification aims to encourage candidates to

- A1 gather, store, process, present and communicate information through activities in a range of contexts
- A2 solve problems through the use of ICT systems and associated principles and techniques
- A3 develop a broad and a balanced view of the range of wider applications of ICT systems including modelling, data logging and control
- A4 design, implement and document ICT systems
- A5 develop an understanding of the wider implications and effects of ICT
- A6 foster an awareness of what characterises information, information processing and ICT systems
- A7 develop an awareness of ethical, social, economic and political consequences of the use of ICT systems for individuals, organisations and society through the study of meaningful applications.

For the purposes of the specification, an '*ICT system*' comprises both hardware and software.

## Assessment objectives

Candidates should demonstrate the ability to work with ICT to

- AO1 apply their knowledge, skills and understanding of ICT to a range of situations
- AO2 analyse, design, implement, test, evaluate and document ICT systems for use by others and develop understanding of the wider implications and effects of ICT
- AO3 reflect critically on the way they and others use ICT
- AO4 discuss and review the impact of ICT applications in the wider world
- AO5 consider the social, economic, political, legal, ethical and moral issues and security needs for data which surround the use of ICT

# Scheme of assessment

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## Tiers of entry

Candidates are entered at **either** Foundation Tier **or** Higher Tier.

Questions in the Foundation Tier paper are targeted at grades in the range C - G. The highest grade which will be awarded at Foundation Tier is grade C.

Questions in the Higher Tier paper are targeted at grades in the range A\* - D. There is a 'safety net' grade E for candidates who narrowly fail to achieve grade D.

Candidates who fail to achieve grade G on Foundation Tier or Grade E on Higher Tier will be awarded 'Ungraded'.

Some examination questions will be common to both tiers.

## Details of each paper / component

### Papers 1F and 2H

The examination Papers 1F and 2H will each consist of short-answer questions with space below each question for candidates to write their answers. The questions will be graded and arranged in order of increasing difficulty.

Up to half the questions will be common to both tiers and will be designed to test candidates in the grade range C - D.

The remaining questions on each paper will extend the range of grades that can be tested. Paper 1F will be designed to test grades C - G; Paper 2H will test grades in the range A\* - D.

### The coursework (component 3)

The coursework is common to both tiers. It consists of two components, a project (15%), and a collection of set tasks based on a case study (15%). Both components will be marked externally.

For the project, candidates must write a report on the use of a computer to solve a problem. Each candidate is required to identify a problem and solve it using an appropriate software package. The report of the solution must be presented under the following headings:

Process heading	Maximum mark
Identify	5
Analyse	9
Design	9
Implement	12
Evaluate	5
<b>Total</b>	<b>40</b>



Because of the need to distinguish between good work that is based on an exacting task, and very good work based on a less demanding task, the assessment guidance for examiners gives two mark ranges – standard and extension.

When marking coursework, examiners will decide what level of task the candidate has attempted and therefore which of the mark ranges to use in assessing the project. In the Identify and Evaluate sections it is possible for standard problems to gain all of the available marks; however, in the Analyse, Design, and Implement sections, the maximum number of marks that can be gained by standard problems is reduced.

**Note:** The coursework project is not intended to be a major project. It should be a small but worthwhile problem.

The following table is a general guide to standard and extension levels for certain kinds of problem. Examiners will use the examples as a guide to marking problem types that are not listed.

<b>Problem type</b>	<b>Standard problems will involve the use of the following skills</b>	<b>Extension problems will involve the use of the following skills</b>
General	General input, editing, processing and formatting associated with the software.	More complex processes associated with the software, including importing data from another package and customising the software for easy use.
Creation and manipulation of a database	Create the data tables, search the database, sort the database, generate reports.	Complex searches (e.g. and/or), reports from more than one table, related tables, macros.
Creation and manipulation of a spreadsheet	Enter text and numeric data, use formulae, multiple sheets, printing, generate graphs.	Multiple sheets with automatic transfer of data, complex formulae (e.g. if ...), look up tables, macros.
Word processing	Enter and edit text, font type and size, inserting clip art, page set up, columns, printing.	Importing data from another application, mail merge, setting up templates, macros.
Desk top publishing	Enter and edit text, font type and size, inserting clip art, page set up, columns, printing	Importing data from another application, text flow between blocks, image manipulation.
Website publishing	Enter and edit text, insert clip art, hyperlinks, font type and size, background	Importing data from another application, image manipulation, web bots, forms, CGI scripts, use of tables for layout

**Project reports will be assessed using the criteria listed in Appendix 2.**

## **The case study**

A simple case study will be distributed to centres at least one year before the examination. Candidates will be required to furnish evidence that they have performed several tasks set by London Examinations based on the case study. Each task will consist of a number of straightforward steps presented in the form of sub-tasks. Evidence submitted for assessment must represent the work of the candidate alone; tasks must not be carried out jointly with others. The time allocated for each task is to be determined by the candidate's teacher and there is no limit on the hardware or software that may be used. See the accompanying Teacher's Guide for guidance on coursework deadlines.

## Relationship of assessment objectives to assessment components

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These tables show the overall weighting of the Assessment Objectives and the relationship between the Assessment Objectives and each of the examination components.

### Foundation Tier

	Assessment objective	Paper 1F	Coursework
AO1	Apply knowledge, skills and understanding of ICT to a range of situations	45	11
AO2	Analyse, design, implement, test, evaluate and document ICT systems for others' use and develop understanding of the wider implications and effects of ICT	15	15
AO3	Reflect critically on the way they and others use ICT	0	4
AO4	Discuss and review the impact of ICT applications in the wider world	5	0
AO5	Consider social, economic, political, legal, ethical and moral issues and security needs surrounding the use of ICT	5	0
	<b>Totals</b>	<b>70%</b>	<b>30%</b>

## Higher Tier

	Assessment objective	Paper 2H	Coursework
AO1	Apply knowledge, skills and understanding of ICT to a range of situations	40	11
AO2	Analyse, design, implement, test, evaluate and document ICT systems for others' use and develop understanding of the wider implications and effects of ICT	5	15
AO3	Reflect critically on the way they and others use ICT	5	4
AO4	Discuss and review the impact of ICT applications in the wider world	10	0
AO5	Consider social, economic, political, legal, ethical and moral issues and security needs surrounding the use of ICT	10	0
	<b>Totals</b>	<b>70%</b>	<b>30%</b>

## **Awarding and reporting**

The grading, awarding and certification of this specification will comply with the requirements of the IGCSE for courses starting for first examination in 2005.

Assessment of this specification will be in English only. All written work for examination must be submitted in English.

## **Students with particular requirements**

Regulation and guidance relating to students with special requirements are published annually by the Joint Council for General Qualifications and are circulated to examination officers. Further copies of guidance documentation may be obtained by contacting the International Customer Relations Unit (ICRU) at the address below or by telephoning +44 (0) 190 884 7750.

London Examinations will assess whether or not special consideration or concessions can be made for candidates with particular requirements. Requests should be addressed to

International Customer Relations Unit (ICRU)  
Edexcel International  
190 High Holborn  
London  
WC1V 7BE  
UK

# Specification content

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## The learning outcomes

These learning outcomes define the content of the whole specification, both coursework and terminal examination. The learning outcomes are the same for Foundation Tier and Higher Tier.

**It is important to note that the learning outcomes are *not* of equal weighting and the amount of time that should be dedicated to each will depend on its content.**

The candidates should be able to

	Learning Outcome	Content
LO1	<p>Identify the constituent parts of an ICT system and their function</p> <p>Select appropriate input/output and storage media and devices for a given application</p>	<p><i>Hardware:</i> input and output devices – backing store, central processing unit, memory (ROM, RAM)</p> <p><i>Software:</i> operating system, application packages, database, spreadsheet, word processor, desk top publisher, web site writer, art package, multi-media presentation package</p> <p><i>Input:</i> Keyboard, mouse, tracker ball, joysticks, graphics tablet, scanner, digital camera, touch screen. OMR, OCR, bar code scanner, biometric scanner, sensors (light, temperature, pressure, inductance loops), magnetic stripe reader, microphone (spoken commands)</p> <p><i>Output:</i> control devices (valves, heaters, coolers, motors), monitors (CRT, LCD, Plasma, Flat Screen), printers (dot matrix, laser and ink jet), plotters, speakers (voice simulation, sounds)</p> <p><i>Storage:</i> floppy disks, hard disks, zip drives, CDs, DVDs, flash memory devices, magnetic tapes</p>
LO2	Explain the key role of the central processing unit	Carrying out instructions within the software, processing control signals, performing arithmetic operations, storing data
LO3	Interpret the internal representation of data in an ICT system	<p>Use of the terms bit, byte and multiples of this unit (Kbytes, Mbytes, Gbytes)</p> <p>Interpretation of a bit pattern as a character using an internal code (ASCII/unicode), graphics, sound</p>

LO4	Describe the key functions of the operating system	Input/output control, file management, resource allocation, error handling  Command interpreting
LO5	Recognise and use file handling terms	Transaction file, master file, update (amend, add, delete) merge, file generations, serial and direct access, batch processing, sorting, searching, merging
LO6	Give reasons for encoding data and information for computer processing and relate this operation to a given application	Reduction in space required for storage and display, ease of data entry and validation
LO7	List and describe in outline the main aspects of system analysis and relate these to a given application	Investigation, analysis, design, implementation, monitoring, evaluation, documentation, testing
LO8	Use data capture operations and relate these to a given application	Collection, preparation, input verification. Design of data capture forms and input screens
LO9	Specify the output for a given application	Design of output screens and printed reports
LO10	Specify and create the tables necessary for a given application	Record structure in terms of fields, defining the necessary fields in terms of their length, type and validation. Use of key fields  Showing typical values for fields
LO11	Develop an algorithm (series of commands) to solve a problem	Produce or interpret an algorithm in the form of a flowchart and structured English
LO12	Explain the need for testing, and design the testing procedures for a given application	Use of typical, extreme and invalid data

LO13	Document the solution to a problem	Using the appropriate method of communication e.g. sketches, diagrams, tables, graphs, flowcharts, photographs
LO14	Evaluate the solution to a problem	Identification of existing shortcomings and future possible improvements
LO15	Use input validation techniques and relate these to a given application	Validation performed by software. Range, format check and field length checks, check digit, presence checks
LO16	Present results for different target audiences	Tables, diagrams, graphs, multi-media presentations
LO17	Explain the need for backup procedures and identify suitable techniques for recovery	Amount of data, frequency of backup, choice of media, storage of backup media, system recovery
LO18	Describe methods of security	User and file passwords, levels of access, physical restrictions, biometrics, data encryption, firewalls
LO19	Demonstrate an appreciation that ICT systems should be designed to communicate with humans	Evaluation and design of user interface. Command line, menu driven, GUI
LO20	Describe the use of modelling in an ICT system	Simulators, games, science experiments, weather forecasting, economic models, virtual reality
LO21	State the benefits and limitations of models and simulations	Benefits: safety, economic, variety of possible experiences/situations Limitations: lack of realism
LO22	Describe the social, economic, legal and moral effects of using ICT systems	Benefits and drawbacks of the use of ICT, Software copyright, Computer viruses, Health and safety issues, Computer hacking, Computer crime and its prevention, Changes to patterns of employment



LO23	Describe the concepts of data logging and control technology	Specify the input, processing, output and storage required for a stated data-logging or control application. Need for appropriate interface. Interpret a bit pattern as a collection of control signals. The concept of real time processing. Feedback.
LO24	Use the terms local area network (LAN) and wide area network (WAN). Describe the hardware and software requirements for the formation of a network.	<i>LAN:</i> network of computers in a limited area <i>WAN:</i> network of computers spread over a wide area using telecommunication systems such as telephone/satellite cable or radio signals. Methods of connection, network interface card, server, operating system, bridges, hubs, switches, fibre optics, radio, cable, microwave, satellite
LO25	Explain the advantages and disadvantages of networked computers compared to stand-alone computers	<i>Advantages:</i> access from any workstation, central storage of data, ease of backup, message carrying, easier software installation, sharing of peripherals, control of users' access rights <i>Disadvantages:</i> cost of installation, reliance on server, need for security, need for network manager
LO26	Identify the differences in network topologies	Bus, star. Greater fault tolerance of star networks
LO27	Identify the advantages and disadvantages of different communication methods	Post, telephone, fax, e-mail, video conferencing, messaging services
LO28	Identify requirements for connecting to the Internet	<i>Hardware:</i> Modem, router, communication link <i>Software:</i> web-browser, communication software Internet Service Provider (ISP)
LO29	Identify the features of common Internet services	World Wide Web, e-mail, news groups, web rings, chat rooms, search engines, filter software Describe the wide range of services available on the World Wide Web: advertising, news, customer support, distribution of software, e-commerce, bulletin boards
LO30	Identify, with reasons, the advantages and disadvantages of the Internet as a source of information	Factors to consider: readily accessible from any computer, up to date, multi-media, quantity of available data, search engines, e-mail response cost of equipment/connection/ wrong information/virus infections

# Grade descriptions

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The following grade descriptions indicate the level of attainment characteristic of the given grade at IGCSE. They give a general indication of the required learning outcome at each specified grade. The description should be interpreted in relation to the content outlined in the specification; they are not designed to define the content. The grade awarded will depend in practice on the extent to which the candidate has met the assessment objective overall. Shortcomings in some aspects of the examination may be balanced by better performance in others.

## Grade F

### Candidates

- show basic knowledge of familiar, simple information processing and communication applications and of the techniques and systems needed to support them
- show knowledge of some basic ICT terms and definitions
- respond to needs and opportunities and evaluate ways of addressing these using information and communication systems
- understand the need for precision in framing questions when finding, selecting and collecting information
- use ICT to explore, develop and interpret information
- develop, test and modify sets of instructions to automate processes and to make things happen
- use computer models to detect patterns and relationships
- use ICT to share, exchange and present work and demonstrate how it contributes to the development of their ideas
- reflect on their use of ICT and show some knowledge of its use in the wider world.

## Grade C

### Candidates

- show some knowledge and understanding of the range and scope of information processing and communication applications and the techniques and systems, including software and hardware sub-systems, needed to support them
- show a good understanding of basic ICT terms and definitions and are able to contrast and compare related ideas
- identify needs and opportunities and analyse, design and evaluate appropriate ways of addressing these using information and communication systems
- use complex lines of enquiry to find and select information, from a wide range of sources
- explore, develop and interpret information to carry out a range of tasks and produce appropriate solutions to problems

- show awareness of efficiency and economy in developing, testing and refining sets of instructions to automate processes and to make things happen, including responding to external events
- use computer models to investigate and test hypotheses
- use ICT to share, exchange and present work, demonstrating a consideration of audience and purpose
- show awareness of the need to detect the loss or corruption of information and to prevent the abuse of personal information
- reflect critically on their use of ICT and consider the effects of its use in the wider world.

## Grade A

### Candidates

- show good knowledge and understanding of the range and scope of information processing and communication applications and of the techniques and systems, including the software and hardware sub-systems, needed to support them
- use ICT terms and definitions appropriately and are able to contrast and compare related ideas
- apply general principles of information processing to given situations and abstract general principles from given examples
- identify a range of needs and opportunities, carry out systematic analysis, and design and evaluate effective ways of using information and communication systems
- evaluate information sources, software packages and computer models, analysing the situations for which they were developed and assessing their efficiency, appropriateness and ease of use
- use complex lines of enquiry to find and select information, employing a wide range of sources
- explore, develop and interpret information to carry out a range of tasks and produce effective working solutions to a range of problems, including designing and implementing systems for others to use
- show efficiency and economy in developing, testing and refining sets of instructions to automate processes and to make things happen, including responding to external events
- use and develop computer models to investigate and test hypotheses
- use ICT to share, exchange and present work, demonstrating a clear sense of audience and purpose
- discuss methods of detecting the loss or corruption of information and describe steps which can minimise the likelihood of the abuse of personal information
- reflect critically on their use of ICT and show understanding of the effects of its use in the wider world.

## **Recommended textbooks**

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### **Particularly recommended**

*Longman ICT for IGCSE* – J Blair, R Crawford and R Birbal (Longman 2005)  
ISBN: 1405 80210 3

### **Also recommended**

*Student Handbook for Information Technology* – Gareth Williams (Pearson 1998)  
ISBN: 1 85749 534 9

*Information Systems for You* – Stephen Doyle (Stanley Thorne 1999)  
ISBN: 0748744592

## Support and training

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### Training

A programme of INSET courses covering various aspects of the specifications and assessment will be arranged by London Examinations on a regular basis. Full details may be obtained from

International Customer Relations Unit  
Edexcel International  
190 High Holborn  
London  
WC1V 7BE  
UK

Tel: +44 (0) 190 884 7750  
E-mail: [international@edexcel.org.uk](mailto:international@edexcel.org.uk)

### Edexcel publications

Support materials and further copies of this specification can be obtained from

Edexcel Publications  
Adamsway  
Mansfield  
Notts NG18 4LN  
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Fax: +44 (0) 1623 450 481  
E-mail: [intpublications@linneydirect.com](mailto:intpublications@linneydirect.com)



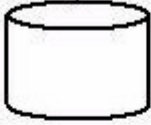


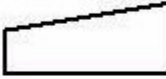






The following support materials will be available from 2003:

- Specimen papers and mark schemes (Publication code: UG013055)
- Teacher's Guide (Publication code: UG013036)

# Appendices

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## Appendix 1: British Computer Society flow chart symbols

Report or Document		Manual Process	
Disk File		Computerized Process	
Telecommunications Link		Data Input Device (Keyboard)	
Tape File		Monitor Screen (CRT)	
Flow Direction		On-Page Connector	
Start/Stop/Entity		Decision	

## Appendix 2: Assessment criteria for the coursework collection

### Identify (5 marks)

Standard and Extension	Assessment criteria	Evidence	Notes
0 – 1	A statement of the problem which is unclear or lacks detail.	<p><i>In order to do this, a candidate should provide:</i></p> <ul style="list-style-type: none"> <li>Written evidence that outlines the problem that needs to be solved.</li> </ul>	<ul style="list-style-type: none"> <li>The 'real' user may need to be fictitious, but it should not be the candidate concerned. Role-play can be useful here with other candidates playing the role of 'real' users.</li> </ul>
2 – 3	<p>A clear statement of the problem which identifies the user(s).</p> <p>Consideration of possible alternative solutions.</p> <p>Objectives or user requirements should be stated.</p>	<ul style="list-style-type: none"> <li>Written evidence that clearly identifies the problem that needs to be solved and the user(s).</li> <li>Alternative solutions need to be considered. Objectives are stated in general terms.</li> </ul>	<ul style="list-style-type: none"> <li>Possible solutions could include a comparison of 'manual' methods with an ICT solution, stating why the ICT solution is preferred. In some cases it may be possible to suggest other software packages that could have been used to solve the problem.</li> <li>Quantitative objectives, that can be measured, are much better for testing than objectives which are very general.</li> </ul>
4 – 5	<p>A clear statement of the problem, giving some background detail and identifying the 'real' user(s).</p> <p>Consideration of possible alternative solutions with adequate justification given for the chosen method.</p> <p>Quantitative objectives or user requirements.</p>	<ul style="list-style-type: none"> <li>Written evidence that provides comprehensive details of the problem that needs to be solved and the 'real' user(s). Alternative solutions should be considered with justification for the proposed solution.</li> <li>Objectives will be quantitative. At least three quantitative objectives should be identified for the top marks.</li> </ul>	<p><i>For example:</i></p> <p>'The user needs to be able to print out a list of stock that is out of date'.</p> <p>'The user needs to send a letter to a customer who has not paid his bill this week'.</p> <p><i>Are preferable to:</i></p> <p>'The solution must be easy to use'.</p>

## Analyse (9 marks)

Standard	Extension	Assessment criteria	Evidence	Notes
0 – 2	0 – 3	Software identified. Raw data required has been partially identified. The output required has been identified. There is some explanation of how the data will be manipulated to solve the problem.	<p><i>In order to do this, a candidate should provide:</i></p> <ul style="list-style-type: none"> <li>• Software and hardware – explanation of what software is going to be used and why it is suitable for this problem.</li> </ul>	<ul style="list-style-type: none"> <li>• A complete list of hardware is not necessary, only the hardware especially relevant to the problem, eg a scanner and colour printer for producing a magazine.</li> </ul>
3 – 4	4 – 6	Software and hardware identified. The raw data required has been identified and its source and method of collection partially explained. Some explanation of the processing required. Flow of data through the system has been partially identified. Alternative forms of output have been considered and appropriate choices made. Backup and security strategies have been considered.	<ul style="list-style-type: none"> <li>• Analysis of the input data required, including source and methods of collection and error checking.</li> <li>• Processing – how the data will be manipulated to solve the problem. Explanation of the flow of data through the system.</li> </ul>	<ul style="list-style-type: none"> <li>• Inclusion of details of any preparation of the data required before input and verification and/or validation procedures used.</li> <li>• Diagrams may be a useful means of explanation. The flow of data through the system must be clear and explicit for full marks to be awarded.</li> </ul>
5 – 6	7 – 9	<p>Appropriate software and hardware identified. Data collection and input has been fully explained. Ways in which the data will be manipulated to solve the problem have been fully explained.</p> <p>The flow of data through the system is clear and explicit. Alternative forms of output have been considered and appropriate choices made and justified. Appropriate backup and security strategies have been identified and fully explained.</p>	<ul style="list-style-type: none"> <li>• Analysis of output requirements and formats.</li> <li>• Analysis of strategies for backups and security.</li> </ul>	<ul style="list-style-type: none"> <li>• What output is going to be screen based and what data needs to be printed? Will different output be required at different times or in different situations? Will the output be sorted or a sub-set of the data? What layout is needed?</li> <li>• A backup strategy suitable for the user should be clearly explained. Frequency, media, amount of data and time required to perform backup should be considered.</li> </ul>



## Further guidance on 'Analyse'

### Data required and its source

#### Examples

- Database Part numbers, descriptions and prices from a catalogue
- Spreadsheet Dates, customer names and total bill from invoices
- Desk Top Publishing Information about planets from encyclopaedia, picture of each from NASA website
- Website Publishing Details of car models from brochure and images obtained at club meeting with digital camera.

### Data collection

This could be achieved using a form or questionnaire or by copying from the original source.

### Data input

Selection of an appropriate method, e.g. keyboard, scanning and any verification or validation that is needed.

### Data manipulation

#### Examples

- Database Fields required, outline of updates, searches, sorts, reports that will be needed
- Spreadsheet Calculations that need to be performed
- Desk Top Publishing Number of pages, columns, text required, graphics required
- Website Publishing Number of pages, links, text required, graphics required.

### Flow of data

What is the sequence of operations needed to solve the problem? Flowcharts or other diagrams should normally be included. Reference should be made to the objectives/user requirements previously identified.

### Output

What output is going to be screen based and what data needs to be printed? Alternative forms of output should be considered. Will different output be required at different times or in different situations? Will the output be sorted or a sub-set of the data?

### Backup/security strategy

#### Examples

- A weekly backup to floppy disk if the user has a simple set of accounts that they only update once a week; a daily backup to tape for a large database that has changes made to it every day.
- The importance of security procedures will depend on the nature of the data being stored and the user. When password use is recommended, the user needs to be given guidelines about the effective use of this method of security.

## Design (9 marks)

Standard	Extension	Assessment criteria	Evidence	Notes
0 – 2	0 – 3	Initial designs do not have enough detail for the user to make a judgement as to their suitability. No user's comments have been recorded. The final design contains little detail and the candidate would be unable to repeat the solution at a later date. No test plan.	<i>In order to do this, a candidate should provide:</i>	
3 – 4	4 – 6	Initial designs are adequate for the user to get an idea of how the problem is to be solved. The user's comments have been recorded. The final design has enough detail for the candidate to carry out the solution, but not a competent third party. A test plan is present but does not fully test the problem.	<ul style="list-style-type: none"> <li>Initial designs.</li> <li>User feedback on the initial designs.</li> </ul>	<ul style="list-style-type: none"> <li>Initial designs concentrating on look and feel.</li> <li>Comments from the user could be written on the initial design, or be in the form of a letter. If there were several users, a questionnaire could be used.</li> </ul>
5 – 6	7 – 9	<p>Initial designs are accurate enough for the user to make a reasoned judgement as to their suitability.</p> <p>The user's comments have been accurately recorded and acted on in the final design.</p> <p>The final design is described in such detail that a competent third party could implement the design.</p> <p>The proposed solution is broken down into manageable sub-tasks.</p> <p>A full and effective test plan has been devised, based on the previously identified objectives. Where validation techniques are planned, a full set of suitable test data has been devised.</p>	<ul style="list-style-type: none"> <li>Final designs.</li> <li>Test plans.</li> </ul>	<ul style="list-style-type: none"> <li>Final designs should now take into account the user's comments and contain all the detail needed to complete the task.</li> <li>The test plan devised should be linked to the objectives described in the 'Identify' section and any validation techniques used.</li> </ul>

## Further guidance on 'Design'

Initial designs would typically be hand-written sketches without a lot of detail. They would be used to check with the user that the design roughly met their requirements. At this stage they would not be expected to include details such as formulae, search instructions or font sizes.

Taking the user's comments into account the candidate can then go on to put further detail into the design.

For example:

- Database File structures, validation details, clearly defined updates, sorts, searches, layout of screen forms and reports
- Spreadsheet Layout, formulae, validation details, macros
- Desk Top Publishing Page layout – positions of frames/columns/lines, fonts, text size, paragraph styles, position/size of graphics and blocks of text, links between frames
- Website Publishing Page layout, position of graphics/lines/tables, navigation buttons, clearly defined map of links.

## Test plans

### Database and Spreadsheet

Details of test data and a quantitative test plan are required. Tests with typical, extreme and invalid data.

For example:

- Database Test plan for searches, sorts and reports.
- Spreadsheet Test plan for formulae.

### Word Processing and Desk Top Publishing

The method of testing will be more descriptive, detailing the use of spellchecker, print preview, proofreading and aesthetic testing.

### Website Publishing

Many of the tests for Word Processing and Desk Top Publishing are also suitable for this problem type. In addition, a test plan for links would be required.

## Implement (12 marks)

Standard	Extension	Assessment criteria	Evidence	Notes
0 – 2	0 – 3	A project that provides evidence that the software has been used, but bears little or no resemblance to the design and there is little or no evidence of testing.	<p><i>In order to do this, a candidate should provide:</i></p> <p><b>Annotated</b> hardcopy evidence of both implementation and testing, showing full details of the implementation process.</p>	<ul style="list-style-type: none"> <li>• Whenever appropriate, the hardcopy evidence should be presented as if it had been produced by the user(s) using the system that has been implemented.</li> <li>• It is not necessary to enter large amounts of data to simulate use of the implemented system, e.g. stock control with thousands of records. Approximately 20 realistic records should be adequate to demonstrate the system's use.</li> <li>• If the final version differs from the original design, candidates should include some notes as to why the changes were necessary.</li> <li>• Candidates should annotate their hardcopies to show the sequence of development, errors and areas for improvement.</li> <li>• Testing should be annotated to show how the expected and actual results compare.</li> </ul>
3 – 4	4 – 6	A project that provides evidence that the design has been implemented with some omissions. There is evidence that errors have been corrected and some unstructured testing has taken place.		
5 – 6	7 – 9	A project that provides evidence that the design has been implemented. Error correction has taken place and a test plan has been partially implemented or the test plan is not relevant to the problem.		
7 – 8	10 – 12	A project with evidence that the design has been fully implemented showing clearly that the problem has been solved. Evidence that all errors have been corrected and that a relevant test plan has been fully implemented.		

**Evaluate (5 marks)**

Standard and Extension	Assessment criteria	Evidence	Notes
0 – 1	Evaluation is non-existent or weak with only general comments.	<i>In order to do this, a candidate should provide:</i>	
2 – 3	Evidence of evaluation against the objectives. User's comments may be present but are too general.	Written evidence of an evaluation of each of the objectives in the 'Identify' section.	Each of the original objectives should be evaluated as to whether they have been solved. Any problems the candidate had, such as major changes to their design, also need to be mentioned.
4 – 5	Original objectives are fully evaluated and the user's comment is critical and relevant. There is evidence that the candidate has understood the user's comments and has suggested changes for the future.	Evidence that the user has seen the problem's solution.  Written evidence of further improvements.	Comments should be based on solving the problem, not on the candidate's ability to use the software, etc.
			User feedback could be in the form of a letter or a questionnaire if there are multiple users. Critical and honest answers are much more useful to the candidate.  The user feedback should lead the candidate into identifying further enhancements to the solution.

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