
4 Unit 4: System Specification and Configuration

[AS level, double award, mandatory, internally assessed]

4.1 ABOUT THIS UNIT

This AS level unit is a mandatory part of the double award only and is internally assessed

This unit is assessed through your portfolio work. The mark on that assessment will be your mark for the unit. You will produce a specification for an ICT system to meet the needs of a given user, together with a working system on which you have installed and configured software to meet a user's needs, and recommendations for ensuring safety and security, and an explanation of the basics of software development, to include:

- a statement of the user's needs and how these might be met;
- a specification for an ICT system;
- evidence of software installation, configuration, testing and implementation of security procedures;
- evidence that the software has been configured by installing toolbars and setting up macros and templates to meet a user's needs;
- recommendations for safety and security;
- an explanation of the basics of software development;
- an evaluation of the specification you produced and the methods used for installation, configuration and testing.

4.2 WHAT YOU NEED TO LEARN

You need to learn about:

- hardware;
- software;
- basics of software development;
- safety and security.

4.2.1 Hardware

This involves understanding the purpose of significant pieces of computer equipment and their links with other components.

You need to understand the purpose of and specify, using reference materials, any of the following components to create an ICT system to meet specified user requirements:

- main processing unit;
- keyboard;
- mouse;
- VDU (visual display unit);
- processor (CPU – central processing unit);
- connectors;
- video card;
- sound card;
- network card;
- disk drives;
- optical drive;
- printer;
- scanner;
- serial port;
- parallel port;
- USB (universal serial bus) port;
- microphone;
- speaker;
- SCSI (small computer system interface) controller.

You need to learn how different systems meet different purposes and the importance of particular components. You also need to learn to judge the effectiveness of systems designed for similar purposes, e.g. how different types of RAM are more efficient and how different sound cards and speakers affect the quality of sound coming from a multimedia system.

Technical terms

Technical terms are used extensively in ICT. Following are lists of terms. You do **not** need to acquire extensive theoretical knowledge about these terms, but you do need to understand how they are used in system specifications and how the items listed affect the selection and installation of a system.

You need to know the terms relating to:

- memory, for example:
 - bit;
 - byte;
 - Kb, Mb, Gb, Tb;
 - RAM;
 - address;
 - buffer;
 - ROM;
 - volatility;
 - cache;
- the main processing unit, for example:
 - tower;
 - desk unit;
 - motherboard;
 - processor (CPU);
 - co-processor;
 - ISA (integrated systems architecture);
 - PCI (peripheral component interconnect);
 - AGP (accelerated graphics port);
 - controller;
 - card;
 - bus (address, data);
 - clock;
 - serial port;
 - parallel port;
 - expansion slot;
- disk-drive storage systems, for example:
 - floppy disk;
 - hard disk;
 - optical disk;
 - write protect;
 - data compression;
 - rotation speed;
 - access time;
 - capacity;
 - IDE (integrated drive electronics);
 - SCSI (small computer system interface);
 - SATA (serial advanced technology attachment);
- optical disks, for example:
 - CD-ROM;
 - DVD-ROM/RAM;
 - CD-RW;

- printers, plotters and VDUs, for example:
 - resolution;
 - flatbed;
 - ink jet;
 - laser;
 - buffer;
 - colour mode (bits);
 - scan frequency;
 - interlace;
 - refresh rate;
- connector plugs and sockets, for example:
 - centronics/parallel;
 - serial;
 - SCSI;
 - RJ (registered jack) series;
 - DB series;
 - DIP, DIL switches;
 - USB;
 - Firewire.

You need to configure and test complete systems and individual components of a system, including:

- main processing unit;
- keyboard;
- mouse;
- VDU;
- speaker and microphone;
- scanner;
- disk or optical drive;
- printer;
- application software;
- connecting cables;
- expansion cards (video, sound or network).

4.2.2 Software

Some software operates the computer system as soon as it is switched on. You need to know about the minimum software needed in a computer to enable a user to communicate with it.

You need to change (configure) various settings, such as setting the right time and date, and more important settings, like setting a password that users need to enter for the system to work, calling up a device driver or selecting between alternative operating systems.

Some incorrect configurations are easily corrected. Others could delete all the existing data and make the system unusable. You have to learn to configure systems safely.

There is a range of different types of software. You need to know what types of software are available and understand the purpose of each type, including:

- BIOS (basic input output system) start-up software;
- operating systems;
- GUI (graphic user interfaces);
- applications software.

The BIOS is used when the hardware first powers up. Access to these has to be initiated on starting the system. You need to understand what this start-up software controls and set or define parameters to meet requirements, such as:

- select start-up (boot) disk drive;
- define a new disk drive;
- set system password;
- configure a new card, e.g. video.

Operating systems control the computer and the way it handles all the attached peripheral devices. They also provide the user with a way of communicating with the computer system to configure the way that hardware operates.

There are many different types of operating system (OS). One of the most common provides a graphic user interface (GUI). This OS presents the user with a visually pleasing, simple interface. Other systems only provide a textual (command) interface. To use this type, the user has to understand how to enter commands. You need to select, install and configure operating systems that may have either a command interface or a graphic user interface.

ICT systems can be configured to start up and operate in different ways. The ICT system manager controls many of these. Others can be configured to suit the needs of users. You need to set up different system-boot or start-up configurations so that a system can be made to start up according to specified requirements. You also need to set up the system to suit user requirements. You need to use the operating system for settings such as:

- time and date;
- password properties;
- scheduled tasks;
- virus-protection configuration;
- directory (folder) structure and settings;
- multimedia configuration;
- printer, mouse and keyboard configuration;
- GUI desktop and display set-up;
- application-software icons;
- checking and setting system properties.

There is a wide variety of applications software to meet user needs. You need to know which type of software suits a particular processing activity. You need to select, install and configure software most suited to a specified need, including:

- document (word) processing;
- desktop publishing;
- multimedia reference;
- programming languages;
- web browsers;
- e-mail software;
- database (record structure);
- spreadsheet (numeric structure);
- vector graphics, e.g. geometric objects;
- bit-map graphics, e.g. photo images.

To enable users to make immediate and effective use of the system, you also need to configure the application software in different ways, including preparing or setting items such as:

- preferences (or configuration files);
- macros;
- toolbars and the buttons available;
- directory structures and defaults;
- data templates;
- saving and back-up security;
- menu layout and contents;
- borders, rules and scroll bars.

4.2.3 Basics of Software Development

You need to understand that software consists of a set of instructions which are in a specific sequence to obtain the desired outcome. Software can be developed using different languages, each of which has its own set of rules or syntax.

You need to learn that, when developing software, there are a number of aspects that need to be considered, including:

- the data that will be input and the output required;
- how the data will be stored;
- how the processing of data will be controlled;
- the efficiency of the program which relates to the precision in framing instructions.

You also need to know how to organise information into a form suitable for processing.

4.2.4 Safety and Security

When specifying ICT systems, to ensure the user can work safely, it is important to consider the ergonomics of:

- hardware;
- software;
- workstation layout;
- furniture.

You also need to implement or recommend proper management and security procedures, including those that ensure:

- data and software back-up is maintained;
- confidential information is protected;
- passwords are used;
- virus checking is undertaken;
- copyright is protected;
- theft is avoided (data, software, equipment);
- users are assigned appropriate rights and file permissions.

4.3 ASSESSMENT EVIDENCE GRID

Please see over.

Unit 4: System specification and configuration					
What you need to do:					
<p>You need to produce: a specification for an ICT system to meet the needs of a given user, together with a working system on which you have installed and configured software to meet a user's needs, and recommendations for ensuring safety and security, and an explanation of the basics of software development. Your evidence needs to include:</p> <p>a [AO3] a statement of the user's needs and how these might be met [5];</p> <p>b [AO3] a specification for an ICT system [10];</p> <p>c [AO1] evidence of software installation, configuration, testing and implementation of security procedures [9];</p> <p>d [AO1] evidence that the software has been configured by installing toolbars and setting up macros and templates to meet a user's needs [6];</p> <p>e [AO2] recommendations for safety and security [8];</p> <p>f [AO2] an explanation of the basics of software development [4];</p> <p>g [AO4] an evaluation of the specification you produced and the methods used for installation, configuration and testing [8];</p>					
How you will be assessed:					
Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	AO3	You identify user requirements by identifying the main tasks that the user wants the system to perform; [0 1 2]	you clearly define the user requirements by stating specific tasks that the user wants the system to perform, including the types of input and the output required; [3 4]	you clearly define the user requirements by detailing specific tasks that the user wants the system to perform, identifying all the types of input and the output required. [5]	/5
b	AO3	You produce specifications for the ICT system, including details of hardware, operating system, applications software and configuration; [0 1 2 3]	you show a systematic approach to clearly specifying an ICT system, including full details of hardware, operating system applications software and configuration; [4 5 6]	you show a systematic approach to clearly specifying an ICT system, including full details of hardware, operating system, applications software and configuration and clear detail of the design of any toolbar layouts, menus, templates and macros that would improve the efficiency and effectiveness of the user. [7 8 9 10]	/10
c	AO1	You select and install suitable software; you will configure the software and operating system to meet the needs of the user; you make little or no attempt to implement test procedures to check each task undertaken; you implement suitable security procedures; [0 1 2 3]	you select and install suitable software; you will configure the software and operating system to meet the needs of the user; you will clearly define and implement test procedures to check each task undertaken; you implement suitable security procedures; [4 5 6]	you select and install suitable software; you will configure the software and operating system to meet the needs of the user, including setting ROM-BIOS parameters and carrying out more complex configuration activities such as virus protection and scheduling tasks; you clearly define and implement test procedures to check each task undertaken and show how you overcame problems found as a result of using the test procedures; you implement suitable security procedures. [7 8 9]	/9

Unit 4: System specification and configuration (continued)					
Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
d	AO1	You install, without testing, a suitable toolbar layout, menu, template and macro to meet the user requirements; [0 1 2]	you install and test a suitable toolbar layout, menu, template and macro to meet the user requirements; [3 4]	you install and test toolbar layouts, menus, templates and macros that you have designed that provide the user with facilities to improve their efficiency. [5 6]	/6
e	AO2	You provide limited recommendations for safety and security, including the ergonomics of furniture and the workstation layout; your report may contain errors in spelling, punctuation and grammar; [0 1 2 3]	you provide recommendations for safety and security that include a full consideration of ergonomics and some consideration of management issues; your report will contain few spelling, punctuation and grammar errors; [4 5 6]	you provide detailed recommendations for safety and security that include a full consideration of ergonomics and of management issues; your report will be consistently well structured and there will be few, if any, spelling, punctuation and grammar errors. [7 8]	/8
f	AO2	You outline at least two of the basic concepts of software development; [0 1]	you outline at least three of the basic concepts of software development; [2 3]	you explain at least three of the basic concepts of software development. [4]	/4
g	AO4	You comment on the quality of your specification and the effectiveness of the methods you used for installation, configuration and testing; [0 1 2 3]	you clearly identify good and not so good features of your specification and the methods you used for installation, configuration and testing; [4 5]	you show that you identified strengths and weaknesses in your initial specification and practical activities and how you refined them to meet the user's needs more closely, suggesting how you might approach a similar task in future. [6 7 8]	/8
Total mark awarded:					/50

4.4 GUIDANCE FOR TEACHERS

4.4.1 Guidance on Delivery

The focus of this unit is to acquire a good understanding of the hardware and software that form computer systems and the extensive software configuration tasks that are necessary to meet given specifications.

It is important that you treat the software and hardware items listed as an *indication* rather than a *prescription*. It is difficult to keep pace with the advances in ICT and, as technology changes, some of the items listed may become more or less important and your course delivery needs to reflect this.

Candidates are expected to acquire sound knowledge of different hardware and software items. They also need to gain experience in configuring a variety of software.

Candidates need to make extensive use of screen prints (dumps) to show how they have set or modified software configurations. They need to gain experience of incorporating these, together with their own annotations, into logbooks or reports that describe their activities.

Software

Candidates need to note all new files created when they add new software, try de-installing the software and then check to see if any of the new files remain. Such activity reinforces the value of standard uninstalling software to purge a system of files added by a particular application.

Software problems need to include configuring the system by setting new values in the start-up ROM-BIOS, often non-volatile RAM (NVRAM), modifying OS system files such as config.sys, autoexec.bat, win.ini, sys.ini or the registry files, and customising the appearance of a GUI system interface. There is a wide range of configuration activities that can be undertaken and candidates need to learn to undertake many of these simple configuration tasks. Sensible installation of software needs to include setting up suitable folder or directory structures.

Within applications software, candidates need to customise the software to meet a user need. Typical requirements are the layout of toolbars and buttons, the operation of multiple key depressions, the operation of macros, the use of standard templates to assist the user to achieve the formats they need, selecting the correct printer or printer driver, or ensuring the default path is suited to user needs.

Candidates need to match the characteristics of the different components to the requirements of the user. They might, for example, select a 21-inch 'high-resolution' monitor, a high-speed processor and a colour plotter for a user who will use the system to produce detailed manufacturing drawings.

Consideration of drivers for printers and other hardware might concentrate most on why such drivers are needed and how they may need to be configured rather than how they work.

This unit requires the provision of a computer that can be configured. Using a stand-alone computer will provide good opportunities for candidates to gain experience in installing and configuring software.

4.4.2 Guidance on Assessment

It needs to be stressed that you determine only the *mark* for a candidate's portfolio evidence and not the *grade* which will be determined by OCR.

Regular, early and constructive feedback to candidates on their performance is essential and crucial. Help with planning and structuring their portfolio work in a logical manner throughout the course will lead to better understanding of their work and is likely to achieve higher marks.

Giving candidates deadlines for the completion of various sections of their work, and encouraging them to adhere to them, is also essential if candidates are not going to rush to complete and possibly finish up with marks below their potential.

You need to mark each portfolio according to the assessment objectives and content requirements in the *Assessment Evidence Grid* (Section 4.3).

The information on this *grid* will eventually be transferred onto a *Unit Recording Sheet* to be attached to the front of each candidate's piece of work at the point when the work is submitted for moderation. A *Coursework Administration Pack* will be supplied, containing all relevant *Unit Recording Sheets*. Where marking for this unit has been carried out by more than **one** teacher in a centre, there must be a process of internal standardisation carried out to ensure that there is a consistent application of the criteria as laid down in the *Assessment Evidence Grids*.

Each row in the grid reflects the development of an assessment objective from a task or sub-task in the banner (there may be one or more assessment objectives to any particular task/sub-task).

The maximum mark for each *strand* of work (each row) is shown in the far right-hand column of the grid and this maximum mark is further broken down into a number of mark bands across each row with a range of descriptors.

You use your professional judgement to determine which descriptor in a strand (row) best suits the candidate's work and from the range of marks available within that particular mark band, you circle the mark that best fits the work. You then record this mark in the column headed *Mark*.

You should use the full range of marks available. You must award *full* marks in any strand for work which *fully* meets the criteria. This is work which is the best one could expect from candidates working at AS level.

Only **one** mark per strand/row will be entered. The final mark for the candidate is out of a total of **50** and is found by totalling the marks for each strand of work.

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help you to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
a	AO3	1	Candidates use information provided to identify only the main tasks the user wants the system to perform, such as producing letters and other documents, producing multimedia presentations or editing video clips;
		2	candidates define user requirements clearly by stating the specific tasks the user wants the system to perform, including the types of input and output required, e.g. candidates might identify that the user wants to input names and addresses of customers to produce a personalised standard letter;
		3	candidates define user requirements clearly by describing in detail the specific tasks the user wants the system to perform, including the types of input and output required – all the input and output devices needed are identified.
b	AO3	1	Candidates gaining maximum marks include details of hardware, such as type, size and speed, as appropriate, of both operating system and applications software, such as type, title and version; and how the system needs to be configured to meet the user requirements, such as the software icons required on the desktop, the directory (folder) structure and settings and the macros, templates, toolbar layouts and menus required – as a minimum, candidates identify all the hardware, software and configuration requirements but their specification lacks detail;
		2	candidates recognise the interdependence of hardware and software components when specifying systems and approach the specification systematically by considering the specific user requirements and the software or hardware essential to meet these as a starting point;
		3	candidates have included detail of the macros, templates, toolbar layouts and menus required; at this level, they have considered the efficiency and effectiveness of the user and produce clear designs that would demonstrably improve these aspects.
c	AO1	1	Candidates select and install software to meet specific requirements; they configure the software, e.g. by setting preferences; they configure the operating system by, for example, setting password properties, setting up directory (folder structures), configuring printer, mouse and keyboard, and configuring GUI desktop and display setup including application software icons; candidates also implement security procedures such as setting and using passwords;

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c	AO1	2	<p>additionally, candidates create test procedures to check each task undertaken that include details of the test to be carried out and the expected result;</p> <p>they carry out the tests and compare the actual result obtained with that expected;</p> <p>where problems are found, candidates keep records of the steps they take to resolve these problems;</p>
		3	<p>candidates test the facilities created to ensure they work as expected;</p> <p>candidates further carry out configuration activities that require them to set ROM-BIOS parameters and schedule tasks such as virus checking.</p>
d	AO1	1	Candidates set up and install a toolbar layout, menu, template and macro to meet specific user requirements – these may be examples provided by the software that have been modified by candidates;
		2	<p>candidates set up and install a toolbar layout, menu, template and macro to meet specific user requirements;</p> <p>candidates create test procedures to check each task undertaken that include details of the test to be carried out and the expected result;</p> <p>they carry out the tests and compare the actual result obtained with that expected;</p> <p>where problems are found, candidates keep records of the steps they take to resolve these problems;</p>
		3	additionally, at this level, candidates use their own designs to create and install toolbar layouts, menus, templates and macros that demonstrably improve the efficiency of the user, e.g. by creating a template that includes macros to input specific data.
e	AO2	1	<p>Candidates provide limited recommendations for safety and security – these may include the use of passwords to prevent theft and protect confidential information and the importance of virus checking;</p> <p>consideration of ergonomics is limited to furniture and work station layout;</p>
		2	<p>candidates include the ergonomics of hardware and software in their recommendations;</p> <p>they also consider management issues such as maintaining data and software back-up;</p>
		3	candidates provide detailed recommendations for all the safety and security issues identified in Sub-section 4.2.4.
f	AO2	1	Candidates provide brief notes that identify at least two of the basic concepts of software development;
		2	candidates provide brief notes that identify at least three of the basic concepts of software development;
		3	candidates explain at least three of the basic concepts of software development with reference to specific examples.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
g	AO4	1	Candidates make brief comments on the quality of their specification and how effective each method used was for installation, configuration and testing, and suggest simple improvements to some of them;
		2	candidates' evaluations consider both good and not so good features of each method used for installation, configuration and testing – they provide sensible suggestions as to how each method could be improved;
		3	candidates show evidence of evaluation through the refinement of their work as it progresses; candidates identify the strengths and weaknesses in their initial specification and practical activities and explain how these were refined to meet the users' needs more closely; final evaluations include consideration of how a more efficient approach might be adopted for similar tasks in future.

4.4.3 Resources

Organisations	Health and Safety Executive			
Publications	Computer magazines such as <i>What PC</i> that include articles on hardware and software components.			
Textbooks	British Computer Society	<i>A Glossary of Computing Terms</i> Tenth Edition	Pearson Education Ltd.	020 177 629 4
	Gookin D & Rathbone A	<i>PCs for Dummies</i> Ninth Edition	John Wiley & Sons Inc	076 454 074 2
	Lawson J (ed)	<i>Vocational A-Level Information and Communication Technology</i>	Pearson Education Ltd.	058 235 709 8
	Meyers M	<i>Michael Meyers' A+ Certification Lab Manual: Student Edition</i>	Osborne McGraw-Hill	007 213 348 1
	Rathbone A	<i>Windows XP for Dummies</i> Second Edition	John Wiley & Sons	076 454 074 2
	Richards RP & Heathcote PM	<i>AVCE Units 4-6</i>	Payne-Gallway	190 311 248 6
Websites	http://www.hse.gov.uk/pubns/index.htm http://www.pcindex.co.uk/			