



National Unit Specification: general information

Unit Computer Systems Architecture (SCQF level 5)

Code FW02 11

Superclass: CB

Publication date: September 2011

Source: Scottish Qualifications Authority

Version: 01

Summary

The purpose of this Unit is to provide candidates with basic knowledge of the workings of a computer system. It will examine the principles common to all computer systems and examine how they work with a focus on the processor and memory. It will give candidates an understanding of how data is represented in a computer system and enable them to convert between binary and denary and between bits and bytes up to megabytes. On completion the candidate will be able to describe different measures of computer components and to produce system specifications for particular software use.

This is a mandatory Unit in the NC Computing: Technical Support (SCQF level 5). It is also available as a standalone Unit.

This Unit is suitable for a wide range of candidates who want to learn about computer systems.

Outcomes

- 1 Demonstrate an understanding of how data is represented in a computer system.
- 2 Identify and describe computer system components.
- 3 Produce and explain system specifications.

Recommended Entry

While entry is at the discretion of the centre, it would be beneficial if the candidate possessed basic IT skills.

General information (cont)

Unit Computer Systems Architecture (SCQF level 5)

Credit points and level

1 National Unit credit at SCQF level 5 (6 SCQF credit points at SCQF level 5*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

National Unit Specification: statement of standards

Unit Computer Systems Architecture (SCQF level 5)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Demonstrate an understanding of how data is represented in a computer system.

Performance Criteria

- (a) Represent positive number in binary form.
- (b) Express file sizes in various different Units of measurement.
- (c) Select backing storage requirements.
- (d) Describe ASCII code.

Outcome 2

Identify and describe computer system components.

Performance Criteria

- (a) Represent the structure of a computer in the form of a simple box diagram.
- (b) Describe the processor.
- (c) Describe clock speed.
- (d) Describe the functions of memory in a computer system.
- (e) Distinguish between main memory and backing storage.
- (f) Describe and compare storage devices.

Outcome 3

Produce and explain system specifications.

Performance Criteria

- (a) Produce relevant system specifications.
- (b) Explain the specifications.

National Unit Specification: statement of standards (cont)

Unit Computer Systems Architecture (SCQF level 5)

Evidence Requirements for this Unit

Written/oral/practical evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria. Evidence for all Outcomes should be produced in open-book conditions.

Written/oral and/or product evidence for Outcome 1 will include:

- ◆ positive numbers accurately represented in binary up to and including 8 bits
- ◆ binary numbers accurately represented as whole numbers up to 8 bits
- ◆ the sizes of six files accurately expressed as follows: bits into bytes, megabytes into bytes and bits, gigabytes in megabytes, bytes and bits
- ◆ selection of the most appropriate medium on which to store six files of different types and sizes.
- ◆ a description of ASCII code in terms of format and its usage

Written/oral and/or product evidence for Outcome 2 will include:

- ◆ a simple box diagram drawing of a computer. The diagram will include the CPU, main memory, backing storage and input and output and show direction of flows
- ◆ a description of the processor in terms of its purpose within a computer system, identifying its fundamental parts, and their purposes. The parts of the processor will include the ALU, control Unit and registers, with a brief statement on their purpose
- ◆ a description of clock speed in a computer system
- ◆ a list and brief description of the different types of memory systems in a computer. This will include RAM, ROM, cache, virtual memory
- ◆ a description of the difference between main memory and backing storage
- ◆ a description of and comparison of four different types of backing storage. This will include a magnetic hard drive, a solid state hard drive and network based storage

Product and written/oral evidence for Outcome 3 will include:

Two PC specifications, intended for users with particular requirements, including maximum cost. This will be accompanied by a report explaining why the specification is appropriate and which must reference all of the following:

- ◆ processor
- ◆ memory
- ◆ storage
- ◆ expansion cards
- ◆ cost

National Unit Specification: support notes

Unit Computer Systems Architecture (SCQF level 5)

This part of the Unit Specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit has been partially aligned to the ESkills National Occupational Standards Unit IT/Technology infrastructure design and planning, competence (4.8.J.1) Follow under supervision, organisation strategy for IT/technology infrastructure design and planning activities point (f).

The overall aim of this Unit is to enable candidates to identify system components and understand how they work together to form a PC. Focussing on the processor, main memory and primary storage, it will provide candidates with information about these components and about how data is represented in a computer system. Candidates will gain a basic knowledge of how data is processed within a computer system and some of the key terminology involved. Candidates will gain an understanding of how the specification of a PC can be altered to satisfy differing user requirements and purposes, taking account of factors such as performance and cost.

This is a mandatory Unit within the NC Computing: Technical Support (level 5). It would be beneficial for candidates to undertake this Unit in conjunction with Install and Configure Networked Hardware and Software (SCQF level 5), where candidates are exposed to different hardware components and gain hands-on installation experience. This will allow a greater understanding of the inner workings of a computer system.

Guidance on learning and teaching approaches for this Unit

Candidates are encouraged to use the Internet in any research etc. however the evidence produced must be in the candidate's own words.

Outcome 1

The tutor should discuss the use of bases in everyday life, eg base 60 for time, base 7 for days/weeks etc. to help the candidates with binary. The relationship between the number of bits in a binary value and the range of values that can be held in that number of bits should be introduced. The candidate should be provided with a range of file types and the difference in their sizes should be highlighted, eg the difference in size of video and text files, CAD files and photographs. Appropriate media on which to store such files should then be discussed. The form and uses of ASCII code should be introduced with candidates shown how letters are represented. The standard ASCII code character set should be shown to candidates, this will require a brief introduction to hexadecimal.

National Unit Specification: support notes (cont)

Unit Computer Systems Architecture (SCQF level 5)

Outcomes 2 and 3

Candidates should be encouraged to undertake research to determine contemporary standards in computer system components.

Through delivery of this Unit, candidates should develop an appropriate technical vocabulary and show confidence in reading and understanding PC specifications. Exposure should be given to as many different technical websites and computer magazines as possible and the tension between performance and cost should be highlighted.

Candidates should be made aware of minimum and recommended requirements of different software packages and the impact of the specification of a PC on software performance.

Guidance on approaches to assessment for this Unit

For Outcome 1 assessment could take the form of questions in which candidates are given a range of binary to denary conversions. This would be followed by a range of file sizes given in Units which candidates express in larger or smaller Units, ranging from three files of up to 50Mb to three files up to 700Mb up to three files of up to 10Gb. These files will range in type from text files to .avi and jpeg to CAD and multimedia files.

Candidates could then be given a range of short response questions concerning file sizes and types and asked to identify appropriate media on which to store them. Short response questions could be given on the uses and format of ASCII code.

For Outcome 2 assessment could take the form of a series of short response questions covering all the Evidence Requirements, with candidates asked to draw a simple box diagram of a computer system.

For Outcome 3 candidates could be given at least two briefs for users who have different requirements. They could then be asked to produce PC specifications which will suit each of the users. Each user should have particular needs, eg a PC for CAD software, for video-editing software or a gaming machine. Each specification must be accompanied by a short report which justifies each part of the specification. Where making use of the internet for this Outcome, all websites used must be referenced.

Where graphics/sound cards are not appropriate to meet a given specification, candidates should make reference to this.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

National Unit Specification: support notes (cont)

Unit Computer Systems Architecture (SCQF level 5)

Opportunities for Core Skill Development

In this Unit the candidate will learn about the basic workings of a computer system and how data is represented within it. This will allow the candidate to understand the different measures of computer components and measure system performance.

Candidates will:

- ◆ convert binary and denary numbers
- ◆ identify suitable storage for different file types and sizes
- ◆ develop a technical vocabulary

As candidates are doing this Unit they will be developing aspects of the Core Skills of *Numeracy, Problem Solving* and *Communication*.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

History of changes to Unit

Version	Description of change	Date

© Scottish Qualifications Authority 2011

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.