

SQA Advanced Unit specification: general information

Unit title: Troubleshooting a Desktop Operating System

Unit code: HR86 47

Superclass: CA

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Unit purpose

This Unit is designed to introduce candidates to the issues involved in troubleshooting and maintaining a computer operating system. It is intended for candidates undertaking an SQA Advanced Qualification in Computing or a related area, who require a broad knowledge of client operating systems and desktop support. Candidates should be able to repair an operating system including system and user settings, security features, network connectivity, applications, and mobile computing. Candidates should also be able to maintain systems by monitoring for and resolving performance and reliability issues.

On completion of the Unit the candidate should be able to:

- 1 Identify and resolve desktop application issues
- 2 Identify the cause of and resolve networking issues
- 3 Manage and maintain operating systems
- 4 Support mobile users
- 5 Identify the cause of and resolve security issues

Recommended prior knowledge and skills

Access to this Unit will be at the discretion of the Centre. There are no specific requirements but candidates would benefit from knowledge of computer hardware and software. This may be demonstrated by the possession of Units such as HT0F 46 Hardware Concepts and/or HT0E 46 Operating System Concepts and/or HR79 48 Computer Operating Systems 2 and/or HR85 47 Configuring a Desktop Operating System. Alternatively, candidates might provide evidence of informal prior learning or experience, or the achievement of commercially recognised qualifications.

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Credit points and level

2 SQA Credits at SCQF level 7: (16 SCQF credit points at SCQF level 7*)

**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 National 1 to Doctorates.*

Core Skills

There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment

Evidence for the knowledge and/or skills for the Unit must be produced using a set of 60 multiple-choice/multiple-response questions to assess candidates' capabilities. This should be administered as a single end-of-Unit test covering all Outcomes.

Candidates must answer at least 60% of the questions correctly in order to obtain a pass.

Testing must take place in a closed-book environment where candidates have no access to books, handouts, notes or other learning material. Testing can be done in either a machine-based or paper-based format and must be invigilated by a tutor or mentor. There must be no communication between candidates and communication with the invigilator must be restricted to matters relating to the administration of the test.

If a candidate requires to be re-assessed, a different selection of questions must be used from all sections. A significant proportion of the questions used in the re-assessment must be different from those used in the original test. Candidates must answer at least 60% of the re-assessment questions correctly in order in to obtain a pass.

Unit specification: statement of standards

Unit title: Troubleshooting a Desktop Operating System

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Identify and resolve desktop application issues.

Knowledge and/or Skills

- ◆ Identification and resolution of new software installation issues.
- ◆ Identification and resolution of software configuration issues.
- ◆ Identification of causes and resolution of software failure issues.

Evidence Requirements

This assessment is carried out as an end-of-Unit test combining assessments for all Outcomes within the Unit. (See Outcome 5 for details.)

Assessment Guidelines

The assessment guidelines are found in Outcome 5.

Outcome 2

Identify the cause of and resolve networking issues.

Knowledge and/or Skills

- ◆ Identification and resolution of logon issues.
- ◆ Identification and resolution of network connectivity issues.
- ◆ Identification and resolution of names resolution issues.
- ◆ Identification and resolution of network printer issues.

Evidence Requirements

This assessment is carried out as an end of Unit test combining assessments for all Outcomes within the Unit. (See Outcome 5 for details.)

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Assessment Guidelines

The assessment guidelines are found in Outcome 5.

Outcome 3

Manage and maintain operating systems

Knowledge and/or Skills

- ◆ Identification and resolution of performance issues.
- ◆ Identification and resolution of hardware failure issues.

Evidence Requirements

This assessment is carried out as an end of Unit test combining assessments for all Outcomes within the Unit. (See Outcome 5 for details.)

Assessment Guidelines

The assessment guidelines are found in Outcome 5.

Outcome 4

Support mobile users.

Knowledge and/or Skills

- ◆ Identification and resolution of wireless connectivity issues.
- ◆ Identification and resolution of remote access issues.

Evidence Requirements

This assessment is carried out as an end of Unit test combining assessments for all Outcomes within the Unit. (See Outcome 5 for details.)

Assessment Guidelines

The assessment guidelines are found in Outcome 5.

Outcome 5

Identify the cause of and resolve security issues.

Knowledge and/or Skills

- ◆ Identification and resolution of Windows Internet Explorer security issues.
- ◆ Identification and resolution of issues due to malicious software.
- ◆ Identification and resolution of encryption issues.
- ◆ Identification and resolution of software update issues.

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Evidence Requirements

The assessment for all Outcomes must be undertaken at the end of the Unit. The candidate capabilities will be examined by 60 multiple-choice/multiple-response questions with appropriate sampling of the complete Unit content. The sample must cover **all** Outcomes with a suitable selection of at least 50% of the Knowledge and Skills points listed for each of the Outcomes.

The assessment must be undertaken in supervised conditions and is closed book. A candidate must complete this assessment within 2 hours. Candidates may not bring to the assessment event any notes, textbooks, handouts or other material (calculators are allowed). The questions presented must significantly change on **each** assessment occasion.

Assessment Guidelines

Testing can be done in either a machine-based or paper-based format and must be invigilated by a tutor or appropriate person. There must be no communication between candidates and communication with the invigilator must be restricted to matters relating to the administration of the test. Centres are recommended to create a coverage grid to highlight which questions cover which knowledge and skills bullet points to assist in the assessment process.

Unit specification: support notes

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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 80 hours.

Guidance on the content and context for this Unit

This Unit should be delivered in a real world context throughout. Individual, class and group discussions should be used to enhance comprehension and learning. Practical demonstration of the tasks involved in the teaching of this Unit should be linked to real world situations wherever possible. It is important that any required concepts and terminology are discussed and presented in an appropriate context.

The intention is that a significant time is available within the delivery of this Unit to allow centres to develop candidates to the correct level prior to assessment. Formative assessments, tutorials and frequent revision should be used to this end all through the duration of this Unit delivery. Candidates should be encouraged to accept responsibility for their own learning by providing opportunities to present chosen topics to the class and to assist others within class in the context of desktop support technicians.

The most important overall emphasis should be on the relevance and currency of content in such a rapidly evolving field. It is recommended that Centres deliver this Unit within the context of modern operating systems.

This Unit may assist in preparing for vendor certifications like Microsoft examination 70-685 Pro: Windows 7, Enterprise Desktop Support Technician. Please see the separate credit transfer document which gives details of vendor certifications that will be accepted as assessment evidence. Vendor certifications can change rapidly and candidates should be encouraged to check current details at the relevant vendor web site to ensure all the objectives have been met. The Microsoft examination contributes towards the Microsoft Certified IT Professional Enterprise Desktop Support Technician (MCITP: EDST).

The Outcomes in this Unit have been written in a vendor-independent manner. There is no restriction placed on the operating system to be used and centres are free to choose alternative operating systems.

Guidance on the delivery and assessment of this Unit

This Unit is likely to form part of a group award which is primarily designed to provide candidates with the technical or professional knowledge and skills related to a specific occupational area. It is moderately technical in content and should not be adopted by group awards in other areas or delivered as a stand-alone Unit without careful consideration of its appropriateness.

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It is a Unit which candidates are likely to find accessible at an introductory level. It is suggested that it be delivered only as part of an SQA Advanced programme in Computing or a related area. It should be delivered in tandem with other Computing Units and opportunities for teaching and assessment integration explored.

To minimise assessment overhead, one set of closed-book multiple-choice/multiple-response questions is used to provide evidence of candidates' capabilities for all Outcomes. As well as reducing the time required for assessment and marking, these reduce the need for candidates to memorise details and encourages understanding. Candidates must meet the necessary threshold to gain a pass.

If a candidate requires to be re-assessed, a significant number of different questions must be used from all sections. The questions used in the re-assessment must be significantly different from those used in the original test. Candidates must meet the necessary threshold to gain a pass.

This Unit may assist in preparing for vendor certifications like the Microsoft Certified IT Professional Enterprise Desktop Support Technician (MCITP: EDST). Please see the separate credit transfer document which gives details of vendor certifications that will be accepted as assessment evidence. Vendor certifications can change rapidly and candidates should be encouraged to check current details at the relevant vendor web site to ensure all the objectives have been met. The Microsoft examination contributes towards the Microsoft Certified IT Professional Enterprise Desktop Support Technician (MCITP: EDST).

The content of this Unit may be delivered using vendor-supplied curricula. As these materials are under continuous development, centres should check the appropriate vendor web site to ensure that such materials meet all the requirements of for this Unit.

Outcome 1

The Outcome will involve the candidate in identifying and resolving issues that occur when software is first installed. These issues may include installation permissions, local administrator requirement, licensing restrictions and digital signing. The Outcome also involves the candidate in identifying and resolving software configuration issues such as enabling and disabling features, pointing to network resources and changing the default settings. The final part of this Outcome will involve the candidate in identifying the cause of and resolving software failure issues. This may include checking the logs, checking whether the application runs in a system debugging mode, running the application in a different version of the operating system, repairing the installation, checking recently added programs and restoring or reimaging the system.

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Outcome 2

For this Outcome the candidate will identify and resolve logon issues which may be caused by hardware issues, network problems, password expiration, security concerns such as determining logon context and logon hours compliance. In this Outcome the candidate will have to identify and resolve network connectivity issues. The investigation and repair will entail determining scope of the issue, determining whether it's a machine or a network connectivity issue, checking TCP/IP settings, hardware and cabling problems, incorrect proxies or default gateway. The candidate will be required to identify and resolve names resolution issues such as checking which DNS is assigned; flushing the DNS cache; querying to the DNS server and checking the DHCP scopes. This Outcome will allow the candidate to identify and resolve network printer issues. These issues may include hardware failure, server issues, printer failure, network issues and driver issues.

Outcome 3

The candidate will be asked to identify and resolve performance issues using appropriate techniques such as analysing system and application logs, analysing machine services, setting power management, checking hard drive space and optimising any virtual memory in use. The Outcome will make the candidate identify and resolve hardware failure issues involving identifying bad sectors, diagnosing memory issues, recommending replacement hardware, updating the BIOS and determining which component is faulty.

Outcome 4

Here the candidate will identify and resolve wireless connectivity issues caused by signal strength, encryption types, encryption keys, wireless profiles and mobile devices issues. The candidate will identify and resolve remote access issues like a VPN client not connecting, IPv6 support, access and authentication to network resources.

Outcome 5

This Outcome will enable the candidate to identify and resolve browser security issues involving adding trusted sites, checking browser settings, installing plug-ins, identifying any policy restrictions and security certificates. The candidate will be asked to identify and resolve issues due to malicious software by analysing services, analysing programs, analysing processes, analysing browser helper add-ons and checking user permissions. The candidate will be involved in identifying and resolving encryption issues like the requirements for installing and recovering encryption keys using key management. The Outcome will require the candidate to identify and resolve software update issues. This may involve identifying software update level, checking whether client is receiving updates and identifying incompatibility of updates with other applications.

Opportunities for developing Core Skills

There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

Open learning

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance.

A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes.

For further information and advice, please see Assessment and Quality Assurance for Open and Distance Learning (SQA, February 2001 – publication code A1030)

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

History of changes to Unit

Version	Description of change	Date

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SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our [Centre Feedback Form](#).

General information for candidates

Unit title: Troubleshooting a Desktop Operating System

This is a Unit is intended for candidates undertaking a Computing or IT-related qualification who require a broad knowledge of client operating systems and desktop support to the level required by the industry. It is designed to develop an understanding of the issues involved in troubleshooting, repairing and maintaining a client operating system. This understanding of the issues is then applied across the practical tasks covered within the Unit delivery.

On completion of the Unit you should be able to:

- 1 Identify and resolve desktop application issues
- 2 Identify the cause of and resolve networking issues
- 3 Manage and maintain operating systems
- 4 Support mobile users
- 5 Identify the cause of and resolve security issues

In the first part of the course you will identify and resolve issues that occur when software is first installed. This may include installation permissions, local administrator requirement, licensing restrictions and digital signing. You will also identify and resolve software configuration issues by checking logs, checking whether the application runs in a system debugging mode, running the application in a different version of the operating system, repairing the installation, checking recently added programs and restoring or reimaging the system. You will identify the cause of and repair software failure issues such as enabling and disabling features, pointing to network resources and changing the default settings

The second part of the course will allow you to identify and resolve logon issues and network connectivity problems. Logon difficulties may be caused by hardware issues, network problems, password expiration, security concerns such as determining logon context and logon hours compliance whereas network connectivity may include determining the scope of the issue, determining whether it's a machine or a network connectivity issue, checking TCP/IP settings, hardware and cabling, investigating incorrect proxies or default gateway. You will be asked to determine and repair name resolution problems such as checking which DNS is assigned, flushing the DNS cache, querying to the DNS server and checking the DHCP scopes. You will be required to identify and resolve network printer issues. These may include hardware failure, server issues, printer failure, network issues and driver issues.

The third part of the course will be asked to identify and resolve performance issues using appropriate techniques such as analysing system and application logs, analysing machine services, setting power management, checking hard drive space and optimising any virtual memory. You will identify and resolve hardware failure issues involving identifying bad sectors, diagnosing memory issues, recommending replacement hardware, updating the BIOS and determining which component is faulty.

The fourth part of the course will let you identify and resolve wireless connectivity issues caused by signal strength, encryption types, encryption keys, wireless profiles and mobile devices issues. You will identify and resolve remote access issues like VPN clients not connecting, IPv6 support, access and authentication to network resources.

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The last part of the course will enable you to identify and resolve browser security issues involving adding trusted sites, checking browser settings, installing plug-ins, identifying any policy restrictions and security certificates. You will be asked to identify and resolve issues due to malicious software by analysing services, analysing programs, analysing processes, analysing browser helper add-ons and checking user permissions. You will be involved in identifying and resolving encryption issues like the requirements for installing and recovering encryption keys using key management. You will be asked to identify and resolve software update issues involving identifying software update level, checking whether client is receiving updates and identifying incompatibility of updates with other applications.

This Unit may assist in preparing for vendor certifications like the Microsoft Certified IT Professional Enterprise Desktop Support Technician (MCITP: EDST). Please see the separate credit transfer document which gives details of vendor certifications that will be accepted as assessment evidence. Vendor certifications can change rapidly and candidates should be encouraged to check current details at the relevant vendor web site to ensure all the objectives have been met. The Microsoft examination contributes towards the Microsoft Certified IT Professional Enterprise Desktop Support Technician (MCITP: EDST).