



National Unit specification: general information

Unit title: Programming for Mobile Devices (SCQF level 6)

Unit code: H2TM 12

Superclass: CB

Publication date: October 2012

Source: Scottish Qualifications Authority

Version: 01

Summary

This Unit develops knowledge and skills in designing, programming and testing mobile applications. Candidates will identify and use the various components needed to construct programs for smartphones, tablets and other devices using a high level language, gaining sufficient knowledge to create a mobile software application. This Unit is device and language independent and should prepare candidates for progression to Higher National Units in programming.

This is an optional Unit in the National Progression Award (NPA) in Mobile Technology (SCQF level 6), but is also available as a freestanding Unit.

Outcomes

- 1 Design an application for a mobile device.
- 2 Create an application for a mobile device using a Software Development Kit.
- 3 Test and document the application.

Recommended entry

While entry is at the discretion of the centre, it would be beneficial if candidates have achieved the following Unit, or equivalent:

Programming for Mobile Devices (SCQF level 5)

General information (cont)

Unit title: Programming for Mobile Devices (SCQF level 6)

Credit points and level

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

**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 title: Programming for Mobile Devices (SCQF level 6)

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

Design an application for a mobile device.

Performance Criteria

- (a) Design an application to a negotiated and realistic brief, using a recognised graphical methodology.
- (b) Design an application to a negotiated and realistic brief, using appropriate non-graphical techniques.
- (c) Produce a test plan using a recognised methodology.

Outcome 2

Create an application for a mobile device using a Software Development Kit.

Performance Criteria

- (a) Implement the design using sequence, selection and iteration.
- (b) Create a user friendly interface which uses at least one common input method.
- (c) Create a user friendly interface which uses at least one common output method.
- (d) Create a tested application.

Outcome 3

Test and document the application.

Performance Criteria

- (a) Using an emulator or device, test the application using black box testing techniques.
- (b) Using an emulator or device, test the application using white box testing techniques.
- (c) Using an emulator or device, test the functionality of the application to ensure it meets the original proposal.
- (d) Produce user documentation.

National Unit specification: statement of standards (cont)

Unit title: Programming for Mobile Devices (SCQF level 6)

Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

Evidence will be gathered in open-book conditions at appropriate points in the Unit.

Evidence for Outcome 1 must include:

- ◆ identification of functional/non-functional requirements
- ◆ statement of requirements
- ◆ structure chart or event diagram as appropriate
- ◆ pseudo-code/structured English to meet the given specification
- ◆ user interface design which includes:
 - at least one of the following input methods — touch screen, on-screen keyboard, voice, shake, direction (using a built-in compass/GPS)
 - at least one of the following output methods — screen, sound, vibration, wireless
- ◆ test plan including at least:
 - black box test data, which will include normal and exceptional data
 - interface testing, to include tests for usability and consistency

Evidence for Outcome 2 must include:

- ◆ fully commented code listings for all modules
- ◆ screen images for all screens
- ◆ evidence of an error free application or justification of reasons for an application not working (this must still meet all Performance Criteria)
- ◆ appropriate use of program generation and execution environment
- ◆ declaration and assignment of simple/primitive data types
- ◆ the use of sequence, selection and iteration control structures
- ◆ the use of no less than two types of operators
- ◆ use of at least three comments embedded throughout the program

The application must meet the design requirements in Outcome 1.

Evidence for Outcome 3 must include:

- ◆ test log and testing evidence of black box testing as defined in Outcome 1
- ◆ test log and testing evidence of white box testing
- ◆ written evaluation of the application (including reasons for any deviations from the brief)
- ◆ end-user documentation

National Unit specification: support notes

Unit title: Programming for Mobile Devices (SCQF level 6)

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 is an optional Unit in the National Progression Award (NPA) in Mobile Technology (SCQF level 6), but is also available as a freestanding Unit.

It is envisaged that this Unit is assessed via a single complete project covering all Outcomes.

Outcome 1

This Outcome should include a full analysis and design of a mobile application using a recognised design methodology, for example:

- ◆ waterfall
- ◆ code-and-fix
- ◆ spiral
- ◆ rapid prototyping
- ◆ unified process (UP)
- ◆ agile methods
- ◆ extreme programming (XP)

The initial analysis of the given problem will include the identification of functional/non-functional requirements/constraints which will then allow candidates to develop a statement of requirements and a top-level design. This should be demonstrated in the form of a structure chart or event diagram or whatever graphical method is appropriate to the chosen methodology.

As part of the design process, candidates will produce user interface designs using an appropriate graphics package, along with descriptions of input/output methods to be used in the application.

Candidates will produce a test plan in order to ensure that when completed, the application is fully tested and reliable with a consistent and user-friendly interface.

Outcome 2

In Outcome 2, candidates will implement the design created in Outcome 1, using an appropriate high-level language.

Whatever environment/language is chosen, or becomes available in future, it should include tools to enable candidates to design the application interfaces easily and include the ability to emulate the target device.

National Unit specification: support notes (cont)

Unit title: Programming for Mobile Devices (SCQF level 6)

Modern mobile devices have many different methods of input and output. Candidates should use at least one of the input and one of the output methods listed in the Evidence Requirements. The requirements for Outcome 2 could include evidence of the use of the following control structures — sequence, selection, iteration.

Outcome 3

The purpose of Outcome 3 is to ensure that the application is fit for purpose, and this should include evidence from test logs and screenshots of all black and white box testing to demonstrate both fitness for purpose and reliability.

A full evaluation of the application should also be produced in order for candidates to demonstrate that the application meets the requirements of the original brief.

The final part of the Outcome is to produce user documentation. Ideally, this documentation will take the form of a help system embedded into the application as is common with mobile applications (the documentation should be planned from the outset to enable its inclusion in the application).

Guidance on learning and teaching approaches for this Unit

Though it is necessary that assessment will be on an individual basis, there may be some scope for a group of candidates to produce a larger mobile application. If this approach were taken it would be necessary to divide the project into clearly distinct areas to allow evaluation of each individual's contribution. This would give greater weight to the final part of Outcome 3, where candidates working as a team could also evaluate each other's work against the original specification. It is essential that in this scenario, each candidate identifies their own contribution to the task if working in a group and that they provide evidence for their own portfolio.

The actual distribution of time between Outcomes is at the discretion of the centre. However, the following distribution and order is suggested.

Outcome 1 – 12 hours

Outcome 2 – 18 hours

Outcome 3 – 10 hours

Guidance on approaches to assessment for this Unit

It is envisaged that this Unit is assessed via a single project covering all Outcomes, with evidence provided in the form of a portfolio which candidates will produce.

The portfolio may be a digital or e-portfolio and should be constructed throughout delivery, with candidates contributing material on an ongoing basis. The contents of the portfolio must be clearly labelled and relate to specific Evidence Requirements. The inclusion of specific items in the portfolio should be negotiated between candidates and assessors, with only the best examples of work stored.

National Unit specification: support notes (cont)

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If an e-portfolio is used, it may take one of a variety of forms, ranging from general purpose digital repositories to specialised e-portfolio products. For example, a blog could be used to record candidate activity over the duration of the Unit. Specific entries to the blog could provide sufficient evidence in their own right (for example, a required identification) or could link to a file stored in another web service, such as a file hosting site. The use of a blog would aid authentication since any record of day-to-day activities would provide implicit evidence of participation and ownership.

An assessor observation checklist could be used to verify the candidate's completion of practical tasks.

Candidates are encouraged to use the internet in any research, etc. However, evidence produced must be candidates' own work. Assessors should assure themselves of the authenticity of candidates' evidence.

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)*.

Opportunities for developing Core Skills

In this Unit candidates are required to program on mobile devices, using software development kits, which provides opportunities to develop aspects of the Core Skill of *Information and Communication Technology (ICT)*.

Designing/planning, testing and evaluating an application may provide opportunities to develop aspects of the Core Skill of *Problem Solving*, particularly the component, '*Critical Thinking*'.

Written and/or oral reporting may provide opportunities to develop aspects of the Core Skill of *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

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