L1 Computing - Unit 2 - Using Digital Applications to Support Projects

Relevant LINKS

BACK TO COMPUTING UNITS **[1]**

Handbook home page **[2]**

Overview

Computer Science at Silver Level requires the candidate to use appropriate digital tools to create and manage projects that involve programming . As a result of reviewing their work, they will be able to identify and use automated methods or alternative ways of working to improve programming and using computers. They will also be aware of issues relating to intellectual property rights. Unfamiliar aspects will require support and advice from other people.

A work activity will typically be 'straightforward or routine' because:

The task or context will be familiar and involve few variable aspects. The techniques used will be familiar or commonly undertaken.

Example of context – designing, planing, implementing and testing a basic program for controlling a physical system.

Support for the assessment of this award

Example of typical Computing work at this level (Coming Soon)

Assessor's guide to interpreting the criteria

General Information

QCF general description for Level 1 qualifications

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- Achievement at QCF level 1 (EQF Level 2) reflects the ability to use relevant knowledge, skills and procedures to complete routine tasks. It includes responsibility for completing tasks and procedures subject to direction or guidance.
- Use knowledge of facts, procedures and ideas to complete well-defined, routine tasks. Be aware of information relevant to the area of study or work
- Complete well-defined routine tasks. Use relevant skills and procedures. Select and use relevant information. Identify whether actions have been effective.
- Take responsibility for completing tasks and procedures subject to direction or guidance as needed

Requirements

- Standards must be confirmed by a trained Level 1 Assessor or higher
- Assessors must at a minimum record assessment judgements as entries in the online mark book on the INGOTs.org certification site.

- Routine evidence of work used for judging assessment outcomes in the candidates' records of their day to day work will be available from their eportfolios and online work. Assessors should ensure that relevant web pages are available to their Account Manager on request by supply of the URL.
- When the candidate provides evidence of matching all the criteria to the specification, subject to the guidance below, the assessor can request the award using the link on the certification site. The Account Manager will request a random sample of evidence from candidates' work that verifies the assessor's judgement.
- When the Account Manager is satisfied that the evidence is sufficient to safely make an award, the candidate's success will be confirmed and the unit certificate will be printable from the web site.
- This unit should take an average level 1 learner 50 hours of work to complete, with 40 hours of learning under specific teacher presence.

Assessment Method

Assessors can score each of the criteria N, L, S or H. N indicates no evidence and it is the default setting. L indicates some capability but some help still required to meet the standard. S indicates that the candidate can match the criterion to its required specification in keeping with the overall level descriptor. H indicates performance that goes beyond the expected in at least some aspects. Candidates are required to achieve at least S on all the criteria to achieve the full unit award. Once the candidate has satisfied all the criteria by demonstrating practical competence in realistic contexts they achieve the unit certificate.

Expansion of the assessment criteria

1. The candidate will be able to select, use and combine applications

1.1 I can select suitable applications to support my work

Candidates should be able to match some common applications to the specific tasks such as a drawing program for designing graphics, a text editor for editing text, a spreadsheet for making number models.

Evidence: from assessor observations, documentation in portfolios.

Additional information and guidance

Candidates should be encouraged not to just take every application on face value and experiment with some different tools, especially free resources from the internet and not restrict their experience to particular types of computer e.g. desktop, tablet, smartphone. There is really no need to spend money on licenses for most general productivity tools and this also enables students to legally use the same tools outside school as in school therefore contributing to inclusion. Two of the key changes taking place globally in technology is a shift to open standards related to the internet and the increasing takeover of mobile technologies. In relation to open source, a simple example is graphics. There are three fundamental open standards for graphic images. .jpg, .png and .svg. These cover nearly every possible requirement and should be encouraged as replacements to older and less efficient formats such as .bmp, .gif, .cdr, .ai and similar formats. Note that proprietary vector formats such as .ai tend to create monopolies by forcing use of the software that created them. .svg is the open internet (XML) based vector standard and Inkscape [3] is a free and open source application for editing .svg files and exporting .png files from them. While .svg has taken some time to establish itself, it is in everyone's interest to promote open standards because it frees up competition in the market and therefore reduces costs and increases convenience to end users. It is generally bad practice to design graphics in applications such as Word or Publisher even though at this level it is practically possible and in some cases might appear easier. It is better to learn a specific application that is designed for the purpose and produces files in the open standard. Where possible originate graphics as vectors and then produce raster graphics such as png and jpg from the vector. This is because the vector application is the best for designing in and it produces

infinitely scalable images without problems of resolution and enormous file sizes. .png files are for displaying line diagrams where the e.g. browser software is not yet up to coping with .svg. A .png can have transparent objects and does not lose any data due to file compression to reduce the size of its files. .jpg can not have transparencies and trades off quality for low file size. Both .png and .jpg can be used for photographs but usually .jpg is the best format for these. .svg can produce photo-realistic drawings and can contain a photograph as part of a file but photographic images can not normally be converted to vectors. Similar arguments can be made for audio and video formats but at this level graphics are likely to be the most common scenario where some basic knowledge will make a significant difference to dealing with practical and unfamiliar circumstances.

1.2 I can collect and record data

Candidates should be able to use digital devices to collect and record data in useful situations

Evidence from assessor observations, content of learner portfolios.

Additional information and guidance

The most commonly cited use of data recording is in experimental measurement in science. This is still a perfectly legitimate activity to support this criterion. An example might be recording the temperature of a liquid as it cools and freezes. Note that all data recording boils down to sampling a changing voltage and storing the samples as bytes of data. The device that converts the physical thing (temperature, sound intensity, brightness of light, etc) into a voltage is called a transducer. A microphone is a transducer for sound, a digital camera for light. The chip that converts a continuously changing electrical signal into digital data is called an ADC - Analogue to digital converter. A 16 bit ADC will divide up the signal into about 64,000 parts. If it was used with a transducer across 100 degrees a theoretical accuracy of 1/640th of a degree would be possible. A 8 bit ADC would divide into 255 parts so better than 0.5 degrees accuracy which would be good enough for a lot of general purpose temperature measurements. Level 1 candidates will not be expected to know about how data recording works but it could be useful background for some for Level 2. Using software such as Audacity to record audio data effectively and outputting it to appropriate file formats is typical of what is required. Being able to relate the size of the data file recorded to the length and quality of the recording will be useful too. Most technical problems arising from data capture are due to a lack of understanding of file sizes and file types. The more experience candidates can get of this, the more confident they will become in unfamiliar contexts.

1.3 I can find patterns in data

Candidates should be able to see patterns in their data and in simple cases relate them to physical effects.

Evidence: from assessor observation and content of learner portfolios.

Additional information and guidance

In the case of audio recording candidates should see that the amplitude of the signal is related to the loudness of the sound and that shorter wavelengths are associated with higher pitch. Other patterns might include variations in brightness e.g. measuring light intensity over a day and night. The exact examples are up to the assessor to provide but candidates should gain
enough experience to relate simple patterns to physical circumstances in unfamiliar settings.

1.4 I can present data effectively

Candidates should be able to present data in tables and graphical forms subject to guidance in keeping with level 1 qualifications.

Evidence: From content of learner portfolios.

Additional information and guidance

Candidates should be regularly reminded of how easy it is to misrepresent data. They should be guided to present simple data informatively with the emphasis on clarity and objectivity in straightforward situations. An example might be to present simple information in a web page by combining the output from a chart drawing program or spreadsheet with text in a content management system web page. The subject could be showing the time they spend each week in different lessons, the number of people in their class who have a birthday in a particular month, the results of a scientific investigation. Try to avoid stereotyping the word presentation with particular proprietary software brands and giving the impression that one piece of software can be used to do everything. Part of the learning process is to develop flexibility in using and combining different applications and so even if it is possible to use a single software resource is is desirable to combine several simpler tools. Issues that arise in data transfer and compatibility will provide useful learning to make the candidates more able to transfer their learning to new and unfamiliar circumstances.

1.5 I can meet the needs of other people

Candidates should be able to present data in tables and graphical forms subject to the structure and guidance in keeping with level 1 qualifications.

Evidence: From assessor observations and learner portfolios

Additional information and guidance

Candidates should use a brief to produce something that is useful to other people. They should be encouraged to combine applications to do this and the work can include programming or scripting. This is an opportunity to undertake a small scale project that can support this and other learning outcomes. Software is becoming increasingly capable of “guessing” user needs. Mobile devices are increasingly “context aware” so for example, when you are standing next to a bus stop the device senses it and can automatically display the timetable on the screen along with how long until the next bus arrives. This can be related also to criteria for data logging as it is all the same principle. While at level 1 it is not realistic to expect candidates to program context awareness into their applications they should be aware of it as a sophisticated application of what is actually quite an old technological concept. It is simply enabled by much more powerful low cost and portable devices.

1.6 I can use more than one application to solve a particular problem

Candidates should be able to combine at least two applications in achieving a solution to a particular problem or task.

Evidence: From assessor observations and learner portfolios

Additional information and guidance

Candidates should be able to provide a solution to a problem supported by at least two and preferably more applications. An example might be to use a graphic design program and an image editing program to design and prepare clip art for display in a web page. They could use noise removal in an application e.g. Audacity to clean up their sound track before adding it to their video. At this level candidates will require structured guidance in keeping with the general description of Level 1 qualifications. Other examples might be producing a newsletter using a text editor and imaging software to source the content and a different application to organise and print it.

2. The candidate will be able to create original works using digital applications

2.1 I can originate original digital information from my own imagination

Candidates should be able to originate original digital resources from a zero base.

Evidence: Assessor observations, local testing, portfolios.

Additional information and guidance

Candidates should create something original from a zero base. This could be an image designed using a vector program, rather than originating a bitmap eg from a camera, They might compose some original music or video film. The spirit of this criterion is creativity and while use of existing work is not banned where it is sensible to incorporate it, there should be a clear element of original work rather than exclusive remix of other people's work. Remix is a legitimate creative activity in its own right and it is assessed in the next criterion so the emphasis here should be on originating new material.

2.2 I can remix to create original digital information

Candidates should be able to edit and combine existing information to create something new with an element of originality.

Evidence From portfolios

Additional information and guidance

There are many good examples of remix on the web. Candidates should be aware of licensing and err on the side of caution although re-mix is an area that is not as clear cut about what is and isn’t infringing a copyright license.

2.3 I can use specific design techniques

Candidates should be able to incorporate specific design techniques in their work

Evidence: From assessor observations and portfolios

Additional information and guidance

In the case of images, specific techniques include perspective, lighting and shadows. They should combine learning from the computer science unit in handling colour and file sizes. In audio applications they should be able to remove noise and edit out unnecessary pauses in, for example speech.

2.4 I can match my work to a target audience

Candidates should make clear the type of people on whom they are targeting their original work.

Evidence: Assessor observations and portfolios.

Additional information and guidance

Two clear possible audiences are their family and younger less experienced learners. If projects are originated to support learning in younger pupils, it helps reinforce their own learning and makes the target audience clear. They can also get evaluation feedback relatively simply. The best endorsement of work is for it to be taken up to be used.

3. The candidate will be able to manage projects

3.1 I can structure a plan for a project supported by digital tools

The candidate should be able to organise a plan for a project in keeping with the general level 1 description.

Evidence: Portfolios

Additional information and guidance

Candidates will need structured support with their planning in keeping with the general level descriptor for level 1 qualifications.

3.2 I can carry out projects by linking a sequence of steps

The candidate should be able to follow a logical sequence of steps to support the execution of their project.

Evidence: Portfolios

Additional information and guidance

Candidates should be encouraged to become increasingly self-sufficient in solving their own problems as they go through the steps in their project. Working in a team is recommended. The main aim is to appreciate that projects require sequential steps and this could be related back to work on algorithms.

3.3 I can evaluate a project in terms of its strengths and weaknesses

The candidate should be able to identify strengths and weaknesses in the execution and/or outcomes of the project

Evidence: Portfolios

Additional information and guidance

Candidates should be able to identify strengths and weaknesses and it is a good idea to involve peer review in the process. Candidates should accept criticism graciously and provide constructive suggestions for improvements.

3.4 I can apply e-safety principles to my projects

The candidate should be aware of e-safety issues and be prepared to take action in keeping with the general description of level 1 qualifications.

Evidence: From assessor observations and portfolio

Additional information and guidance

Being safe online is the objective. At level 1 structured support will be necessary in some areas. Part of this criterion is the appreciation and willingness to take advice from more experienced people. E-safety is important and the best way to become safe is through guided practical experience.

3.5 I can show courage in completing a project

The candidate should demonstrate courage in persevering and making an effort to overcome difficulties.

Evidence: From assessor observations and documentation in portfolios

Additional information and guidance

The spirit of this criterion is to recognise the fact that although at level 1 structured support will be needed, candidates are expected to make an effort to overcome difficulties themselves. Real life projects require courage to complete and this is an opportunity for candidates to demonstrate this

quality.

4. The candidate will be able to respect intellectual property

4.1 I can identify licenses that are restrictive

The candidate should be able to identify copyright licenses that restrict re-use of the work

Evidence: From assessor observations, portfolios

Additional information and guidance

Try to establish the difference between copyright and licenses. It is the license that determines whether or not you can copy a work. Copyright free should be either public domain or licensed for free use. Whenever a candidate originates work technically they are the copyright owner and they can determine who can use the work and how. Many proprietary companies license work so that it can only be used if a fee is paid. These licenses are “restrictive” because they restrict the use of the work. Just to add more confusion, copyright rules are different in different countries. In general candidates should not use anything that causes them any doubt.

4.2 I can identify licenses that are liberal

Candidates should be able to identify licenses that are liberal. These are licenses where copying is allowed but there might also be some conditions.

Evidence: From assessor observations and portfolios

Additional information and guidance

The most liberal license is public domain. Work in the public domain can be freely copied. A good source of public domain clip art is www. openclipart.org. Your students can contribute and become famous artists! There are many liberal licenses for software too. The BSD license and Apache Software Foundation licenses allow you to do just about anything with the software as long as you respect the trademarks. The GPL is liberal but also requires you to use the same license for works you derive from GPL licensed work. Linux is probably the best known product licensed with the GPL. Creative Commons is another widely used liberal license e.g. by Wikipedia. At this level it is sufficient for candidates to understand the broad license types and to be aware enough to start checking. it is safest to use sources such as the wikimedia commons and openclipart to be sure to be working legally. There is usually no need to “pirate” software because perfectly good free and legal applications are available for most major and popular tasks. Candidates need to appreciate this and be supported in finding suitable applications themselves.

4.3 I can ensure my work contains only appropriately licensed content

The candidate should use peer review and quality assurance review to identify risk in using inappropriately licensed information.

Evidence: Assessor judgements and portfolios.

Additional information and guidance

Whenever candidates get information - text, images, video, audio - to use as part of their work they should acknowledge the source and b) question whether or not what they are doing is legal. At level 1 they will need structured support and constant reminders. The objective here is to ingrain the questioning of the rights to use copyright material so that it becomes a routine part of working. They should appreciate that it is a lot less hassle to go to known sources of work that is licensed for free use. If they can’t find what they need there, is it worth paying for it? Assessors should be vigilant in ensuring candidates do not have inappropriately licensed material in their portfolios.

4.4 I can find open source equivalents for many proprietary software applications

Candidates should be able to identify open source equivalents to the most popular proprietary productivity tools.

Evidence: From assessor observation and portfolios

Additional information and guidance

The aim here is to engender informed choice. Mostly people use software applications that are popular because they have never tried anything else. There is no obligation to use Open Source Applications but if you have never done so how do you know whether they are useful or not? The most obvious applications are OpenOffice.org/LibreOffice in place of MS Office, Inkscape as a replacement for Fireworks, Illustrator, Corel Draw, Serif Draw etc. GIMP as a replacement for Photoshop, Audacity for sound recording programs. There are also free resources on the internet that while free of charge are not Open Source. Google Docs is a good example of this. A list of popular open source applications is here [4]. The recommendations from central government are here [5].

Moderation / Verification

The assessor should keep a record of assessment judgements made for each candidate and make notes of any significant issues for any candidate. They must prepared to enter into dialog with their Account Manager and provide their assessment records to the Account Manager through the online mark book. They should be prepared to provide evidence as a basis for their judgements through reference to candidate e-portfolios and through signed witness statements associated with the criteria matching marks in the online mark-book. Before authorizing certification, the Account Manager must be satisfied that the assessors judgements are sound.

Links
[1] http://theingots.org/community/Computing_qualification_info_units
[2] https://theingots.org/community/sites/default/files/uploads/site_icons/handbook-computing-L1-L2.jpg
[3] https://inkscape.org/en/download/
[4] http://sourceforge.net/directory/os%3Alinux/freshness%3Arecently-updated/?page=1&_pjax=true
[5] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/78964/Open_Source_Options_v2_0.pdf