Schools ITQ - Unit 25 - Developing Computer Games and Puzzles (Gold 4 credits)

Relevant LINKS

BACK TO ITQ UNITS **[1]**

Handbook home page **[2]**

Overview

The candidate can plan and execute a working game or puzzle design using standard methods of development such as story boards and decision making processes for continuity and flow. They will also employ graphics and animation skills.

This unit is for students who would like to explore the processes and tools used in creating animations for games and puzzles. They will need to understand how animation graphics and constructed and acted upon, as well as understand that games are effectively stories. They may need to modify existing games to demonstrate their skills and understanding.

Example of context – making a short game to explain one of their school based subjects such as a game for students to choose their options for KS4. Making it fun and engaging.

Activities supporting the assessment of this award **[3]**

Example of work at this level **[4] (coming soon)**

Assessor's guide to interpreting the criteria

General Information

QCF general description for Level 2 qualifications

- Achievement at QCF level 2 (EQF Level 3) reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgement subject to overall direction or guidance.
- Use understanding of facts, procedures and ideas to complete well-defined tasks and address straightforward problems. Interpret relevant information and ideas. Be aware of the types of information that are relevant to the area of study or work.
- Complete well-defined, generally routine tasks and address straightforward problems. Select and use relevant skills and procedures. Identify, gather and use relevant information to inform actions. Identify how effective actions have been.
- Take responsibility for completing tasks and procedures subject to direction or guidance as needed.

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Requirements

- Standards must be confirmed by a trained Gold Level Assessor or higher
- Assessors must at a minimum record assessment judgements as entries in the on-line 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 e-portfolios and on-line 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 2 learner 40 hours of work to complete.

Assessment Method

Assessors can score each of the criteria N, L, S or H. N indicates no evidence. L indicates some capability but some help still required. S indicates that the candidate can match the criterion to its required specification. H indicates performance that goes beyond the expected in at least some aspects. Candidates are required to achieve at least a S on all the criteria to achieve the full award.

Expansion of the assessment criteria

1. The candidate will understand the principles of graphics animation

1.1 I can work out the memory needed to store an image from its dimensions and colour depth

At the simplest level this is knowing that images have a memory footprint and this can be worked out by knowing the dimensions.

Evidence: will be provided directly from worked examples from students. Perhaps creating a table of values for some of the more common values.

Additional information and guidance

A basic 800 x 600 image that has 24 bits of colour per pixel would require 1.44MB to store it. That is 800 x 600 pixels = 480,000 and each pixel requires 3 bytes (24 bits), so 1,440,000 bytes to store that image. If this was then turned into a video for animation, the UK system uses 25 frames per second (fps), the US 30 fps. Some games run at 60fps. At 25fps there would be a need to deal with 25 x 1.44MB per second, so 36MB second. This date would need to be managed by the computer system.

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1.2 I can use coordinates to locate an image on a screen with precision

Evidence of using the tools available with software to precisely place objects when designing.
Evidence: Directly from their write ups and the finished product.

Additional information and guidance

Animation is representing reality and as we perceive reality it needs to be exactly how we expect. Therefore, if characters do not move fluidly, it will spoil the experience. Using precision measuring and placement tools will ensure that the animations and characters move in a natural way and do not jitter like a 1920s Disney cartoon. It might be useful to have some practice exercises in placing objects to make sure that the skills are acquired before final development runs.

1.3 I can animate an image by using a simple loop to plot its position at successive coordinates across a screen including curves

Candidates show evidence of simple animation techniques which they can latter build upon.

Evidence: Plans documented on web pages or in document files.

Additional information and guidance.

All designs will be a succession of ever more complex and sophisticated actions as the learners gather more skills and confidence. At this point, they need to show an awareness of simple motions and actions. Many animators start out with a simple bouncing ball that moves across the screen. It sounds quite simple but involves some complex actions of squashing and expanding of the ball as it hits the ground and extending and distorting as it bounces back up again, as well as a decreasing arc as it loses energy to the ground, friction and gravity. Playing it with a loop will allow it to be viewed in motion and to enable the candidates to see and strangeness in the motion.

1.4 I can explain the role of persistence of vision in image animation

Candidates should be able to comfortably explain this phenomenon and how it relates to their work.

Evidence: Reflective notes or a write up in their overall documentation.

Additional information and guidance

This is an important element of animation as it means that work can be reduced somewhat. The brain retains some of the information it sees as long as it is consistent with what went before, therefore an animation can be made up of 6 or 12 images per second meaning that an animation can consist of just 6 drawings that change per second (with a fixed background), even though the video sequence is running at 30 or 60 frames per second. There is a useful physical demo to demonstrate the notion here [5].

2. The candidate will understand decision making in a games program

2.1 I can describe two ways of making a decision in a computer program

Computer games and puzzles are all about making decisions. Even complex games are a series of choices that lead to actions.

Evidence: will be provided by a written paragraph describing what decisions are made and how they might be used.

Additional information and guidance

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At the most simple level, a computer needs to be told what to do. It can only really deal with off or on, yes or no, but it is possible to build these binary choices into more complex forms through logic. If you have a number of choices, the computer can be told to carry out action D, only if the answer to question A and B is yes and C is no, for example. This simple matrix would allow at least 6 different options.

A	B	C	D
No	No	No	Choice 1
No	No	Yes	Choice 2
No	Yes	Yes	Choice 3
Yes	Yes	Yes	Choice 4
Yes	No	No	Choice 5
Yes	Yes	No	Choice 6

Further complexity can also be built in with the use of the Else and If and Do While functions. Do A while B is happening, or do A else do B.

Some understanding of these choice patterns needs to be demonstrated by the candidates.

2.2 I can explain the role of decisions in preventing iterative loops carrying on forever
Candidates should be able to demonstrate they can understand the need for closure in their games and puzzles.

Evidence: Direct observation and dialogue with the assessor, ePortfolio or other evidence pages.

Additional information and guidance

In some instances, it may be easily possible to create a game which has no definite ending. The character might go around in a circle and never stop. Depending on the design, this might not be an issue, but in most cases candidates should know to build in a limit to the activity loops so that there are no more than say 10 iterations before another action happens. A classic example in a shoot em up game might be that the bad characters need to be hot 3 times in order to be eliminated from the game, unless the game is about zombies, but if they can not be eliminated, then where is the game?

2.3 I can write a practical game or puzzle program that requires at least three user decisions
Candidates should create a basic game of puzzle with these characteristics.

Evidence: The working of the game or puzzle of assessor observations.

Additional information and guidance

The candidate will likely make a game with many more decisions, but the minimum number expected here is three. In a very simple implementation this might be an interactive command line game that asks users for 3 different pieces of information about themselves before giving them some answer, such as a future guessing game, "based on your age, interests and gender, I predict you will be an engineer".

3. The candidate will use story boards to make games specifications

3.1 I can devise a set of story boards for a simple game or puzzle
The candidate should be competent enough to draft a storyboard of the main action of their game or puzzle.

Evidence: Pages created or scanned. Assessor observations.

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Additional information and guidance

All animators use a storyboard and even some of the most sophisticated movies from Pixar and Studio Ghibli start out as a simple sequence of drawings. It is the best way to begin to bring your ideas to life and imagine some of the scenes or activities taking place. It also allows you to think about what else might be needed and what resources could be an issue. Candidates can scan their drawings in order to submit them for moderation. There are some online options [6], though they may cost money.

3.2 I can evaluate the story board plan for a computer game giving constructive feedback

The candidate should be able to reflect on their own story or their class colleagues in a constructive way.

Evidence: Reflective journal entries or assessor observations.

Additional information and guidance

Working with other people's ideas is a great way to learn new ideas and skills and to share best practices. Candidates should be able to look at their completed storyboard and make some comments and observations about its suitability and how good a story it might be. They should also allow others to do this for them. In many film companies there will be an editor who looks over the stories and looks for issues, but the candidates will be doing both roles. Sometimes you will see things in other people's work, or they in yours, which was missed.

4. The candidate will modify existing games code to make changes to a game

4.1 I can modify an existing game or puzzle to make a new game play
The candidate should be able to work with existing material and be competent enough to change it.

Evidence: Web pages or documents showing a process of modification and the reasons for it.

Additional information and guidance

Not all work is an original piece and the art of remix is popular in animation. Some modification of an existing game or puzzle, documenting the reasons why it was needed or the purpose, will show a wider appreciation from candidates of the world of games and puzzles and how they function. In some cases, it may be harder to modify an existing game than to create a new one.

4.2 I can explain copyright and licensing related to modifying source code
The candidate should be able to explain th main laws they will be working within.

Evidence: Web pages or documents providing their evidence of the laws they are using in their work.

Additional information and guidance

Since there might be a lot of remixing in the candidates work, they need to be clear about what they can copy and what is free to copy and remix. If they create an original game for themselves, they will probably need to license it. What license do they apply and why. There may be an automatic licenses applied as part of the software they use, do they know what it is?

4.3 I can identify and fix bugs in the code of games or puzzles
The candidate should be able to trouble-shoot their work.

Evidence: Web pages and documents, or assessor feedback, of problems being identified and

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fixed.

Additional information and guidance

It is likely that there are many different kinds of problems encountered while making their work and all of these need to be documented and commented upon. There could be problems with the way action happens because of the wrong kind of command, or the speed of the action. The characters might not react as they are supposed to because of typos in the commands.

Moderation/verification
The assessor should keep a record of assessment judgements made for each candidate guided by the above guidance. Criteria should be interpreted in the context of the general descriptors of QCF Level 1 qualifications. They should make notes of any significant issues for any candidate and be in a position to advise candidates on suitable routes for progression. They must be prepared to enter into dialogue with their Account Manager and provide their assessment records to the Account Manager through the on-line mark book. They should be prepared to provide evidence as a basis for their judgements through reference to candidate e-portfolios. Before authorising certification, the Account Manager must be satisfied that the assessors judgements are sound. In the event of missing evidence, the assessor will be requested to gather appropriate information before the award can be made.

Source URL: https://theingots.org/community/sil2u25x

Links
[1] http://theingots.org/community/ITQ_unit_development
[2] http://theingots.org/community/handbook2
[3] http://www.theingots.org/community/ITQcourse1
[4] https://theingots.org/community/sites/default/files/uploads/user4/PupilFNC7.pdf
[5] http://www.exploratorium.edu/snacks/persistence_of_vision/index.html
[6] https://www.storyboardthat.com/

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