Higher National Unit specification

General information

Unit title: 2D Animation for Games (SCQF level 7)

Unit code: HH38 34

Superclass: CB

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Version: 02

Unit purpose

The purpose of this Unit is to enable learners to develop skills in the creation of 2D animated sprites for use within a computer game. This Unit covers a wide range of 2D animation concepts and techniques and how they can be applied in a games context. Learners will use 2D animation software packages to create 2D game sprites and apply animation sequences to them.

The Unit is suitable for learners who have limited or no experience of using animation packages and wish to gain or enhance their knowledge and skills in the use of animation within a games development context.

Outcomes

On successful completion of the Unit the learner will be able to:

1 Explain key animation concepts and techniques within the context of games development.
2 Plan the creation of 2D animated game sprites.
3 Create 2D animated game sprites.

Credit points and level

1 Higher National Unit credit at SCQF level 7: (8 SCQF credit points at SCQF level 7)

Higher National Unit specification: General information (cont)

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Recommended entry to the Unit

Access to this Unit is at the discretion of the centre. However it is recommended that learners should have basic competency in the use of modern computer operating systems and software packages. It would be advantageous if they have completed a relevant National Progression Award or Nation Certificate award at SCQF level 5 or 6, such as the NPA in Computer Games Development or the NC in Computer Games Development at SCQF level 5.

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Complete Core Skill	None
Core Skill component	Critical Thinking at SCQF level 5 Planning and Organising at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit specification.

Context for delivery

The Unit sits within the Content Selection section of the HNC and HND Computer Games Development Group Award from which 1 credit minimum is required. It is anticipated when this Unit is delivered as part of the Group Award, that learners will create 2D graphic assets inside other Units within the Group Award, that can be used in the creation of 2D game sprites for this Unit. However, it may also be delievered as a standalone Unit, where the graphic assets can be either sourced or created.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website **(http://www.sqa.org.uk/sqa/46233.2769.html)**.

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**.

Higher National Unit specification: Statement of standards

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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.

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. Learners 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

Explain key animation concepts and techniques within the context of games development.

Knowledge and/or Skills

- Animation timelines
- Frames and key frames
- Motion Tweening
- Shape Tweening
- Deformation
- Frame rates
- Iteration
- Inverse and forward Kinematics in animation
- Sprite sheets
- 12 basic principles of animation

Outcome 2

Plan the creation of 2D animated game sprites.

Knowledge and/or Skills

- Appropriate methods for planning game sprites
- Sourcing digital graphics
- Media requirements

Outcome 3

Create 2D animated game sprites.

Knowledge and/or Skills

- Creation of game sprites using appropriate software
- Animating game sprites using appropriate software
- Creation of animated sequences using appropriate software
- Exporting animated sequences to appropriate file formats

Higher National Unit specification: Statement of standards (cont)

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Evidence Requirements for this Unit

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills across all Outcomes.

The evidence for this Unit may be written or oral or a combination of these. Evidence may be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital). Particular consideration should be given to digital formats and the use of multimedia.

Outcome 1 is knowledge based and requires that candidates demonstrate their cognitive competence.

Evidence of this may be sampled across the knowledge domain which must encompass all of the knowledge statements in Outcome 1.

Candidates must demonstrate that they will be able to:

- explain the purpose of timelines, frames and key frames within 2D animation.
- describe the use of motion tweening, shape tweening and deformation within 2D animation.
- explain how frame rates and iteration is used within 2D animation.
- describe the use of inverse and forward kinematics in animation.
- explain the use of sprite sheets in 2D animation within a games development context.
- describe the 12 basic principles of animation.

The assessment for **Outcome 1** will be closed-book. If a traditional test is used to assess the candidate's knowledge and understanding, this test should be timed and completed in a single assessment occasion ('sitting') and an appropriate pass mark should be set. Where reassessment is required, it should contain a different sample from that previously used.

Outcomes 2 and 3 require that candidates demonstrate their practical competence in their planning and creation of animated game sprites. It is recommended that a holistic approach to assessment is taken and that the practical skills required for Outcomes 2 and 3 are assessed by a single assessment instrument.

Evidence should be generated by the planning and creation of at least two game sprites. Candidates must also create at least four short animated sequences involving the game sprites they have created.

Candidates will be asked to provide the following:

- A plan for the creation of at least two 2D animated game sprites. This could take the form of a typed report, concept art, reference diagrams, storyboards or any other valid approach. It is expected that a combination of at least two approaches will be used.

Higher National Unit specification: Statement of standards (cont)

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- Media requirements for the graphics which will be used in the creation of the 2D game sprites. This should specify if the media will be sourced or created. The evidence for the media requirements could take the form of a simple word processed table, but other appropriate methods are acceptable.
- At least two game sprites created using appropriate software that will allow animation to be applied to them.
- At least four short animated sequences applied to the game sprites previously created. It is acceptable for multiple sequences to be applied to a single game sprite. For instance, if the candidate creates a humanoid game character, they could add walking and jumping animated sequences to it.
- All animated sequences exported to appropriate file formats such as a PNG sprite sheet, animated GIF or any other valid format as long as it can be used within a game. Each sequence must be exported to two separate formats.

Evidence of practical competence for Outcomes 2 and 3 may be produced over an extended period of time under open-book conditions; but where it is generated without supervision some means of authentication must be carried out.

Higher National Unit Support Notes

Unit title: 2D Animation for Games (SCQF level 7)

Unit Support Notes are offered as guidance and 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

The purpose of this Unit is to enable learners to develop skills in the creation of 2D animated sprites for use within a computer game. Learners will learn about a wide range of 2D animation concepts and techniques and how they can be applied in a games context. They will use 2D animation software packages to create 2D game sprites (these can be game characters) and apply animation sequences to them.

Learners should become familiar with at least one 2D animation package for games, such as Spine from Esoteric, Spriter from Brashmonkey, Puppet 2D for Unity or Creature from Kestrel Moon Studios. Using such packages they can look at techniques such as rigging characters for animation using bones, inverse and forward kinematics, free-form deformation, skinning, weights, bounding/collision boxes, action points, image swapping, etc. Not all of these features are available in all 2D games animation packages, so it is not a requirement that learners must cover all of them.

The Unit sits within the Content Selection section of the HNC and HND Computer Games Development Group Award from which 1 credit minimum is required. It is anticipated when this Unit is delivered as part of the Group Award, that learners will create 2D graphic assets inside other Units within the Group Award, that can be used in the creation of 2D game sprites for this Unit. The Unit Computer Games: Creating Graphics would be suitable for this. However, it may also be delievered as a standalone Unit, where the graphic assets can be either sourced or created.

Outcome 1

The primary purpose of this Outcome is that learners gain an understanding of the key concepts and techniques of 2D animation, particularly in regards to games development. This includes looking at traditional techniques, such as Disney's 12 basic principles of animation, which includes techniques for creating animation, but is also about how animation should be staging and presented. Learners must also gain knowledge and understanding of the key 2D digital animation techniques and concepts, such as timelines, key frames, motion and shape tweening. Studying examples of 2D animation in movies and games would be advantageous. Learners should reinforce their understanding of these principles by learning how to use modern 2D digital animation software applications which they will then use later in Outcomes 2 and 3 to produce their own sequences.

Higher National Unit Support Notes (cont)

Unit title: 2D Animation for Games (SCQF level 7)

Outcome 2

In this Outcome learners will plan the creation of 2D animated game sprites. They should learn about how to plan their animated game sprites using action plans, Gantt charts, concept art and storyboards.

The graphics which make up the 2D game sprites can be sourced and/or created. Learners should look at legitimate sources of graphics such as opengameart.org and other methods of acquired graphics such as gaining permission from the author or copyright holder. One valid approach to sourcing graphics is for learners to create them. Learners should list the sources of all graphics they plan to use as part of the planning process, along with their file type and purpose. It may be that if learners are creating a humanoid character that they will source the individual body parts which make up the character.

It is anticipated that learners who are doing the HNC Computer Games Development Group Award will create the graphics in a relevant graphics Unit within the Group Award. Graphics can be created using vector graphic authoring packages such as Adobe Illustrator or Inkscape or by using bitmap graphic authoring packages such as Adobe Photoshop or Paint.net.

Outcome 3

In this Outcome learners will create and animate 2D game sprites. This will include creating multiple short animated sequences for each character. As the context for these animations are games, it is expected that the sequences will consist of actions like walking, jumping, running, climbing, shooting, punching, etc.

Learners must become familiar with at least one 2D digital animation package for creating animated game characters, preferably a package suitable for use in the games industry such as Spine, Spriter, Puppet2D or Creature. In most of these packages characters can be created by attaching graphics to bones, so in the case of a humanoid character this means attaching body parts to bones, such as the character's arms, feet, head, etc. This is sometimes referred to as rigging the character. Learners can create their characters by constructing them from individual sourced graphics or from graphics they have created themselves.

Learners must also become familiar with using timelines, key frames, tweening and manipulating frame by frame (where necessary). If onion skinning/ghosting is available in the animation package being used, they should also look at how this feature can be applied.

Learners must also learn how to export animations to appropriate formats such as GIF and PNG sprite sheet for inclusion in a computer game. Animation packages such as Spine and Spriter provide runtime libraries which allow animation data to be exported and used in popular game engines like Unity and Monogame. Learners should be encouraged to investigate these features, which would allow them to export the native file formats from their chosen animation package into a game.

Higher National Unit Support Notes (cont)

Unit title: 2D Animation for Games (SCQF level 7)

Guidance on approaches to delivery of this Unit

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 in which it contributes. If taught as part of the HNC or HND Computer Games Development it is anticipated that learners will create digital graphics in other Units in the Group Award which can be used in the creation of the animated game sprites they create as part of this Unit.

The most appropriate approach to delivery of this Unit would be to utilise a holistic approach to delivery. The knowledge covered in Outcome 1 could be taught in tandem with the practical skills of Outcomes 2 and 3 thereby maximising the potential for learners to be better prepared for the Outcome 1 assessment, at the same time allowing more time to focus on the practical elements of the Unit. The animation techniques covered in Outcome 1 can be put into practice in the skills they learn from Outcomes 2 and 3.

For **Outcome 1** learners should learn about the following animation topics, these should be put into a game context whenever possible:

- Animation timelines
- Frames and key frames
- Motion Tweening
- Shape Tweening
- Deformation
- Frame rates
- Iteration
- Inverse and forward Kinematics in animation
- Sprite sheets
- 12 basic principles of animation:
  - Squash and stretch
  - Anticipation
  - Staging
  - Straight ahead action and pose to pose
  - Follow through and overlapping action
  - Slow in and slow out
  - Arc
  - Secondary action
  - Timing
  - Exaggeration
  - Solid drawing
  - Appeal

This is not an exhaustive list of all relevant topics in regards to 2D digital animation and tutors are free to cover other techniques and principles as they see fit, as well as encourage learners to study other techniques and principles.

Higher National Unit Support Notes (cont)

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In order to provide the best possible learning experience, consideration should be given to utilising a variety of methods of content delivery. These various methods could include (but should not necessarily be limited to) the following:

- Tutor-led presentations of the principles and techniques of animation.
- Videos about 2D game art and animation.
- Research tasks where learners look into certain principles or techniques and report back to the whole class. This could be done in a traditional manner or via a shared document or presentation stored on a cloud service.
- Class driven discussions allowing for peer input and positive engagement by learners, where they discuss the qualities of specific examples of 2D digital animation. For instance they may want to put forward a game which they think is an excellent example of 2D art and animation.

For **Outcomes 2 and 3** learners should spend the majority of their time learning how to create 2D game sprites and animated sequences in a 2D digital animation package, preferably a package suitable for use in the games industry such as Spine, Spriter, Puppet 2D or Creature. As suggested earlier the knowledge gained in Outcome 1 could be put into practice in the delivery of the practical skills in for these Outcomes, for instance if the topic being covered in Outcome 1 is tweening, learners could also do a practical exercise where they learn how to tween a graphic.

As part of Outcome 2 learners should learn how to plan the creation of their game sprites and animations, this should involve looking at different ways of planning their game sprites and animated sequences. They should be exposed to action plans, Gantt charts and any other suitable method for planning that the tutor thinks suitable. They should also learn about concept art and storyboards as a way of planning out and getting across their concept.

In order to provide the best possible learning experience, consideration should be given to utilising a variety of methods of content delivery. These various methods could include (but should not necessarily be limited to) the following:

- Tutor-led demonstrations, eg using a Smartboard to demonstrate inside a 2D digital animation package how to perform certain animation techniques and skills.
- Video captured demonstrations of how animation techniques and skills are applied using a 2D digital animation package. These could be shared with students via a cloud service, an online video sharing service or via a college virtual learning environment.
- Practical exercises where learners have to create game sprites and animated sequences using an appropriate 2D digital animation package. This should also include how to export the finished sprites and sequences into appropriate file formats for use within a computer game.

Higher National Unit Support Notes (cont)

Unit title: 2D Animation for Games (SCQF level 7)

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to candidates.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where candidates experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Assessment evidence is required at all stages and Outcomes. It must be documented and recorded electronically or in written/printed form, however it is encouraged to look at alternate approaches such as web blog, video blog, pod casts and even social media. Alternate approaches making use of modern technology is encouraged.

Outcome 1 is a closed-book assessment and could take the form of a set of 20 objective questions. This assessment must be carried out under supervised, closed-book conditions. It can be carried out via an on-line assessment or a paper based one.

If a centre is presenting the assessment for Outcome 1 on-line the following assessment methods, where appropriate, may be selected:

- Multiple-choice
- Drag and drop
- Multiple response
- Mix and match
- A combination of the above

Outcomes 2 and 3 require that candidates demonstrate their practical competence in their planning and creation of animated game sprites. It is recommended that a holistic approach to assessment is taken and that the practical skills required for Outcomes 2 and 3 are assessed by a single assessment instrument. Evidence should be generated by the planning and creation of at least two game sprites. Candidates must also create at least four short animated sequences involving the game sprites they have created and export them to an appropriate format. Digital submission of the final animated game sprites is recommended via a college virtual learning environment.

The evidence for these Outcomes should be generated under open-book conditions. Whether this need be under supervised or unsupervised conditions is at the discretion of the assessor and the centre; however evidence should be produced under controlled conditions whenever possible and where appropriate. Where the amount of control is low, the amount of authentication should rise. It is not acceptable to produce evidence in lightly controlled conditions with little authentication.

Authentication may take various forms including, but not limited to, oral questioning and plagiarism checks. Some forms of evidence generation (such as video recordings) have intrinsic authentication and would require no further means of verification.

Higher National Unit Support Notes (cont)

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Opportunities for 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 social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

This unit provides opportunities to develop some of the components of the following Core Skill:

- *Information and Communication Technology (ICT)* (SCQF level 6)

This Unit has the Critical Thinking and Planning and Organising components of Problem Solving embedded in it. This means that when learners achieve the Unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 5 and Planning and Organising at SCQF level 5.

History of changes to Unit

Version	Description of change	Date
02	Core Skills Components Critical Thinking and Planning and Organising at SCQF level 5 embedded.	21/02/17

General information for learners

Unit title: 2D Animation for Games (SCQF level 7)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

The purpose of this Unit is to enable you to develop skills in the creation of 2D animated sprites for use within a computer game. You will learn about a wide range of 2D animation concepts and techniques and how they can be applied in a games context. You will use 2D animation software packages to create 2D game sprites and apply animation sequences to them.

The Unit is suitable if you have limited or no experience of using animation packages and wish to gain or enhance your knowledge and skills in the use of animation within a games development context.

The Unit sits within the Content Selection section of the HNC and HND Computer Games Development from which 1 credit minimum is required. It is anticipated when this Unit is delivered as part of the Group Award, that you will create 2D graphic assets inside other Units within the Group Award, that can be used in the creation of 2D game sprites for this Unit.

In **Outcome 1** you will be required to demonstrate an understanding of the key animation concepts and techniques within the context of games development. This may be assessed by means of an assessment consisting of a set of 20 objective questions. This assessment will be carried out under supervised, closed-book conditions.

In **Outcome 2** you will plan the creation of at least two 2D game sprites. The plan could take the form of a typed report, concept art, reference diagrams, storyboards or a combination of these. You will also create a list of media requirements for the sourcing of graphics to be used in the sprites.

In **Outcome 3** you will create at least two animated game sprites with at least four short animated sequences. These sequences should be actions appropriate for games, such as walking, running, jumping, sliding, punching, etc. These sequences will be exported to a format appropriate for use within a computer game. The sprites will be created using a 2D digital animation package appropriate for creating game sprites.

Outcomes 2 and 3 will be assessed via a practical assessment carried out under open-book conditions.

This unit provides you with opportunities to develop the *Information and Communication Technology (ICT)* Core Skill at SCQF level 6.

This Unit has the Critical Thinking and Planning and Organising components of Problem Solving embedded in it. This means that when you achieve the Unit, your Core Skills profile will also be updated to show you have achieved Critical Thinking at SCQF level 5 and Planning and Organising at SCQF level 5.