Northumbria University NEWCASTLE

COURSEWORK ASSESSMENT SPECIFICATION

Module Title:	*Computer Graphics and Animation*
Module Number:	*KF6018*
Module Tutor Name(s):	*Edmond Ho, Hubert Shum*
Academic Year:	*2018-2019*
% Weighting (to overall module):	*50%*
Coursework Title:	*Interactive Computer Graphics Application with Natural User Interface*
Average Study Time Required by Student:	*54 study hours*

Dates and Mechanisms for Assessment Submission and Feedback

Date of Handout to Students: *Monday 4th February 2019*
Mechanism for Handout to Students: *via Blackboard*
Date and Time of Submission by Student: *Friday 10th May 2019 by 16:00*
Mechanism for Submission of Work by Student: *via Blackboard*
Date by which Work, Feedback and Marks will be returned to Students: *Will be available in the week commencing on the 27th May 2019.*
Mechanism for return of assignment work, feedback and marks to students: *via Blackboard Grade Centre and email*

Module Learning Outcomes Assessed:

This assignment involves the production of a portfolio of items related to the development of a computer animation application for a given problem. These will include a report analysing the problem, the application and an evaluation of its appropriateness. The following module learning outcomes will be assessed:

1. Demonstrate knowledge and understanding of computer graphics and animation techniques and algorithms
2. Design and implement a computer animation application utilizing appropriate techniques and algorithms
3. Critically evaluate the effectiveness and appropriateness of computer graphics and animation techniques and algorithms for a given problem
4. Demonstrate independent research skills in computer graphics and animation issues

The Tasks

This assignment contains an implementation part and a report part. Students are requested to form a team with up to 4 members (less than 4 members in exceptional situations, approval by module tutors required) to complete this assignment.

In the implementation part, the students are asked to develop an interactive computer graphics application using WebGL. Each group is free to explore the areas of your own interest and develop an interactive application for evaluating the performance of the user through a Natural User Interface, and Kinect is the provided equipment for this module. For example, you may develop an application to evaluate the dancing skills of a user by capturing the body movement of the user using Microsoft Kinect and visualize the results (analysis on the performance) using Kinect and WebGL. You are encouraged to discuss your application ideas with your tutors and get feedback.

In the report part, the students are asked to write a short report in point form to point out the features implemented in the computer graphics application.

Requirements

For the implementation part, the interactive computer graphics application should contain the elements below:

- Basic rendering elements (shading, lighting)
  The quality of the rendering and the complexity of the techniques are considered
- Application on motion analysis for the designed application with a motion sensing device, i.e. Microsoft Kinect
  The quality of the implemented motion analysis algorithms and how appropriate they are for the desired application
- Feedback to the user
  The quality of the visualization of the detected motion so as to feedback to the user.
- Advance use of the motion sensing device, i.e. Microsoft Kinect
  The quality of the tracking accuracy using advanced algorithms, as well as the quality of the human-computer interaction

To get the best score, you will need to demonstrate your ability to go beyond expectations. This includes, but not limited to, introducing your own innovate ideas that are relevant to the elements mentioned, researching into relevant topics by yourselves and adapting such ideas into your implementation, etc. Typically, going beyond expectations will probably involve extra study. If you have implemented anything extra, you should document them in the report such that the grader can consider them. There are plenty of learning materials and tutorials on relevant topics, such as:

https://threejs.org/
https://kinectron.github.io/docs/intro.html
https://developer.mozilla.org/en-US/docs/Web/API/WebGL_API/Tutorial

Important: The program must be run-able. A program that cannot be started will have no mark at all. Furthermore, marks will be reduced if the program is not stable (e.g. crashes) or not efficient (e.g. high computation cost per frame), which demonstrate low quality source code.

For the report part, all students in the team are asked to prepare a joint report in a Microsoft Word format with a page limit of 2 pages. The report should list out, in a point-by-point format, the features they implemented in the application. The document should consist of the 5 main sections of the application (i.e. rendering elements, motion sensing features, user performance analysis, visual feedback, student's proposed features for each of the members). In each of the sections, a point list of items implement should be provided. For the sections student's proposed features, the students should explicitly specify student in the team handled which section.

Important: It is possible for students to borrow open-source program code from online tutorials and examples into their application. However, marks will only be given if the students demonstrate a full understanding of the code they used. The student must:
- Comment the source code with own words in details to demonstrate understanding
- Reference the source of the code and the part it is used in the application in the report
Failure to do so will result in no mark at all and also result in academic misconduct proceedings. The tutors may interview students to test their understanding of the borrowed source code for grading the assignment if needed.

Submission:
The four students in the team should prepare a ZIP file that consists of:
- A run-able application
- The source code of the application
- The report in a Microsoft Word format

The file name of the ZIP file must be in the following format:
KF6018_A2_w12345678_w23456789_w34567890_w45678901, in which w12345678, w23456789, w34567890, w45678901 are example student IDs of the four students in the team.

All students should submit the same ZIP file. Each of the members of the team should upload the ZIP file onto their own submission slot. In case the students submit different versions of ZIP files, the tutors will only grade one version and ignore the other one.

Mark Distribution:
- Basic rendering elements – (10%)
- Application on motion analysis for the designed application with a motion sensing device, i.e. Microsoft Kinect
    - The complexity and the variety of motion analysis implemented (15%)
    - The appropriateness of the analysis for the selected application domain (15%)
- Feedback to the user – visualization of the results
    - Clarity of the information (feedback) in the visualization (15%)
- Advance use of the motion sensing device, i.e. Microsoft Kinect
    - Accuracy (15%) – whether the algorithms enable the motion-sensing device to obtain and understand user movement accurately, algorithms implemented to minimize the impact of inaccurately tracked joints/postures
    - Interactivity (10%) – the performance of the application in terms of real-time performance, the latency between the user performance and results visualization, the creativity and effectiveness of the human-computer interaction design
- Individual contributions (20%)
    - The features proposed by each team member, for that student only

All students in the team receive the same marks for all items above except the last one. For the Individual contributions, each student of the team receives an individual mark. As a result, the total mark for each student is 100%.

The report carries no mark by itself; however, the report is essential for the tutors to understand what has been implemented. It is the responsibilities for the students to tell the tutor what they have implemented in the report in order to receive marks. Failure to produce an organized report may result in features not being graded.

Marking Scheme:

Criteria required for this task are listed above. Marks will be given to each sub-tasks according to the correctness and completeness of the functionality listed in the requirements.

Opportunities for Feedback and Final Feedback Form
During each seminar session, formative activities and discussions will occur on how the learning you're undertaking on how to carry out your investigation and develop your report can both support and evidence successfully meeting the module learning outcomes (listed above). Informal one-to-one feedback may also be requested via a pre-arranged meeting.

Unmoderated marks and feedback for your final report will be returned to you approximately 20 working days after the final given submission deadline.

Academic Misconduct

You must adhere to the university regulations on academic conduct. Formal inquiry proceedings will be instigated if there is any suspicion of plagiarism or any other form of misconduct in your work. Refer to the Northumbria Assessment Regulations for Taught Awards. if you are unclear as to the meaning of these terms. The latest copy is available on the University website.

Where you have used someone else's words (quotations), they should be correctly quoted and referenced in accordance to the Harvard System. Help regarding referencing can be found at: http://www.northumbria.ac.uk/sd/central/library/resources/referencing/

For guidance on avoiding plagiarism see
- Pears, R. & Shields, G. (2013) Cite Them Right: the essential referencing guide, 9th edn. Basingstoke: Palgrave Macmillan.
- There's also Cite Them Right Online. Palgrave Macmillan (2016) Cite Them Right Online. http://www.citethemrightonline.com/
- http://www.northumbria.ac.uk/studentaz/survival/plag/
- http://www.northumbria.ac.uk/static/5007/llspdf/skills/referencing.pdf

Failure to submit: The University requires all students to submit assessed coursework by the deadline stated in the assessment brief. Where coursework is submitted without approval after the published hand-in deadline, penalties will be applied as defined in the University Policy on the Late Submission of Work; please refer to the link below.

- https://www.northumbria.ac.uk/static/5007/arpdf/lateappr

Marking Criteria

Mark	Assessment Criteria
70%+	Excellent work providing evidence to a very high level of the professional and technical knowledge, understanding, and skills appropriate computer forensic investigation, evidencing and documentation. All learning outcomes met, most at an excellent level. Marks towards the high end of this range indicate outstanding work where all learning outcomes have been met to an excellent level. Excellent in all (or most of) the following criteria: - appropriate identification, evaluation and selection of appropriate of tools and techniques for the detection and prevention of digital crime; - detailed analysis and application of appropriate computer network and forensic tools; - preservation of evidential integrity whilst analysing, evaluating and interpreting digital evidence; - evidence and application of appropriate legal knowledge and procedural principles; - technical and professional understanding and knowledge of standards required; - communication and presentation of investigative findings suitable for court of law; - use of high-quality up-to-date information sources; - evidence of independent learning.
60-69%	High-quality work providing evidence to a high level of the professional and technical knowledge, understanding, and skills appropriate computer forensic investigation, evidencing and documentation. All learning outcomes met, with many or most at a very good level.

	Very good in all (or most of) the following criteria: • appropriate identification, evaluation and selection of appropriate of tools and techniques for the detection and prevention of digital crime; • detailed analysis and application of appropriate computer network and forensic tools; • preservation of evidential integrity whilst analysing, evaluating and interpreting digital evidence; • evidence and application of appropriate legal knowledge and procedural principles; • technical and professional understanding and knowledge of standards required; • communication and presentation of investigative findings suitable for court of law; • use of high-quality up-to-date information sources; • evidence of independent learning.
50-59%	Satisfactory work providing evidence of the professional and technical knowledge, understanding, and skills appropriate computer forensic investigation, evidencing and documentation. All learning outcomes met, some to a good level. Satisfactory or reasonably good in all (or most of) the following criteria: • appropriate identification, evaluation and selection of appropriate of tools and techniques for the detection and prevention of digital crime; • detailed analysis and application of appropriate computer network and forensic tools; • preservation of evidential integrity whilst analysing, evaluating and interpreting digital evidence; • evidence and application of appropriate legal knowledge and procedural principles; • technical and professional understanding and knowledge of standards required; • communication and presentation of investigative findings suitable for court of law; • use of high-quality up-to-date information sources; • evidence of independent learning.
40-49%	Adequate work providing evidence of the professional and technical knowledge, understanding, and skills appropriate computer forensic investigation, evidencing and documentation but at a minimum threshold level. All learning outcomes are met to the threshold level (or are nearly met and balanced by strengths elsewhere). Adequate in all of (or most of, with balancing strength elsewhere) the following criteria: • appropriate identification, evaluation and selection of appropriate of tools and techniques for the detection and prevention of digital crime; • detailed analysis and application of appropriate computer network and forensic tools; • preservation of evidential integrity whilst analysing, evaluating and interpreting digital evidence; • evidence and application of appropriate legal knowledge and procedural principles; • technical and professional understanding and knowledge of standards required; • communication and presentation of investigative findings suitable for court of law; • use of high-quality up-to-date information sources; • evidence of independent learning.
0-39%	Work is not acceptable in providing evidence (or shows no evidence) of the professional and technical knowledge, understanding, and skills appropriate computer forensic investigation, evidencing and documentation. None or only some of the learning outcomes are met. Inadequate in some of the following aspects or seriously inadequate in at least one of the following criteria:

	- appropriate identification, evaluation and selection of appropriate of tools and techniques for the detection and prevention of digital crime; - detailed analysis and application of appropriate computer network and forensic tools; - preservation of evidential integrity whilst analysing, evaluating and interpreting digital evidence; - evidence and application of appropriate legal knowledge and procedural principles; - technical and professional understanding and knowledge of standards required; - communication and presentation of investigative findings suitable for court of law; - use of high-quality up-to-date information sources; - evidence of independent learning. OR Work not submitted. OR Work gives evidence of serious academic misconduct.