UNIVERSITY OF LINCOLN

Lincoln School of Computer Science

Assessment Item Briefing Document

Title: CGP3012M Physics Simulation, Assessment Item One, Coursework	**Indicative Weighting: 30%**

Learning Outcomes:

On successful completion of this assessment item a student will have demonstrated competence in the following areas:

- [LO2] analyse and evaluate computational performance and accuracy of real-time simulation algorithms;
- [LO3] demonstrate practical skills in applying real-time physics algorithms by the use of middle-ware products.

Requirements

In this assignment, you are required to develop, design, implement and evaluate a hybrid of Rugby and Medieval Fantasy game written in C++ and PhysX. The game should feel like contemporary Rugby with respect to the sport and physics (e.g. gameplay rules, kicking functionalities, dimensions and aspects of the play field and ball, scoring mechanics), whilst including elements of Medieval Fantasy (e.g. weaponry, battles, jousting, transportation, trap mechanics, etc.).

The minimal implementation of your Fantasy Medieval Rugby game should consist of implementing a *Rugby Free Kick,* which includes a playfield, a halfway line, a rugby ball, a player-controlled foot/character/medieval machinery ball-kicking mechanic, a goal, and some player feedback upon successfully scoring a goal.

Beyond the minimal requirements, you should consider improving your game with more contemporary Rugby and Medieval Fantasy mechanics (e.g. accurate Rugby physics, additional gameplay rules, ball kicking/passing controls, etc.), game objects geometry (e.g. dimensions, shape, etc.), physical parameters (e.g., mass, etc.), and physics modelling (e.g., collision handling, forces, etc.). You should also consider expanding the playfield with advanced elements such as artificial static obstacles (e.g. tunnels, ramps, traps, other standing players, bumpers, etc.), moving obstacles (e.g. hinges, traps, simple AI-controlled characters, etc.) and different playing surfaces (e.g. materials, carpet, turf, concrete, sand, etc.). You may go beyond the basic requirements of this assignment and explore programming capabilities and techniques of your own interest!

Additional credit will be granted for the creative use of advanced PhysX functionalities including compound shapes, materials, joints, motors, triggers, filters, collisions groups, etc. A careful consideration of physical models and parameters in context of Rugby and Medieval Fantasy is an important criterion.

A full 3D visualisation of the game is not critical. Graphic display, rendering, and camera movement can be based on the default debug renderer that was used during the workshop sessions.

Furthermore, you will have to use your Fantasy Medieval Rugby game to evaluate and analyse the computer performance of the simulation algorithms. In the evaluation, as a minimum you should

implement a metric indicating computational performance of your simulation. Furthermore, you should consider one or more test cases which include conditions or variables under which you determine whether your Rugby game's simulation algorithms are performing as expected. This includes valid test cases (e.g. typical gameplay situations, etc.) and invalid test cases (e.g. multi-ball, multiple instances of the game in the same window, crowded playing area, changing update steps, etc.). This aspect will be assessed during a live in-class demo in which you will present the functionality of your implementation but also present the evaluation results.

Useful Information

This assessment is an individually assessed component. You will be required to demonstrate your developed code during a dedicated workshop session in the computing labs. Only the submitted code will be considered during demonstrations so further developments occurring after the deadline will not be taken into account. Non-attendance at the scheduled demonstration session will automatically result in zero mark for this assessment item. The demonstration date and further details will be provided during lectures.

Please note that you are only required to create one Rugby fantasy playfield/level for this assignment. Game and PhysX functionalities that are demonstrated in additional playfields will not be marked nor taken into consideration for this assessment.

Please make sure you have a clear understanding of the grading principles for this component as detailed in the accompanying Criterion Reference Grid. If you are unsure about any aspect of this assessment component, please seek the advice of a member of the delivery team. Please also make sure you are aware about university regulations around plagiarism.

Submission Instructions

The deadline for submission of this work is included in the School Submission dates on Blackboard.

You must make an electronic submission of your work by using the assessment link on Blackboard for this component. All developed code should be submitted as a single ZIP file. It is important that you check that your .ZIP file decompresses to a Visual Studio project that can be directly built and executed on the computers in the computing labs. This will be required during the final demonstration of your work. There is no written report required for this submission.

DO NOT include this briefing document with your submission.