



# LIT

DEPARTMENT OF  
INFORMATION TECHNOLOGY

**Semester:** Semester 2 (Summer 2016/17)

**Date/Time:** Friday 5<sup>th</sup> May 2017, 2 PM – 4 PM

**Programme:** Bachelor of Science (Honours) in Computing (Games Design and Development)

**Stage:** 4

**Module:** DIGITAL GAMES ARTIFICIAL INTELLIGENCE

**COMP 8007**

**Time Allowed:** 2 hours

**Instructions:** Attempt any four (4) questions

**Additional Attachments:** None

**External Examiners:** Derek O'Reilly

**Internal Examiners:** Janice O'Connell, Eugene Kenny

**Question No. 1****(25 Marks)**

- (a) Outline with aid of a diagram the basic structure of a games artificial intelligence engine. (8 marks)
- (b) In *Execution Management*, describe how a frequency based scheduler divides up available time amongst various AI tasks in a game. (8 marks)

What problems occur with this approach?

- (c) Outline three approaches for dividing available time among *Interruptible AI* tasks. (9 marks)

**Question No. 2****(25 Marks)**

- (a) What is the difference between *Kinematic movement* and *Dynamic movement*? (5 marks)
- (b) How is *Collision Avoidance* implemented using *Separation movement* behaviours? What problems can occur and how can they be handled? (10 marks)
- (c) Describe how *Flocking* is implemented using a *Boids model*. (10 marks)

**Question No. 3****(25 Marks)**

In *Pathfinding*, planning a path is often reduced to a graph search problem by:

1. Constructing a graph representing the planning problem
2. Searching the graph for a (hopefully, close-to-optimal) path

Show how a graph can be constructed by *Approximate Cell Decomposition* and describe any problems with this approach. How can these problems be overcome?

**Question No. 4****(25 Marks)**

Describe in detail three techniques that can be used to support *decision making* in computer games.

**Question No. 5****(25 Marks)**

- (a) *Action Prediction* attempts to predict the future actions of a player based on past actions. Outline two methods for achieving this. (12 marks)
- (b) Outline three uses for *Tactical Locations* in Strategic AI in games. (13 marks)