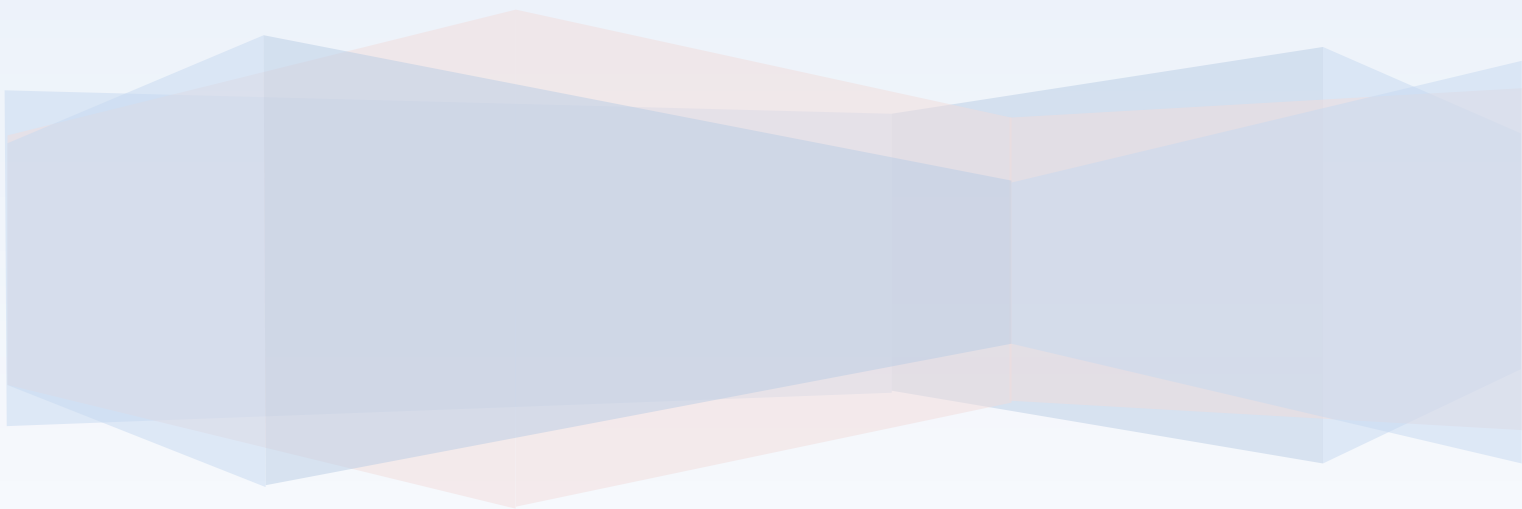# COS30002 Artificial Intelligence for Games

Semester 1, 2023
Learning Summary Report

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Declaration

I declare that this portfolio is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part of this submission been written for me by another person or software service.

Signature: Ben Holmes

Self-Assessment Details

The following checklists provide an overview of my self-assessment for this unit.

	Pass (P)	Credit (C)	Distinction (D)	High Distinction (Low HD)	(High HD)
Self-Assessment (please tick)	✓				

Self-assessment Statement

	Included? (tick)
Learning Summary Report	✓
Complete Pass ("core") task work, approved in Canvas	✓

Minimum Pass Checklist

	Included? (tick)
Additional non-core task work (or equivalent) in a private repository and accessible to staff account.	
Spike Extension Report (for spike extensions) in Canvas	
Custom Project plan (for D and/or low HD), and/or High HD Research Plan document in Canvas (optional)	

Credit Checklist, in addition to Pass Checklist

	Included? (tick)
Custom Project Distinction Plan document, approved in Canvas	
All associated work (code, data etc.) available to staff (private repository), for non-trivial custom program(s) of own design	
Custom Project "D" level documents in Canvas, to document the program(s) (structure chart etc) including links to repository areas	

Distinction Checklist, in addition to Credit Checklist

	Included? (tick)
Custom Project "HD" level documents in Canvas, to document the program(s) (structure chart etc) including links to repository areas	

Low High Distinction Checklist, in addition to Distinction Checklist

	Included? (tick)
High Distinction Plan document, approved in Canvas	
High Distinction Report document, in Canvas, which includes links to repository assets	
All associated work (code, data etc.) available to staff (private repository) for your research work	

High High Distinction (Research) Checklist, in addition to D/Low HD Checklist

Introduction

This report summarises what I learnt in COS30002 AI for games. It includes a self-assessment against the criteria described in the unit outline, a justification of the pieces included, details of the coverage of the unit intended learning outcomes, and a reflection on my learning.

Overview of Pieces Included

This section outlines the pieces that I have included in my portfolio…

0.1p – lab – Bitbucket Setup

- a core task, learning outcome 1

0.2p – lab – FSM & Python

- a core task, learning outcome 1

0.3p – lab – Tic Tac Toe

- a core task, learning outcome 1

0.4p – spike – Graphs, Search & Rules

- a core task, learning outcome 2

0.5p – lab – Graphs, Paths & Search

- a core task, learning outcome 2

0.6p – spike – Navigation with Graphs

- a core task, learning outcome 2

0.7p – lab – Goal Oriented Behaviour & SGI

- a core task, learning outcome 1,4

0.8p – spike – Goal-Oriented Action Planning (GOAP)

- a core task, learning outcome 1,4

0.9p – lab – PlanetWars

- a core task, learning outcome 4

0.10p – spike – Tactical Analysis with PlanetWars

- a core task, learning outcome 4

0.11p – lab – Steering 1- Seek, Arrive, Flee

- a core task, learning outcome 3

0.12p – lab – Steering 2 - Wander and Paths

- a core task, learning outcome 3

0.13p – spike – Tactical Steering (Hide!)

- a core task, learning outcome 3

0.14p – spike – Emergent Group Behaviour

- a core task, learning outcome 3

0.15p –spike – Agent Marksmanship

- a core task, learning outcome 3

0.16p – spike – Soldier on Patrol

- a core task, learning outcome 3,4,5

0.14p – spike – Emergent Group Behaviour

Coverage of the Intended Learning Outcomes

This section outlines how the pieces I have included demonstrate the depth of my understanding in relation to each of the unit's intended learning outcomes.

ILO 1: Software Development for Game AI

"Discuss and implement software development techniques to support the creation of AI behaviour in games"

Labs 1,2,3 only have intended learning outcome 1, all other labs utilise learning outcome 1 as well as others

ILO 2: Graphs and Path Planning

"Understand and utilise a variety of graph and path planning techniques."

Spikes 4 and 6 as well as lab 5 utilise this learning outcome 4 has the building blocks for a graph search, and lab 5 and spike 6 have visual graphs and path planning algorithms.

ILO 3: Force-based Agent Movement

"Create realistic movement for agents using steering force models."

Tasks 11 – 16 are the tasks that use the force based agent movement. With labs 11 and 12 teaching us how to use them, spike 13 testing basic knowledge, spike 14 teaches/tests how to use them in group movement, and spikes 15 and 16 use them as the basis on which to add more mechanics

ILO 4: Goals and Planning Actions

"Create agents that are capable of planning actions in order to achieve goals."

Lab 7 and spikes 8 and 16 use this learning outcome, 7 teaches the basic format, 8 tests your ability to add more complex mechanics, and 16 combines that with learning outcome 3

ILO 5: Combine AI Techniques

"Combine AI techniques to create more advanced game AI."

Spike 16 is the only full combination of multiple techniques that I completed, with it combining learning outcome 3 as the basic movement for the soldier and target agent and learning outcome 4 deciding when it switches between patrol and attack as well as controlling the "guns" shooting rate and reload.

Reflection

The most important things I leant:

I learnt basic ai functionality that I had no idea about before as the unit is intended to teach

I also learnt force based movement as well as how to do some basic tactical analysis within code

And finally how to use python effectively as I used to have a lot of trouble coding within it

The things that helped me most were:

The discord was the most helpful thing across the entire semester, with certain lectures (the one about group behaviours particularly) being very helpful for specific tasks

I found the following topics particularly challenging:

The force based movement was initially difficult for me to understand as most of the previous subjects did not teach it.

Also the goal oriented behaviour was tricky as the spike 8 specification was pretty vague

I found the following topics particularly interesting:

Force based movement and the combination of all the techniques was definitely the most interesting part of the unit

I feel I learnt these topics, concepts, and/or tools really well:

I have learnt how to code in python pretty well as well as use Pyglet to a basic level well as shown by the speed at which I completed the final 4 tasks in comparison to spike 6. The speed also shows that I learnt the basics required for this unit rather effectively

I still need to work on the following areas:

My submission reports could have been better as shown by the fact I had to resubmit labs 11 and 12 as well as spike 8 as a result of not providing good enough reports.

My progress in this unit was …:

Not the best, I left the work for very late and did not interact with the tutor enough, I definitely could have gone for a credit at least if I had done better on the progress

This unit will help me in the future:

This unit has taught me basic ai which will be helpful for any future games I decide to make/work on and it has taught me python which will be useful during my career

If I did this unit again I would do the following things differently:

I would definitely do my tasks to the recommended timings and aim for a higher grade as a result of having more time to spend upon it. I would also go to the tutorials more frequently.

Conclusion

In summary, I believe that I have clearly demonstrate that my portfolio is sufficient to be awarded a PASS grade.