COS30002 AI for Games

Semester 1, 2019
Learning Summary Report

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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	✔
Time-boxed Demonstration Activity (Lab Test) in Doubtfire	✔
Complete Pass (“core”) task work, approved in Doubtfire	✔

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 Doubtfire	✔
Custom Project plan (for D and/or low HD), and/or High HD Research Plan document in Doubtfire (optional)	✔

Credit Checklist, in addition to Pass Checklist

	Included? (tick)
Custom Project Distinction Plan document, approved in Doubtfire	✔
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 Doubtfire, 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 Doubtfire, 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 Doubtfire	
High Distinction Report document, in Doubtfire, 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…

1. Task 1 – Lab - Bitbucket Setup, created a repository and added tutor by giving him access to repository.
2. Task 2 - Lab - FSM & Python, learned about FSM and how they work including the fact we designed one on our own and used python to implement the FSM behaviour.
3. Task 3 -Lab - Tic-Tac-Toe, learned to create and implement types of AI behaviour such as smart and dumb AI
4. Task 4 - Spike - Goal Oriented Behaviour and SGI, carried out the game by implementing Goal oriented behaviour including the documentation of our finding in the spike report.
5. Task 5 Lab – PlanetWars, created AI bot following simple strategic events in the game
6. Task 6 Lab - Graphs, Search and Rules, helped grasped the key concept of AI system behaviour by helping in understanding how to utilise a graph representation of a classic rule-based puzzle, and then use search to find solutions to the problem, which was later useful in the following navigation graphs search labs.
7. Task 7 Spike - Tactical Analysis with PlanetWars, learned how Tactical analysis techniques can enable game agents to react intelligently, and to create intelligent plans used in game environments, helped implemented simple bot agents and tactial bot in Planet Wars game.
8. Task 8 - Lab - Steering #1 - Seek, Arrive, Flee, helped explore and implement behaviours of Seek, Arrive and Flee, gave a basic idea of the Steering movement model for autonomous moving agents.
9. Task 9 - Lab - Steering #2 - Wander and Paths, Extended learning on steering behaviour by implementing wandering and path following behaviour to agent.
10. Task 10- Spike - Tactical Steering (Hiding), Combining behaviours from steering behaviour and tactical behaviour, so that there can be situation where agents react according to events such as danger-flee.
11. Task 11 - Spike - Emergent Group Behaviour, Create Emergent group movement behaviour based on alignment, cohesion and separation in regard to neighbourhood, by playing with these parameters you explore types of useful group behaviours that can be implemented in a game.
12. Task 14- Spike - Agent Marksmanship, learned how to implement projectile movements and the estimation of shots fired and hitting target in a game based on how an agent can calculate.
13. Task 15 - Spike - Solider On Patrol, Implemented a Layered FSM, utilising both state models, steering and actions as welll.
14. Task 16 - Spike - Goal-Oriented Action Planning (GOAP), Combine goal-oriented behaviour (GOB) with graph search to create a goal-oriented action planning (GOAP) system for agents plan their best move accordingly.
15. Task 17 - Lab - Graphs Paths and Search, used graph searching algorithm and compare their outcomes on navigation, useful in combining AI techniques for game.
16. Task 19 Doc - Spike Extension Report, covered on basis of my Custom Plan which implements different techniques acquired from the tasks submitted on doubtfire and the research did online.
17. Task 20 - Doc - Custom Project Plan, A short document that demonstrates my knowledge and understanding on the concepts demonstrated in the lab and outside the lab activities.
18. Task 22 - Doc - Research Plan, Did a research on the topic I was curious about and found some useful stuff which can bring insight to people about AI behaviour in games.

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"

Lab 02 FSM to support creation of AI behaviour in Games, Task04 to depict intelligent AI behaviour by accomplishing a goal, and other spikes that depict AI functionality in the game.
Plus T01 was one of the essential task as creating an agile backlog is a positive behaviour.

ILO 2: Graphs and Path Planning

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

Lab 06- use graph representation techniques to find solution to a problem

Lab Task 17, variety of graph search techniques explored that were used to plan a path from source to target, which later was used to find solution to problems if their searching algorithms were used.

ILO 3: Force-based Agent Movement

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

T07,T08, T09,T10,T11,T14,T15,T20 all these tasks follow up on the steering force models as they create movements for the agents to depict different level of complexities and behaviour.

T14 and T10 specially focuses on the path predicting for target while the T14 specially has the implementation has the projectile covered in it with shooting at target.

T16 uses modes from T07, T10 as a basis for each of the sates the agent transition between

Plus the custom project basically covers this ILO by implementing the steering force model as outlined in the Custom Project plan.

ILO 4: Goals and Planning Actions

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

Task 2, Task 15 demonstrates the FSM architecture for the agent action plans.

Task 03--- simple rule-based system for AI

Task 04 – the insistence architecture for agent to achieve its goals using basic tactical analysis on the agent.

Task 16, more complex planning by having the agent transition between states based on the most suitable action necessary to accomplish goal.

ILO 5: Combine AI Techniques

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

Task 10 uses a combination of force model behaviour with tactical analysis to create an agent that flees, hides behind objects.

Task 15 uses FSM combined with steering and action analysis to flee if enemy is strong and transition between stages.

Reflection

The most important things I leant:

AI path planning and seeking behaviour, which works around with different scenarios in the game which I already demonstrated when implemented in my Custom Project

The things that helped me most were:

YouTube videos ---- quick easy reference to AI conceptual techniques and how they can be implemented.

Canvas lectures--- help revise the forgotten theories.

Quick chat with Tien about my tasks.

I found the following topics particularly challenging:

Task 15, it took me a bit of time to grasps what it actually wanted me to do plus learning algorithm took a bit of time for the state machines.

I found the following topics particularly interesting:

T16, GOAP since it basically was better than FSM at first I thought that way but later in my Research Plan I have clarified.

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

Path Finding algorithms, I also used this in my Custom Project

I still need to work on the following areas:

T14, as projectiles were not at all easy to implement and even If I figured out the theory coding took a bit of time.

My progress in this unit was …:

My progress wasn't all good in this unit mostly because of the transition to online, as I don't exactly have the best environment to study where I live (shared room with noisy housemates) I was fairly new to python syntax and understanding conceptual theories at first seemed easy but implementing them took time.

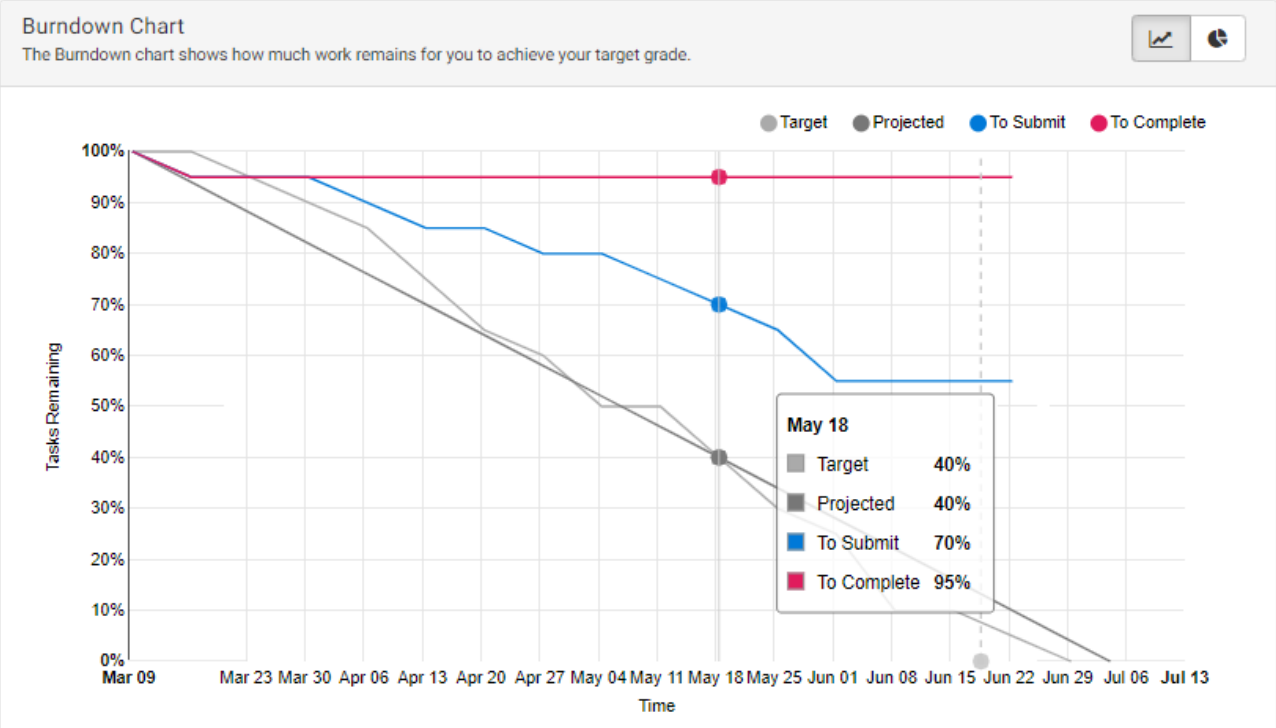

Figure 1 Example burn-down chart.

This unit will help me in the future:

I'm planning to purse game development in the future possibly plus with the AI knowledge Ive gained from this unit I feel confident in making games

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

Start ahead with the python syntax so implementing theories don' take too much of my time.

Conclusion

In summary, I believe that I have clearly demonstrate that my portfolio is sufficient to be awarded a Credit grade, as I've clearly demonstrated knowledge and understanding on a higher level plus I've completed all the pass and the credit tasks on doubtfire.