CSYE 7374
Autonomous Learning in Games
Assignment 3 – Reinforcement Learning
Unity ML Agents

Professor: Nik Bear Brown
Due: **Wednesday, March 11, 2020**
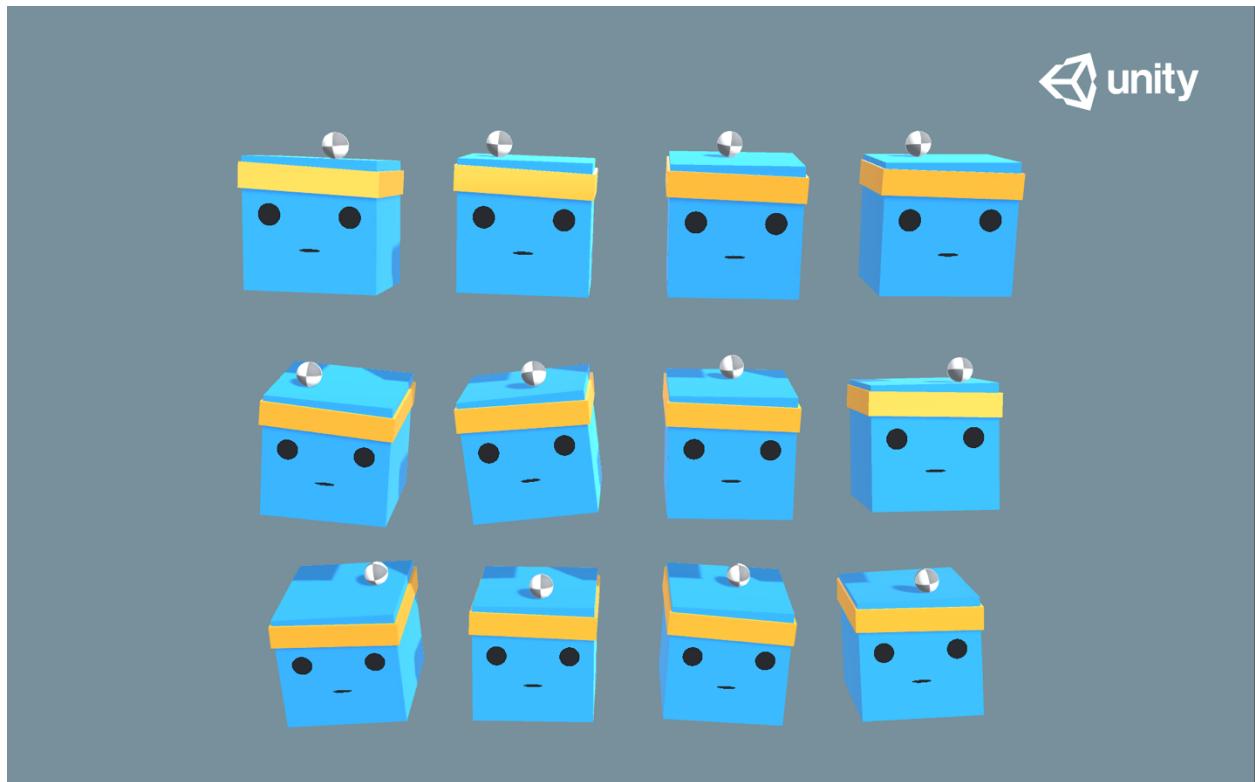
TAs

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Implement goal oriented behavior using ML-Agents https://github.com/Unity-Technologies/ml-agents and see https://github.com/Unity-Technologies/ml-agents/blob/master/docs/Readme.md

(10 Points) Complete Getting Started with the 3D Balance Ball Environment

https://github.com/Unity-Technologies/ml-agents/blob/master/docs/Getting-Started-with-Balance-Ball.md
You MUST change the look of the scene so it is obviously visually different from the out of the box the 3D Balance Ball Environment

Show that you got it working.

Part 2. Pick An example environment and extend it.

https://github.com/Unity-Technologies/ml-agents/blob/master/docs/Learning-Environment-Examples.md

(10 Points) Establish a baseline performance.

(10 Points) You must add at least two more states that improve the performance by at least 5%. 5 point for some improvement one more point for each percent improvement.

(10 Points) Change the AgentAction() function that improve the performance by at least 5%. 5 point for some improvement one more point for each percent improvement.

(10 Points) Change the rewards, how does it effect the performance?

(15 Points) Train with Proximal Policy Optimization, how does it effect the performance?
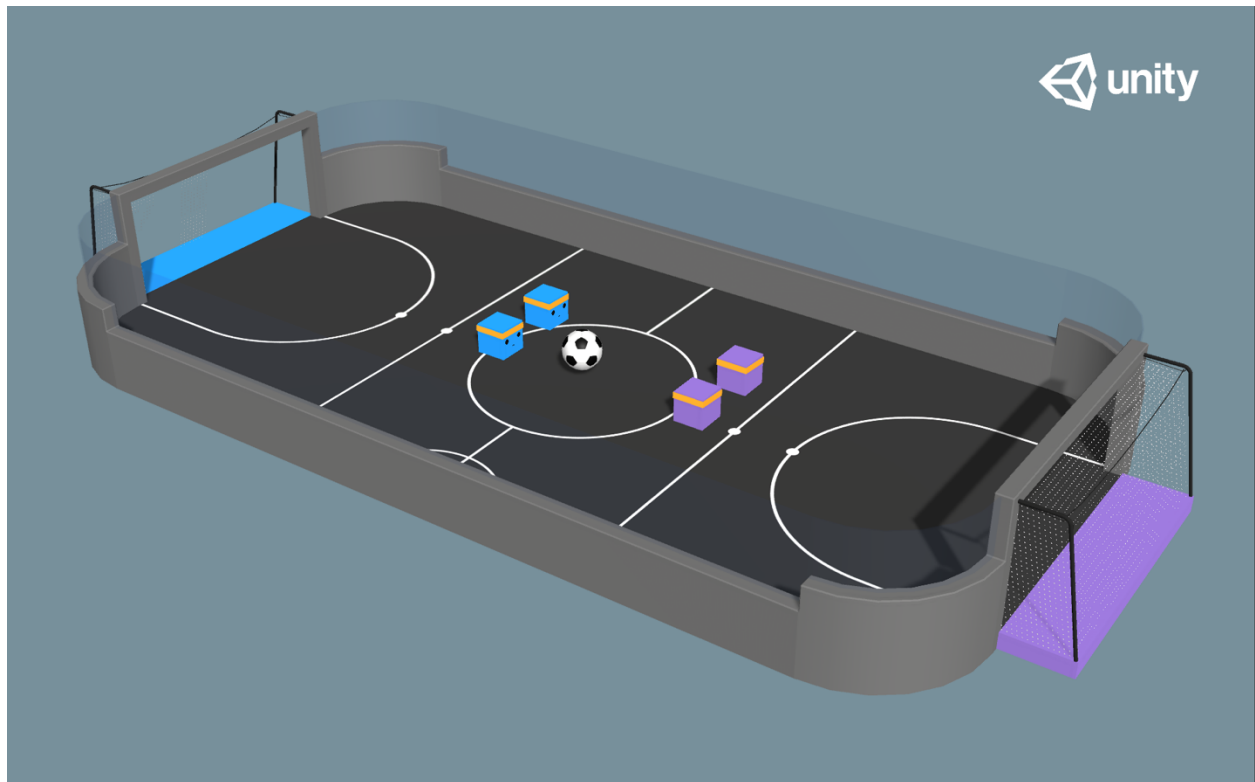
(15 Points) Training with Soft-Actor Critic, how does it effect the performance?

(10 Points) Did I explain my evaluation clearly?

Clearly explain the code and testing.

(10 Points) Video

Create a video that explains what you did.

More information on Unity Machine Learning Agents

Using Machine Learning Agents in a real game: a beginner's guide
https://blogs.unity3d.com/2017/12/11/using-machine-learning-agents-in-a-real-game-a-beginners-guide/?

Introducing ML-Agents v0.2: Curriculum Learning, new environments, and more
https://blogs.unity3d.com/2017/12/08/introducing-ml-agents-v0-2-curriculum-learning-new-environments-and-more/

Introducing: Unity Machine Learning Agents
https://blogs.unity3d.com/2017/09/19/introducing-unity-machine-learning-agents

Unity Machine Learning home page
https://unity3d.com/machine-learning/

Download the latest release on <u>the ML GitHub page.</u>
https://github.com/Unity-Technologies/ml-agents