

**AI Plan**

***Week 5***

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A) Game build

The project I intend to build will be a Game resembling that of Asteroids, except with enemies. For now or Forever, we'll call the game "Asteroids 2" AI required for such a game is minimal, though slight AI advancements are going to be attempted to create a more complex Asteroid Game. Enemy or AI cruisers as they'll be called will follow simple AI functions and states to 'intelligently' track the player while avoiding obstacles.

B) Components

Asteroids 2 is going to feature all completed components so far, And will aim to also include additional, so far incomplete Components.

1) State Machines Will be used to determine the action of the AI cruisers. Actions include, PURSUE, AVOID, CIRCLE.

a) Pursue means to chase the player. During this state, the AI will watch for reasons to swap to the Avoid state (such as a nearby asteroid.) or the Circle state (such as a nearby Player)

b) Avoid means to avoid an obstacle, such as an asteroid. While pursuing, a swap may occur in which the AI begins to avoid an obstacle. However, when deriving from the Pursue state, the AI will attempt to maintain general direction towards the Player.

c) Circle means to circle the Nearby Player. AI will enter this state when nearing the Player, causing them to circle, rather than chase. This way the AI seems to understand his own cruisers ability. If the AI swaps to Avoid from Circle, the AI will not worry about the direction its traveling, as it will soon begin the chase again, before it has traveled too far away.

2) Collision Avoidance will be used during the Avoid state, allowing the AI to predict future positions and prevent collisions, rather than simply 'running away'. Using the intersection of two rays as determined by current velocities of the two moving objects, a point of collision can be determined, and it will be that point that the AI actually avoids.

3) Movement Algorithms will be used during all states. A Chase algorithm will be modified to allow an AI to chase and avoid simultaneously, though overall it will be an ordinary chase algorithm.

A highly altered Flee will be used as the Avoid state, so that the AI will know to avoid the obstacle and maintain a general direction enough so that it is not losing distance between it and the chase target.

Another variation of chase will be used, implementing portions of Arrive, allowing the AI to effectively circle a target, maintaining a general distance away, representing Circle state radius.

4) Fuzzy Logic will used in a Degree of Measurement function in each of the AI's states, using distances from targets and obstacles, the AI will perform 'intelligent' maneuvers, as previously described.

C) Extra Credit Components

While no Extra Credit components currently exist in the project, It is hoped that at least one will be implemented. A Markov Chain learning algorithm is in early development and is intended to have trials established at least.