**CS 4365 Report on Final Project**

Our agent code works by splitting up the agents into separate tasks; one agent is the defender and one is the attacker. The defender is chosen to be the agent on the top corner and the attacker the bottom corner. We also create a matrix to map out any obstacles so we can add weights to certain cells that have walls, enemies, or mines.

**Shared Movements/Actions**

**Beginning Mode**

At the beginning of the game, the agents head towards the home base, keeping track of how far they have moved. This allows us to map out the size of the board so we can create a matrix to remember where obstacles are and pinpoint the enemy base. Once they have reached the home base, they plant a mine on the north and south side of the base.

**Death**

To keep track of if an agent has died, the agents will attempt to determine if they are in their starting corner by checking if the home base is in the original direction of their spawn point and they have obstacles in the directions of the corners. They will update their location to the starting position if all of these conditions are met.

**Map Updating**

Every time each of the agents move, they will look at their immediate surroundings and see if there are obstacles. If there are, they update the map to show that there are walls in the positions.

**Defender Movements**

After planting the initial mine, the defender agent moves to the side (right or left side) of the base which does not have a mine. If it cannot reach the space, it goes into Hunting Mode. If it can reach the position, it waits there until it gets tagged by an enemy agent or until half of the game has passed. When tagged, it tries to return to the position next to the base.

The defender will also go into Hunting Mode if:

* Half of the game has passed.
* The home team flag is taken.
* The attacker is stuck at the beginning of the game.
* The attacker has the enemy flag (The defender also attempts to blow up the top mine if it is there).

**Defender Hunting Mode**

While in Hunting Mode, the defender will head towards the enemy base, tagging any enemies that it sees. Once it reaches the enemy base, it stands on the base to prevent the home flag from being captured. In this mode, it is possible that the defender will acquire the flag, where it will go into Defender Flag Captured Mode.

**Defender Flag Captured Mode**

While in Flag Captured Mode, the defender will use the information mapped out in the matrix to head towards the home base using UCS. If it sees an enemy in its immediate vicinity, it will tag the enemy.

**Attacker Movements**

After planting the initial mine, the attacker will head towards the enemy base, using UCS and the matrix to path towards the base. After acquiring the flag, the attacker will go into Attacker Flag Captured Mode. When tagged, it will keep attempting to head towards the enemy base.

**Attacker Flag Captured Mode**

While in Flag Captured Mode, the attacker will plant a mine on the enemy base and then move to the space it used to move onto the base and plant a mine. After that, it will use the information mapped out in the matrix to head towards the home base using UCS. If it sees an enemy in its immediate vicinity, it will try to avoid it.