Semester Project Proposal

1. Name : Aaditya Gurav | NetID : asgurav. I would like to work alone.

2. Selected Domain : **Connect 4**
   i. Two player game similar to Tic tac toe, but here we need to connect 4 entities of same type; horizontally, vertically or diagonally.
   ii. Unlike Tic tac toe we can't place the token any where, we have to place it either at the bottom of the board or top of some other token, the board is 6 rows **x** 7 columns.

3. Tree Search Algorithm : **Minimax Search** algorithm as here we have to maximise our chances of winning and at the same time minimises the chances for the opponent.

4. We can keep the size of the board dynamic and at the same time change the conditions for winning such as connecting 3 or 5 tokens instead of 4.

5. Neural network will be used mostly for the evaluation function where we get the utility and pruning the tree.

6. Will be using Python language, for implementation of neural network we will be using open-source libraries such as **Tensorflow** or **PyTorch**.

The proposal looks good. Since many connect4 implementations exist I will require one tweak to the rules. At the beginning of the game, 1 piece for each player is dropped into a randomly chosen columns; neither player controls where these first pieces are dropped. Then gameplay begins as normal, and the players have to strategize based on the initial conditions. This will also help you generate a wider variety of random gameplays for the purpose of the experiments. You'll also need to think about how to encode the current game state as input for the NN; I'd recommend a one-hot 3-channel image to represent player 1, player 2, or empty at each board position.