

Intelligent Connect 4

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- Get source and exe from our github [repository](#)
- Watch our youtube demo from [here](#)
- We have agreed and tested our networking protocol with an other team check their [repository](#) and watch this [video](#) for networking mode test

Supported Features

1-Four difficulties due to different utility functions

Utility1 Function

-Evaluation Table

The number in the table indicate the number of four connected positions

- For example :

If we count number of four connected positions in the lower left corner , it will be 3 as the following

3	4	5	7	5	4	3
4	6	8	10	8	6	4
5	8	11	13	11	8	5
5	8	11	13	11	8	5
4	6	8	10	8	6	4
3	4	5	7	5	4	3

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Utility2 function:

To evaluate the game state as it adds the summation of five kinds of score center, horizontal, vertical, positive crossed and negative crossed lines for center column it counts the pieces for the current player and multiply it by 3. for other cases it passes a window of 4 elements to evaluate_window function

Evaluate_windows:

To evaluate a window of 4 elements w.r.t piece (current player value) vs opp_piece (other player value) with weights:

- 100, if window has 4 pieces from current player type
- 5, if window has 3 pieces from current player type and 1 empty piece
- 2, if window has 2 pieces from current player type and 2 empty pieces
- 4, if window has 3 pieces from other player type and 1 empty piece

Difficulty levels

- Beginner difficulty level: use utility function 1 with 3 seconds as time limit
- Easy difficulty Level: use utility function 2 with 3 seconds as time limit
- Medium difficulty Level: use utility function 2 with 15 seconds as time limit
- Hard difficulty Level: use utility function 2 with 30 seconds as time limit

2- Iterative deepening

3- Game saving and loading

Save the game in any time while user is play “when he press (s)” saved to connect4.txt file

Load game if any connect4.txt file is existed

4- Networking mode through 2 instances of the game

Using gevent library in python, we can open a connection through a server with a defined port.

You can run two instances of the application on same machine or run on different machines on same local network. (ip addresses and ports are taken as input from the user; for more info see the user guide)

User guide:

- First you should decide to start a new game or load a saved game.

```
-  
Welcome to Connect 4 game  
Please choose option number.  
1.New Game  
2.Load Game
```

- Then choose the suitable difficulty for you

```
Welcome to Connect 4 game  
Please choose option number.  
1.New Game  
2.Load Game  
1  
Please choose option number.  
1.BEGINNER  
2.EASY  
3.MEDIUM  
4.HARD  
,
```

- Then choose to either play against the local AI, or against the network AI, so that your AI play against a network AI.

```
-  
Please choose option number.  
1.VS Local AI  
2.VS Network AI  
1
```

- Then choose to play first or second

```
Please choose option number.  
1.Start first  
2.Start second  
,
```

- The game will appear like this, you should type the column number from 1 to 6 or 's' to save the current game state.

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```

Your turn, please enter a column number, or 's' to save game and exit.

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```

Your turn, please enter a column number, or 's' to save game and exit.

- If you choose to load a saved game, you should then choose to continue with which difficulty, and the game state will be loaded

```
Welcome to Connect 4 game
Please choose option number.
1.New Game
2.Load Game
2
Please choose option number.
1.BEGINNER
2.EASY
3.MEDIUM
4.HARD
2
```

```
Your turn, please enter a column number, or 's' to save game and exit.
```

- ```
Please enter the ip address of destination machine:127.0.0.1
```

| Team member name       | Role                                          |
|------------------------|-----------------------------------------------|
| بيتر راتب مملوك اسكندر | Iterative deepening with alpha-beta algorithm |
| بیشوي انور ملك هارون   | Connect4 class, networking mode               |
| مينا طلعت حكيم اسكندر  | Utility2 function and main file               |
| مينا مورس محارب الامير | Utility1 function, game saving and loading    |