

# PROJECT- REPORT

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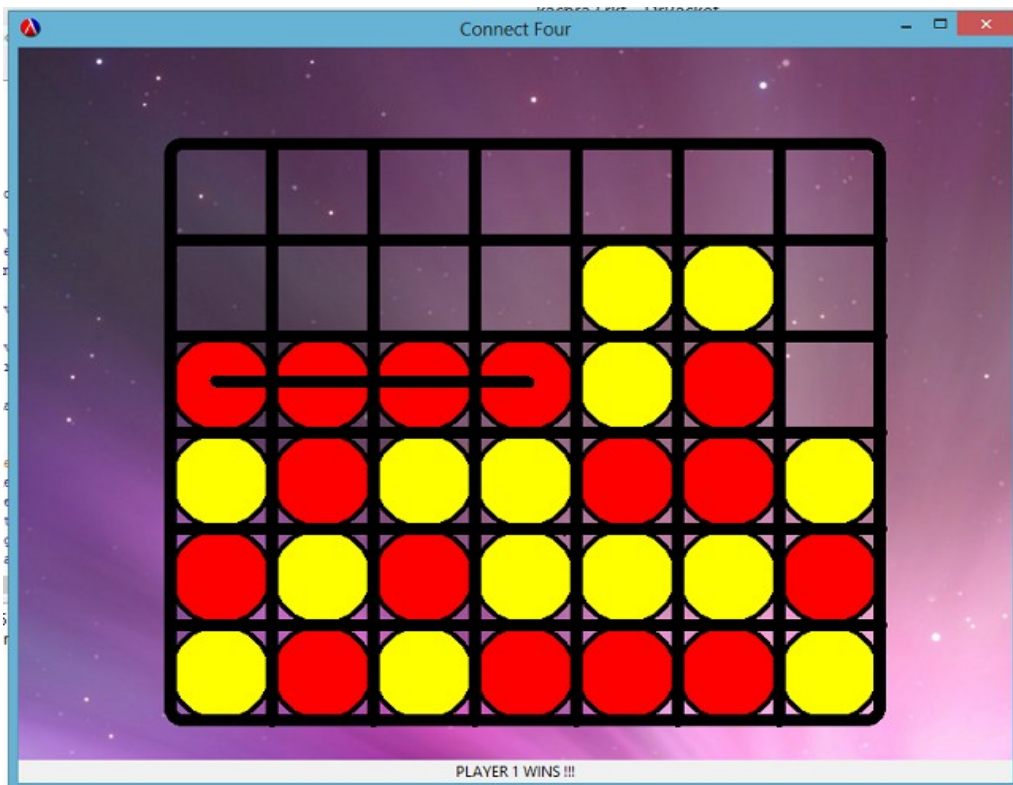
## Team Members

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## About Project

Connect Four (also known as Captain's Mistress, Four Up, Plot Four, Find Four, Fourplay, Four in a Row and Four in a Line) is a two-player game in which the players first choose a colour and then take turns dropping coloured discs from the top into a seven-column, six-row vertically-suspended grid. The pieces fall straight down, occupying the next available space within the column. The object of the game is to connect four of one's own discs of the same colour next to each other vertically, horizontally, or diagonally before your opponent.

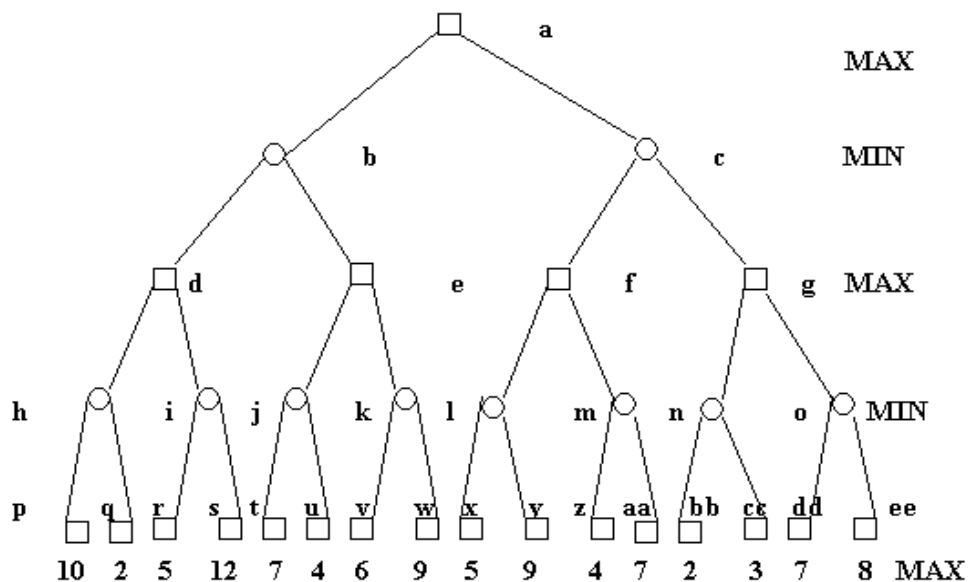


## Design Of Game

We have used the minimax algorithm (of 4-ply) to find the best move for CPU.

In the minimax algorithm, we associate a value with each position or state of the game. This value is computed by means of a position evaluation function and it indicates how good it would be for a player to reach that position. The player then makes the move that maximizes the minimum value of the position resulting from the opponent's possible following moves.

Example of a 4-ply game-tree:



In the evaluation function (eval in our program) we have given a state +500 points if four yellow discs are in a line, -500 if 4 red discs are in line. Further the eval function favours the central positions and therefore a central position has more points than the terminal one.

## Sample Input and Output

You can play the game either in 1 player or two player mode. To make a move you need to click in the respective column of the 6x7 grid. The disc will appear in the lowest unoccupied position

in the column. The first player has red colored discs and the second player has blue discs. If at any time of the game four discs of the same colour come in a line (vertically, horizontally, or diagonally), then that player has won the game. If all positions are filled and no one has won then the game is drawn. The result of the game is printed on the bottom of the canvas.

### **Bugs and Limitations**

Sometimes the game gives a error when it is computer's turn and all the positions are filled except the top two positions in the last column. Further in the game of connect four the person who makes the first move always have some kind of advantage and he can always win no matter what the AI is.