ARTIFICIAL INTELLIGENCE LAB 3

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Heuristic OR Evaluation Function used in the Connect4Game:

1. **Checking all the rows, columns, diagonals:**
   1.1 Checking all the potential configurations of player 1 and 2's moves in the current board. By row, By column, By diagonals.
   1.2 Count the tokens for each player in each line and assign scores accordingly.
   1.3 Higher scores are given for longer sequences closer to winning.

2. **Score Calculation:**
   2.1 Assign positive points for sequences favorable to the current player (player 1).
   2.2 Assign negative points for sequences favorable to the opponent (player 2).
   2.3 Encourages actions that lead to winning configurations and defensive moves to block opponent progress

3. **Bias towards winning:**
   Assign higher scores for longer sequences, encouraging moves that lead to victory. Makes defensive moves to block the opponent's progress towards victory.

NOTE: Our code has been written for depth limited search for a given Depth i.e. 5 here (it can be changed in the code to make it go into deeper depths and get more effective moves)

Performance of Algorithm based on time constraint:

Mainly the time taken by the AI to return the move depends on the depth it is allowed to go to. So given are the performances of our code for different time limits:

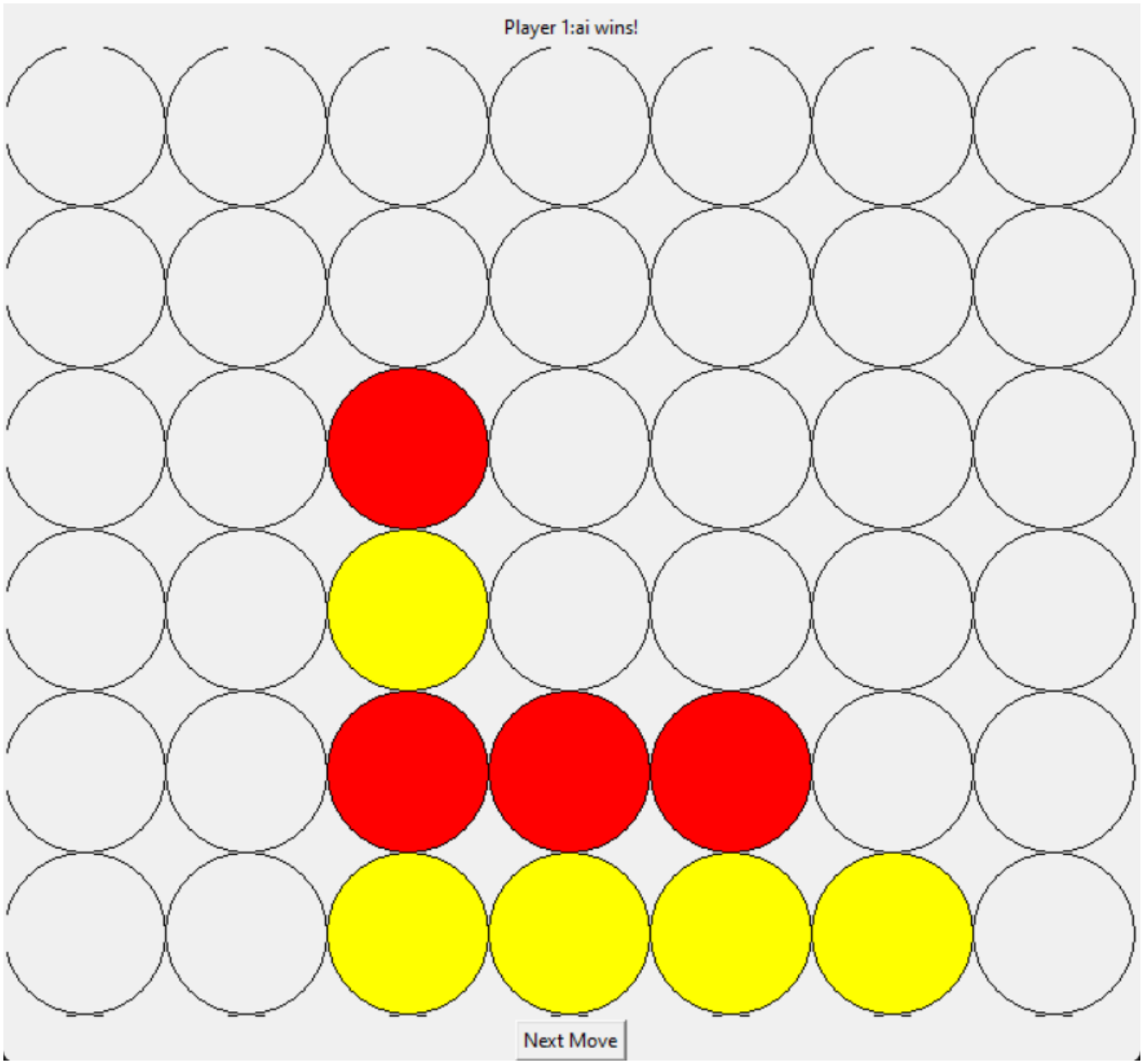
For 3 seconds: depth reached 5 (depending on the machine)
For 5 seconds: depth reached 7 (depending on the machine)
For 10 seconds: depth reached 8-9 (depending on the machine)

AI Vs. AI:

The AI vs AI match's winner depends on the depth the AI player is allowed to access, the evaluation function, depending whether they are first player or the second player.

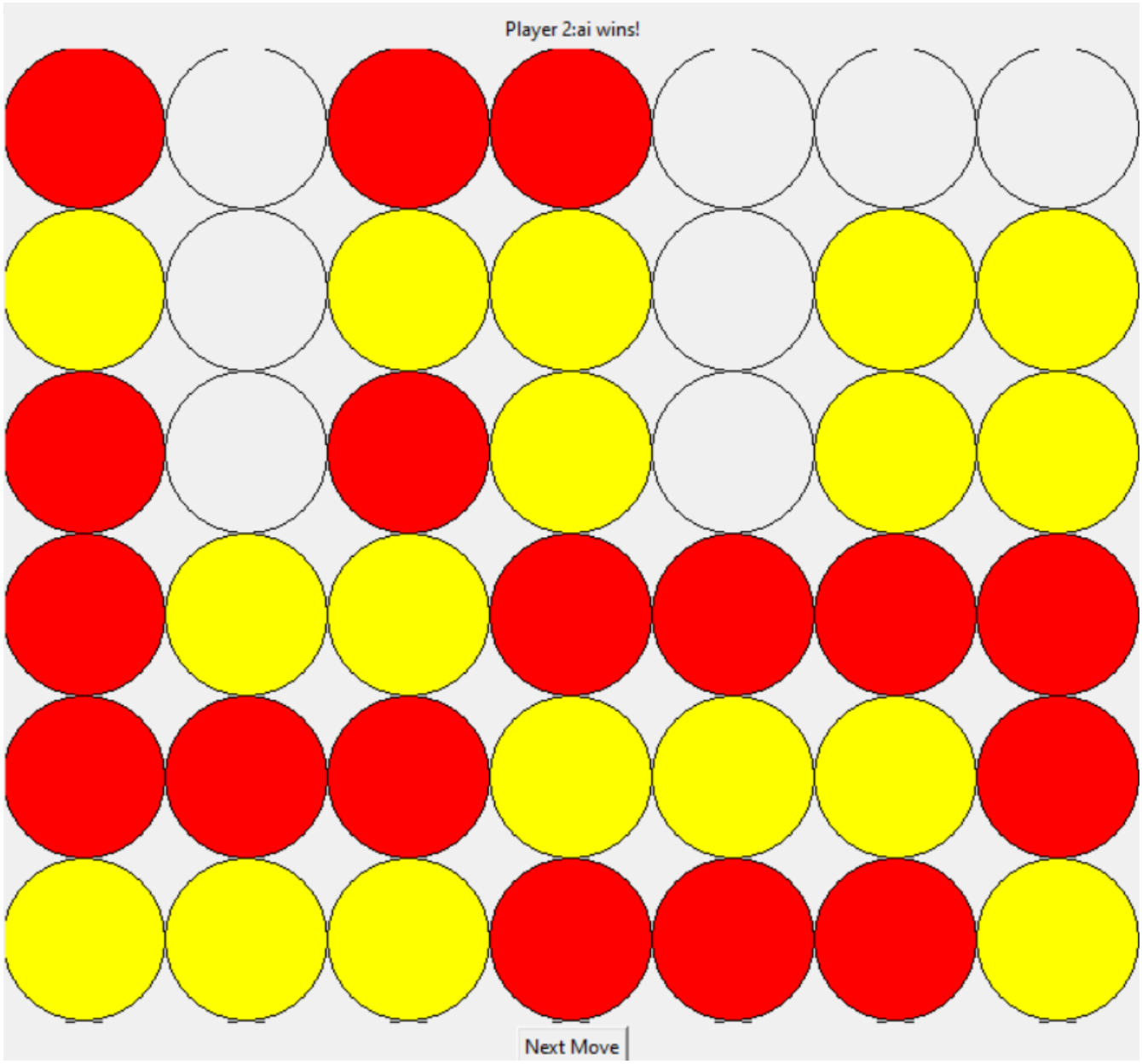
For a specific evaluation function the following is the output:

For depth 5 and score : 1,2,10,100



For a specific evaluation function the following is the output:

For depth 5 and score : 1,10,100,1000



Player 2 wins

For the different scoring function we will get different outputs.