CS5200: Project Extra
Design AI for Playing Gomoku

desciption and figure from wikipedia (https://en.wikipedia.org/wiki/Gomoku)

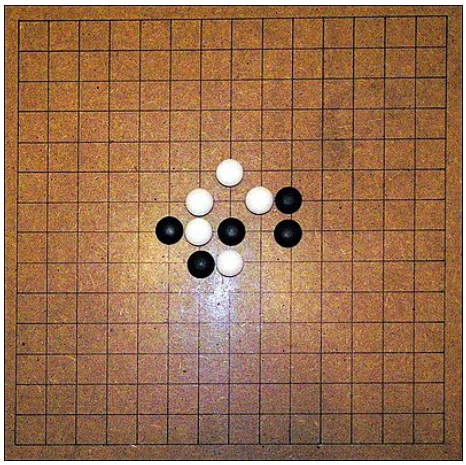

Figure 1: Gomoku

Gomoku: Gomoku, also called Five in a Row, is an abstract strategy board game. It is traditionally played with Go pieces (black and white stones) on a Go board. It is played using a 15×15 board while in the past a 19×19 board was standard. Because pieces are typically not moved or removed from the board, gomoku may also be played as a paper-and-pencil game. The game is known in several countries under different names.

Rule: Players alternate turns placing a stone of their color on an empty intersection. Black plays first. The winner is the first player to form an unbroken chain of five stones horizontally, vertically, or diagonally. Placing so that a line of more than five stones of the same color is created does not result in a win. These are called overlines.

Task: Your task is to implement the following functions in C/C++:

1. `int checkBoardStatus(int board[15][15])`: return 0 if no one wins; return 1 if black wins; return 2 if white wins.
2. `void play(int board[15][15], int color, int position[2])`: play a pebble with color at the board (position[0], position[1]). Let's assume that black=1 and white=2 for consistency. Let's further assume board[i][j]=0 if position (i, j) is available for playing a pebble; board[i][j]=1 if position (i, j) has a black pebble; board[i][j]=2 if position (i, j) has a white pebble.

3. `void search(int board[15][15], int color, int position[2])`: search the best position for the given color and return it in the position array. You are recommended to use the Monte Carlo Tree Search algorithm to find the best possible position.
4. `void display(int board[15][15])`: display the current status of the board.
5. `int main()`: main function which takes human input from keyboard and play with the AI you designed.

Grades (11 extra points maximal):

1. 3 points for implementing the basic functionality;
2. +1 points if it beats me or the grader;
3. Round-robin competition among all the submission: +1 point (for people in a group of 2) and +2 point (for people who did it alone) every time you win a competition and 5 points maximal. (+2 additional points for the champion and +1 additional point for 2nd and 3rd places.)