|  |  |  |  |
| --- | --- | --- | --- |
| Input | 5 numbers (int) | the type of piece with its initial coordinate to the next step coordinate | Type (1-5)  Coordinate1 (1,1)-(4,3)  Coordinate2 (1,1)-(4,3) |
|  |  |  |  |
| function | Move Judge  Int (type, from, to) | To judge if the input moving is possible | 1. moving direction 2. not be occupied by your own piece 3. not move outside the board   Return 1(legal)  Return 0(illegal) |
| Piece judge  Int (type, from, to) | To judge if this moving influences any other pieces | Case 1: if lion is on the enemy’s boundary--checkmate  Case 2: capture enemy piece  If capture the lion--checkmate  Case 3: level up (niwatori)  Return 0 checkmate  Return 1 continue |
| Movable piece calculation  Void(board) | In the current occasion to calculate all of the possible moves including the pieces on the board and out of the board.  While record the moves, also record the score of the moves respectively and sort them to get the highest five |  |
| Current board score for one side  Int(board, redstocks, bluestocks) | To calculate the score of one side on the current board | Return the score |
|  |  |  |  |
| array | board | 5\*6 including the wall | To record the present state of the play |
| stocks | 1\*5 | To record the holding piece of each sides  eg. Red\_stock[1]=1 means the red side holds one hiyoko now |
| array set | moving rule | 3\*3 of five piece | To help judge if the input moving is legal  eg. Hiyoko 010  000 yellow is present pos  000  means only one step forward is legal |
|  |  |  |  |
| define | Animal numbers | 5 types | 1 hiyoko  2 niwatori  3 zou  4 kirin  5 lion |
|  |  |  |  |
| alg | evaluation | To evaluate the score point of the present state  https://www.oit.ac.jp/is/~shinkai/seminar/thesis/2013kawafune/sotsuron.pdf  factors:   1. holding pieces on the board and outside the board (because of the flexibility the evaluation score would be different)  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | lion | zou | kirin | hiyoko | wanitori | (outside)zou | kirin | hiyoko | | 50 | 5 | 5 | 4 | 8 | 3 | 3 | 1 |  1. Checkmate both cases are 500pts   Case1: capture the enemy lion  Case2: lion reach the enemy’s boundary   1. advanced position??   eg. If at this state the lion would be gained by enemy in the next turn, it’s a bad state | |
| search  maxmin | A search tree alg about 4 layers(consider the calculation ability of the chip)  To consider if move the piece A to the position A, the present evaluation point  Return the best movement | |

Important references

1. the evaluation <https://www.oit.ac.jp/is/~shinkai/seminar/thesis/2013kawafune/sotsuron.pdf>
2. Total setps <http://train.gomi.info/trainshogi/making/#survey>

Class record

Int type, int xfrom, int xto, int yfrom, int yto, int score

Record A[5]

1.对在棋盘上的棋子扫描

如果搜到了己方的棋子，计算移动后的棋面得分

如果这个得分大于记录数组里面的最低分，把这个移动插到记录数组的对应位置

When the program operating:

//player first

1. get the data of player (make sure the input is legal)
2. Change the board according to the input-move

--Player won

--Continue

1. Get the move-data of PC based on Algorithm
2. Change the board according to the move-data

--Player won

--Continue