Artificial intelligence

Mancala project

Team members

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1. Brief description:

At first the board of the mancala game is printed in the console. Each player has 6 holes on his side, each hole has 4 stones and the score is 0 for the two players. The human player starts the game then the AI continues. The stealing mode is activated.

2. description of the utility functions:

getInitialState function :

It stores the default state of board at the beginning of the game

displayState function :

It displays the current state of the game.

makeTransition function :

it’s responsible for Transitions from “state” to a “newState“ by moving the stones from “transition.hole“.

state : it’s the current situation of the game.

newState : it’s the next situation of the game after player’s move.

isTransitionValid function :

It checks if the output of **makeTransition** function “newState” is valid or not.

buildStateChildren function :

It gets the possible moves in preparing to evaluate them using AI.

minimax function :

It uses minimax algorithm to evaluate between possible states and applies alpha beta pruning to optimize and save time.

getBestAIDecision function :

It gets the scores of of each AI decision and chooses the one with best score

isFinal function :

It checks if the game is over or not.

getFinalScores function :

After the game is over this function get the final scores of each player.

evaluateState function :

It calls **isFinal** function to check if the game is over or not and if it’s over it calls **getFinalScores** function to know the winner player.

So basically it evaluates every state to check the game is over or not.

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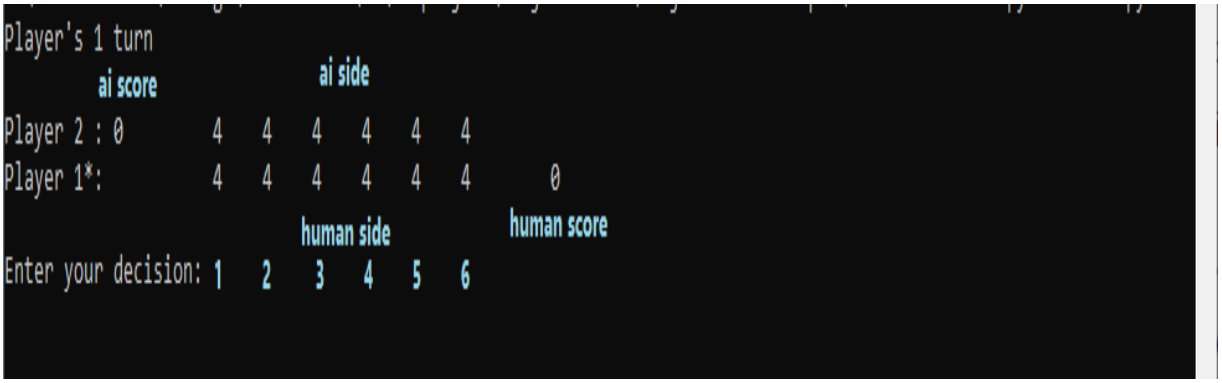
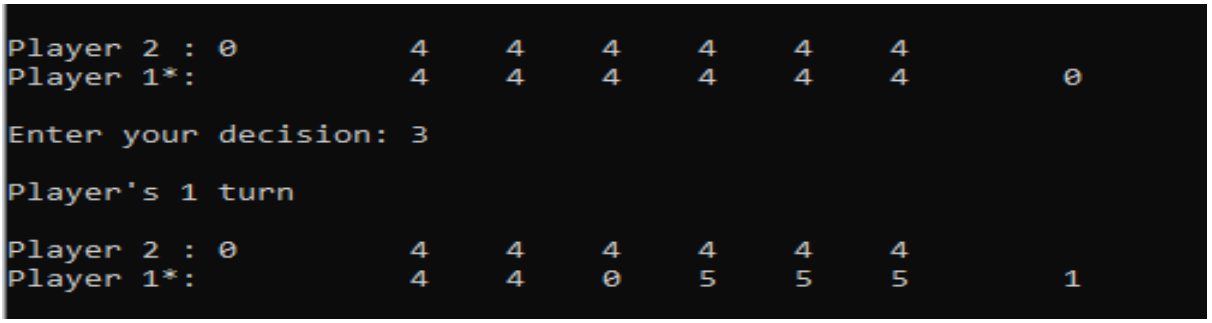
3. User guide with snapshots:

- After we run exe file the board of the mancala game will appear.



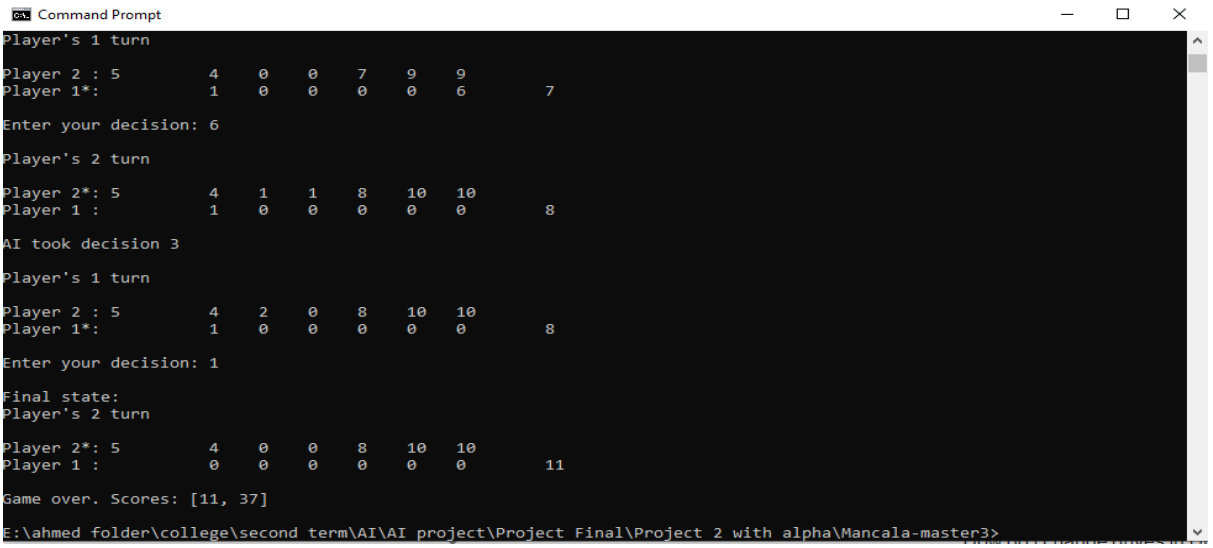
3.1

- The first move is always for human who enter a number from 1 to 6 like in the 3.1 photo this number is the number of the hole you want to play



3.2

- The stones in the hole you chose are distributed among the holes after the one you chose like the 3.2 photo and so on until one whole side is empty from the stones then the game is over and the score appears at the left is human score and at the right is AI score like in 3.3 photo.



3.3

4. Team members roles :

Ahmed Mohamed Fahmy	**getInitialState, displayState and evaluateState**
Ahmed Hamed Ahmed	**makeTransition, isTransitionValid and report**
Mostafa Mohamed Badawy	**makeTransition, isTransitionValid and report**
Salah Solaiman Elsayed	**buildStateChildren, minimax and getBestAIDecision**