DSA Project Report

Topic: Checkers (varible size)

TA: Debojit Das Sir

Team 34:

Members:

(name is in lexicographical order)

1. Hardik Gupta
2. Mayank Shukla
3. Nachiket Patil
4. Rahul Garg
5. Sukhjinder Kumar

Work Division:

- Mayank Shukla:

Worked On:

1. Undo function.
2. Review function.
   Created Stack, ‘push’ to push current game state into stack
3. Toss function.
4. Rule function.
   Written Rules of checkers in a txt file and added that file in program.
5. Instruction function.
   Written instruction of how to play the game and their respective control keys in a txt file and added that file in program.
6. Restart function:
   To restart the game and clear the stack of previous game
   Added clear_stack funtion.
7. Quit function:
   To quit the game in between.
8. Multi capture:
   Added multi capture thing inside controller function for 2-player game as well as for bot.
9. Control keys:
   Added control keys inside controller function and several instructions for smooth play of game.
10. Play_simple_move function:
    This function is used in k_state to play simple move.

Bug fixed:

1. CapturePossible function:
   Added that given direction is legal or not which is given by player. Can not use isLegal function for that because isLegal fuction itself uses CapturePossible inside it.
2. Move Entries:
   Added whether piece is king or not.

Complexity Analysis of these function:

1. Undo:
   Complexity: O(1)
   Explanation:
   Used Doubly linked and pop out top element from stack in constant time.
2. Review:
   Complexity: O(n)
   Explanation:
   Traverse the entire linked list and print all game states. Here n is number of elements in stack.
3. Toss:
   Complexity : constant time.
4. Rule and Instruction:
   Complexity: O(1)
   Explanation:
   Read the file rule_book.txt and instruction.txt and print that.
5. Restart:
   Complexity: O(n)
   Explanation:
   It clears the stack by using clear_stack function inside it. Here n is number of elements in stack.
6. Quit:
   Complexity: If player wish to review while quitting then it will take O(n) time else O(1).
7. Multi Capture:
   Complexity: O(1)
   Explanation:
   for loop runs constant number of time.
8. Play_simple_move:
   Complexity: O(1)
   for loop runs constant number of time.