Alexandria University
Faculty of Engineering
Computer and Systems Engineering
Programming-1

Final project Report

Program a game (Dots and Boxes)

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Dots and Boxes

Description:

First, player is asked to input main inputs of the game (ex: showing top10 players, exit, playing as beginner, expert, playing with a friend or with computer). if the player chose to play the game will be like the following: Starting with an empty grid of dots, two players (player vs player or player vs computer) take turns adding a single horizontal or vertical line between two unjointed adjacent dots. The player who completes the fourth side of a 1x1 box (or groups of one or more adjacent boxes) earns one point (s) and takes another turn until all lines are played then the winner's name is entered to be added to top10 players list.

Features:

The player has ability to:

- Show top10 players list.
- Play against computer as beginner or as expert.
- Play with a friend as beginners or as experts.
- Exit the game.

AI trick: when computer takes turn, it searches for a box which need only one line to be completed, if it is found computer will draw this line to get a point which make the game more exciting and challenging.

Design Overview:

A grid with specific dimensions according to the player's input then the game loop begins, lines (either red or blue) is drawn between dots, if a box is completed it is colored with the player's color, after each turn the information of players is showed on the screen (scores, moves, time since the game started, moves until the game ends).

Assumptions:

- Assuming maximum board size is 5x5.

Data Structure:

Structures:

- Struct playerScore {char name [50]; int score;}.

Arrays:

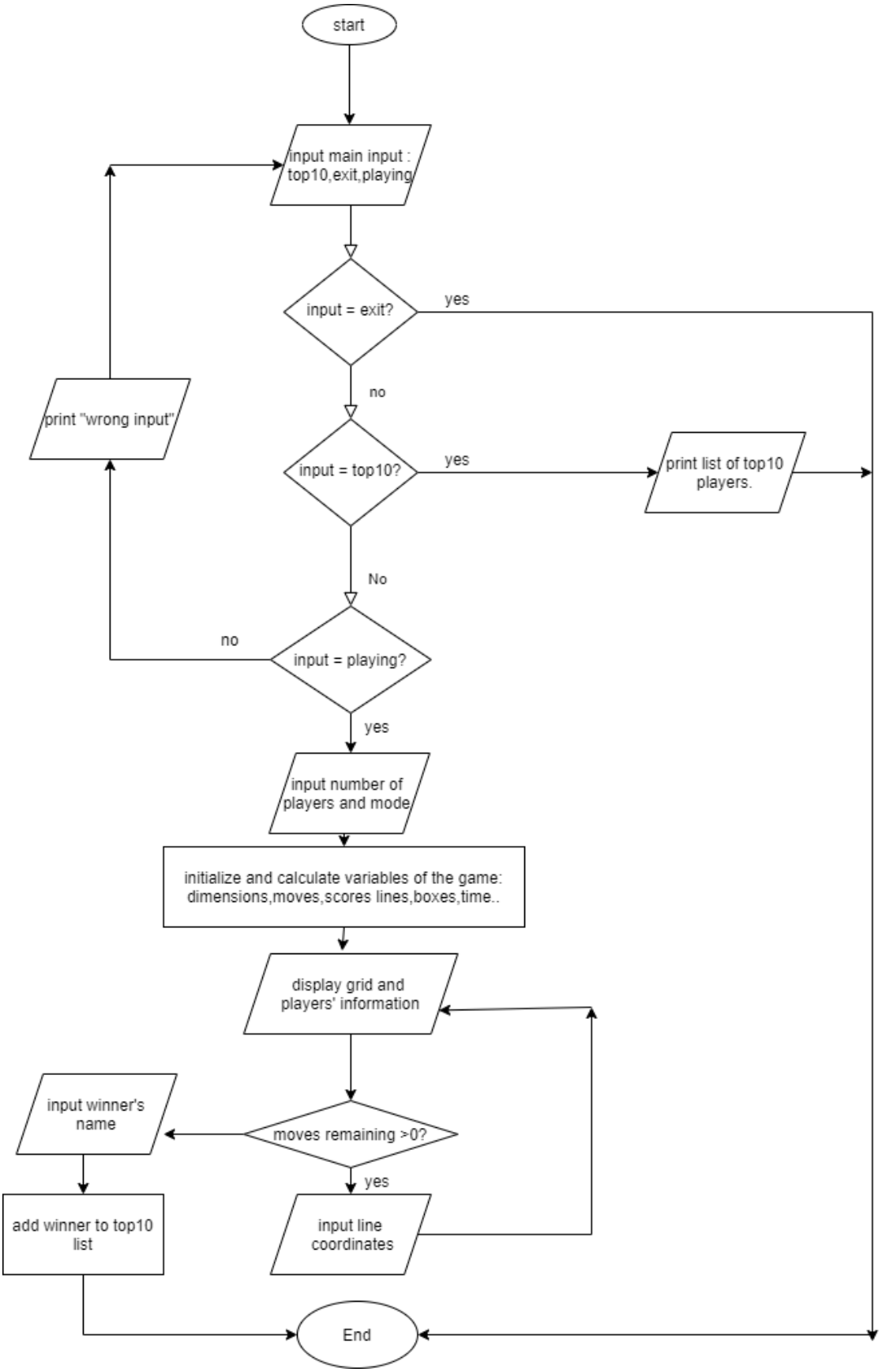
- char winnerPlayer[50]
- char Game[2][dim * (dim + 1) + 1]
- char Boxes[dim * dim + 1],
- char MoveRem = 2 * dim * (dim + 1).
- int score[2] = {0}
- int input[2] = {0, 0}
- int noMoves[2] = {0, 0}.

Description of the important functions/modules:

- Implemented functions:
  - ComputerMood: to define computer action while playing in player vs pc mode.
  - InputAction: to deal with players' inputs during the game.
  - mainInput: to get main input of the game (ex: showing top10 players, exit, playing…).
  - gameDisplay: to display grid and lines.
  - get_int: to get coordinates of lines from players during the game.
  - displayBox: to print players' information, moves, scores and time.
  - addingWinnerToTop10: to add the winner and his score to top10 list.

Pseudo code and flow chart:

- Player inputs main inputs of the game (number of players, dimensions ….) and inputs are validated.
- While there are still moves remaining game loop goes as following:
- Player input coordinates and inputs are validated.
- Grid, lines, boxes and players information are displayed.
- After game loop ends, the winner inputs his name, and his information is stored.


start
input main input : top10,exit,playing
input = exit?
yes
no
print "wrong input"
input = top10?
yes
print list of top10 players.
No
no
input = playing?
yes
input number of players and mode
initialize and calculate variables of the game: dimensions,moves,scores lines,boxes,time..
display grid and players' information
input winner's name
moves remaining >0?
yes
add winner to top10 list
input line coordinates
End

User Manual:

Input whether you want to show top10 list or play as beginner or expert or exit game.

Input number of players: 2 to play vs a friend, 1 to play vs computer.

Input a number N to play on a grid with dimensions N*N.

Input coordinates of the line you want to draw as x y where x represent row and y represent column.

When the game ends input winners name to be saved.

Sample runs:

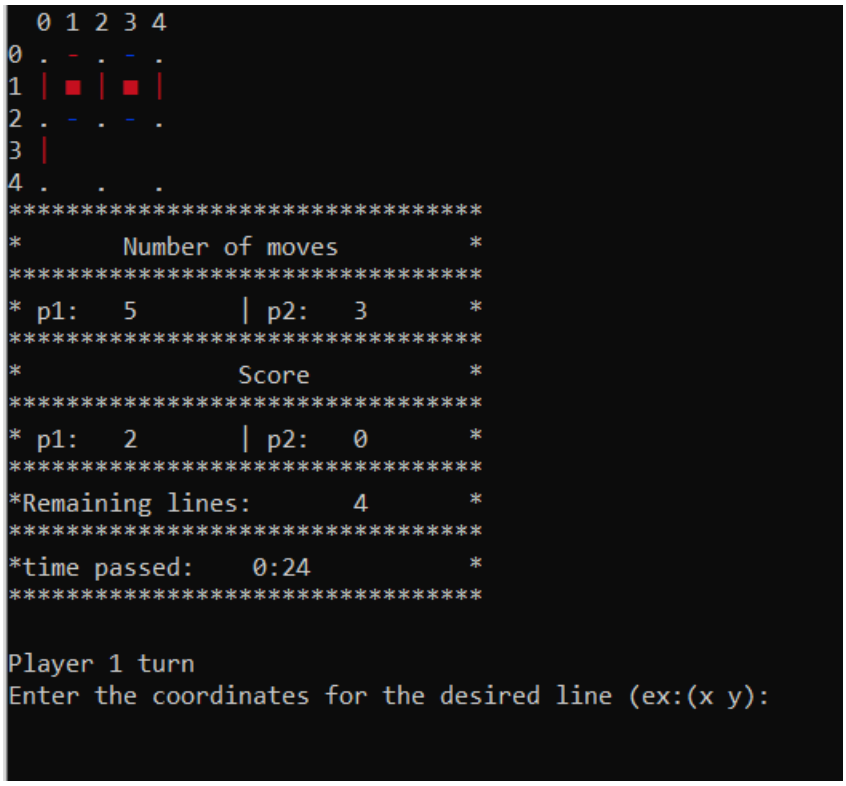
Main input:

```
Choose to show top10 or play as beginner or expert or quit(t or b or e or q): t
```

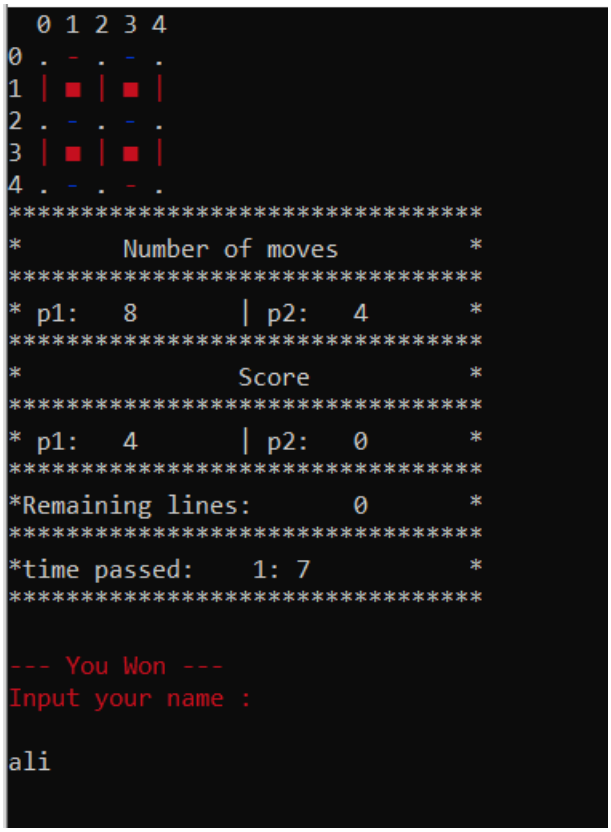
Top 10:

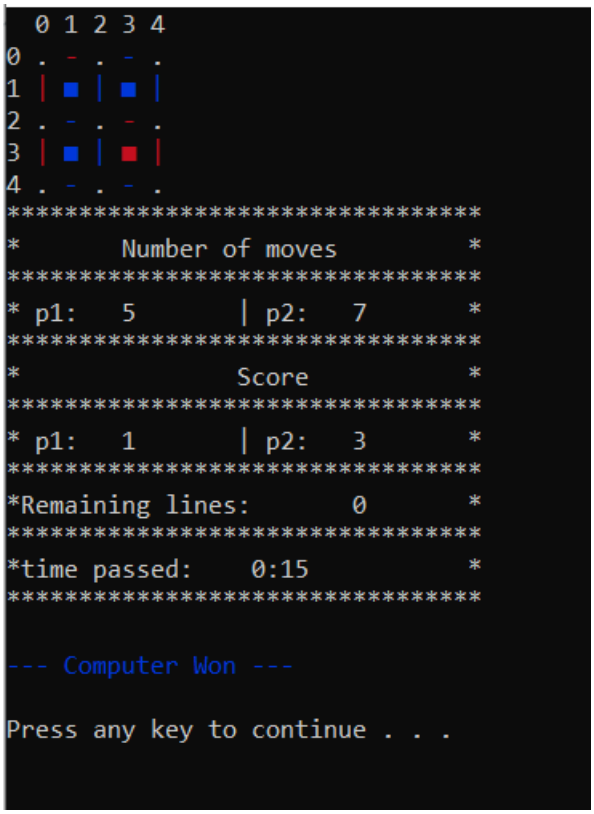
```
Choose to show top10 or play as beginner or expert or quit(t or b or e or q): t
1 - Name: hassan        Score: 6
2 - Name: samir Score: 4
3 - Name: amr   Score: 3
4 - Name: ali   Score: 3
5 - Name: abdullah      Score: 0
6 - Name: hossam        Score: 0
7 - Name: hussein       Score: 0
8 - Name: mohamed       Score: 0
9 - Name: mahmoud       Score: 0
10 - Name: mostafa      Score: 0
Press any key to continue . . .
```

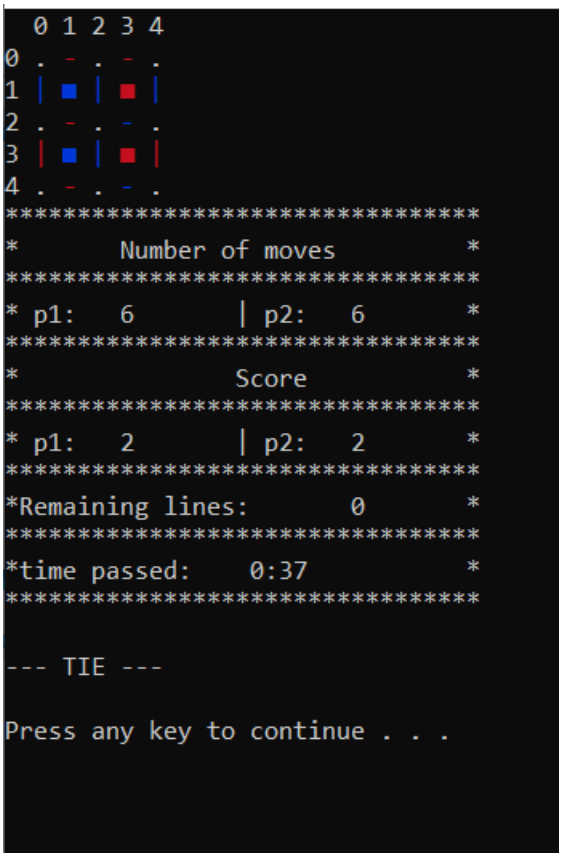
Playing:


0 1 2 3 4
0 . - . - .
1 | ■ | ■ |
2 . - . - .
3 |
4 . . .
****
* Number of moves *
****
* p1: 5 | p2: 3 *
****
* Score *
****
* p1: 2 | p2: 0 *
****
*Remaining lines: 4 *
****
*time passed: 0:24 *
****
Player 1 turn
Enter the coordinates for the desired line (ex:(x y):

Winning, losing, tie:




0 1 2 3 4
0 . - . - .
1 | ■ | ■ |
2 . - . - .
3 | ■ | ■ |
4 . - . - .
Number of moves
p1: 5 | p2: 7
Score
p1: 1 | p2: 3
Remaining lines: 0
time passed: 0:15
--- Computer Won ---
Press any key to continue . . .


0 1 2 3 4
0 . - . - .
1 | ■ | ■ |
2 . - . - .
3 | ■ | ■ |
4 . - . - .
Number of moves
p1: 6 | p2: 6
Score
p1: 2 | p2: 2
Remaining lines: 0
time passed: 0:37
--- TIE ---
Press any key to continue . . .