

CHECKERS
CSCI 3132 - CLASS PROJECT
Team 4

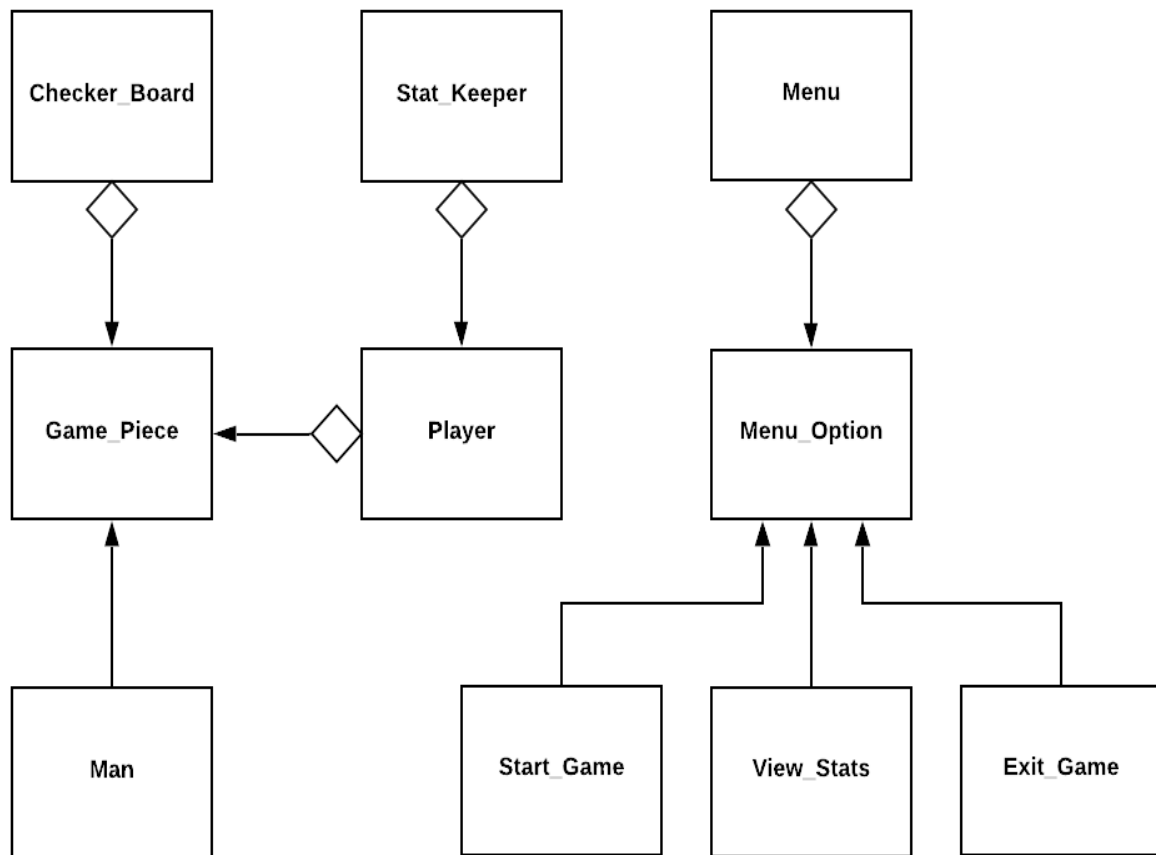
Alex Pawelczyk (B00755840)
Maksym Taranukhin (B00813462)
Liam O'Shea (B00613041)
Gobii Vivagananda (B00517002)

July 7th, 2019

THE RULES OF CHECKERS

- Checkers is a classic game in which the objective is to capture all of your opponent's pieces.
- A checker piece (also known as a 'man') may only be moved diagonally.
- A piece which reaches the home row of your opponent is 'kinged'. Kinged pieces may move and capture in both the forwards or backwards directions.
- During a player's turn, pieces may be moved forward-diagonally by one square.
- Enemy checker pieces which are adjacent to the current player's pieces may be captured by jumping over them diagonally into an empty square. Players may not jump over empty squares. Non-king pieces may only capture in the forward-diagonal direction.
- Multiple pieces may be removed from the board during one turn by chaining captures together.
- Only one piece may be moved per turn.
- The first player to capture all of the opposing team's pieces wins the game!

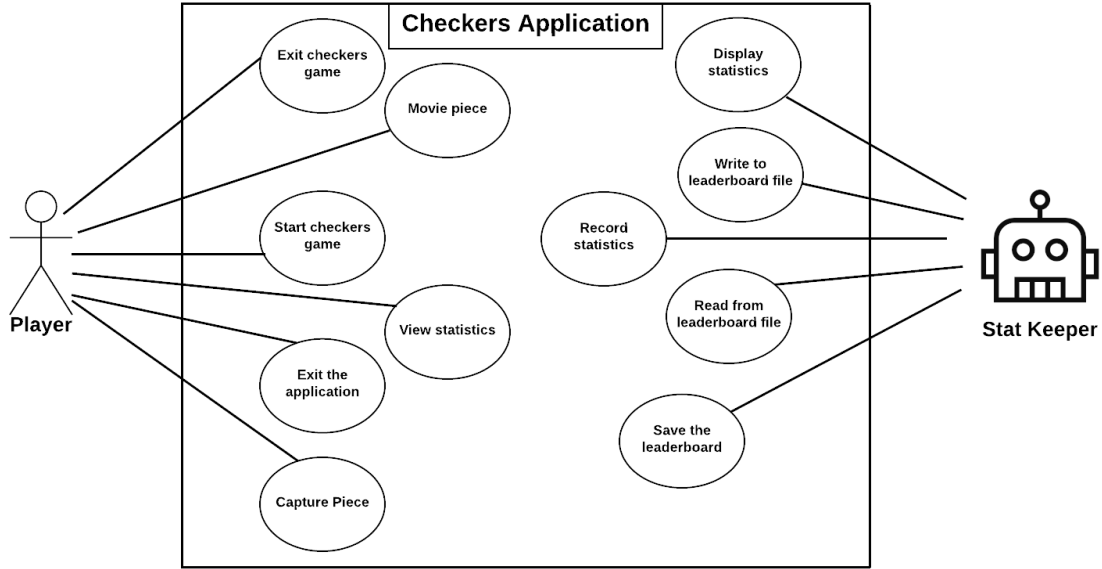
DOMAIN MODEL



Link:

<https://www.lucidchart.com/documents/edit/44d81164-8532-43e4-a48a-766575263c35/0?shared=true&>

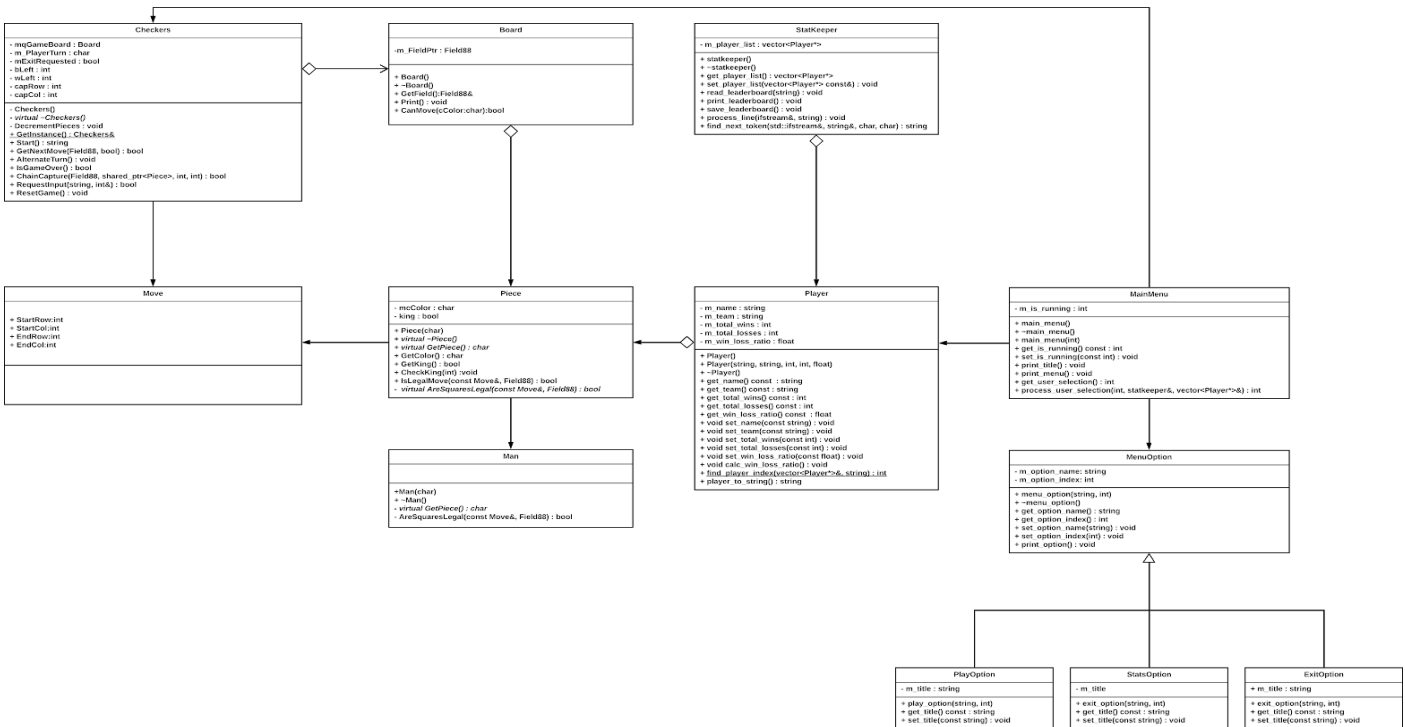
USE CASE DIAGRAM



Link:

<https://www.lucidchart.com/documents/edit/8e43e29f-70ec-483d-aaa7-447707a69195/0?shared=true&>

CLASS DIAGRAM



Link

<https://www.lucidchart.com/documents/edit/1f85da35-3795-45e1-a841-98ff84969a6b/0>

SCREENSHOTS OF WORKING GAME

Initial Menu

```

      (      )
     (  (/  )  (      )  (  (/  )  (      )  (  (/  )  (      )
    )\   )\() (      )\   )\() (      )\   )\() (      )\   )\()
  ((_) ((_) \  )\   ((_) |((_) \  )\   /(_) /(_) /(_) /(_)
 )\___ _((_) ((_) )\___ | _((_) ((_) (  ) (  ) (  )
 (/___| | | | |___| (/___| | / / |___| | - \ /___|
 | ___| |___| |___| | ___| ' < |___| | - / \___\
 \___| | | | |___| \___| -\ \ |___| | | \ |___/

=====
=====

=====
1) Play Checkers
=====
2) View Stats
=====
3) Exit Game
=====
Select an option from the menu: █

```

View Stats Option

```

      (      )
     (  (/  )  (      )  (  (/  )  (      )  (  (/  )  (      )
    )\   )\() (      )\   )\() (      )\   )\() (      )\   )\()
  ((_) ((_) \  )\   ((_) |((_) \  )\   /(_) /(_) /(_) /(_)
 )\___ _((_) ((_) )\___ | _((_) ((_) (  ) (  ) (  )
 (/___| | | | |___| (/___| | / / |___| | - \ /___|
 | ___| |___| |___| | ___| ' < |___| | - / \___\
 \___| | | | |___| \___| -\ \ |___| | | \ |___/

=====
=====

=====
1) Play Checkers
=====
2) View Stats
=====
3) Exit Game
=====
Select an option from the menu: 2
Option 2 selected.
***** GLOBAL LEADERBOARD *****
[name=Alex, wins=2, losses=1, win/loss_ratio=2.000000]
[name=Liam, wins=1, losses=2, win/loss_ratio=0.500000]
[name=Max, wins=0, losses=0, win/loss_ratio=0.000000]
[name=Bill, wins=0, losses=0, win/loss_ratio=0.000000]
[name=Tom, wins=0, losses=0, win/loss_ratio=0.000000]
[name=a, wins=0, losses=0, win/loss_ratio=0.000000]
[name=b, wins=0, losses=0, win/loss_ratio=0.000000]
[name=Jacob, wins=0, losses=0, win/loss_ratio=0.000000]
[name=Billy, wins=0, losses=0, win/loss_ratio=0.000000]
Enter any character to return to the main menu: █

```

Playing a Game of Checkers

```
[
  (      )
  ( / (      )      (      )
  )\    )\() (      )\    )\() (      )\() (      )\()
  ((_)  ((_) \ )\    ((_) |((_) \ )\    /(_) /(_)
  )\___ _((_) ( )   )\___ | ( ) ( )   ( )   ( )
  (/ ___ | | | | | ___ (/ ___ | | / / | ___ | - \ / ___
  | (___ | ___ | | - | (___ | < | - | | - / \___ \
  \___ | | | | | ___ \___ | - \ \ \___ | | - \ \___ /
```

=====

1) Play Checkers

2) View Stats

3) Exit Game

Select an option from the menu: 1
Option 1 selected.
Player 1, enter your name: Alex
Player 2, enter your name: Liam

***** Current Stats for Players 1 and 2 *****
P1: [name=Alex, wins=2, losses=0, win/loss_ratio=2.000000] Team: W
P2: [name=Liam, wins=0, losses=2, win/loss_ratio=0.000000] Team: B

***** START OF GAME *****

```
---      *BM*      *BM*      *BM*      *BM*
-8-      *BM*      *BM*      *BM*      *BM*
---      *BM*      *BM*      *BM*      *BM*
---*BM*      *BM*      *BM*      *BM*
-7-*BM*      *BM*      *BM*      *BM*
---*BM*      *BM*      *BM*      *BM*
---      *BM*      *BM*      *BM*      *BM*
-6-      *BM*      *BM*      *BM*      *BM*
---      *BM*      *BM*      *BM*      *BM*
---*BM*      *BM*      *BM*      *BM*
-5-*BM*      *BM*      *BM*      *BM*
---*BM*      *BM*      *BM*      *BM*
---      *BM*      *BM*      *BM*      *BM*
-4-      *BM*      *BM*      *BM*      *BM*
---      *BM*      *BM*      *BM*      *BM*
---*BM*      *BM*      *BM*      *BM*
-3-*WM*      *WM*      *WM*      *WM*
---*WM*      *WM*      *WM*      *WM*
---      *WM*      *WM*      *WM*      *WM*
-2-      *WM*      *WM*      *WM*      *WM*
---      *WM*      *WM*      *WM*      *WM*
---*WM*      *WM*      *WM*      *WM*
-1-*WM*      *WM*      *WM*      *WM*
---*WM*      *WM*      *WM*      *WM*
```

-----1---2---3---4---5---6---7---8---

White's Move

Enter your row (q for exit): 3

Enter your column (q for exit): 3

To

Enter target row (q for exit): 4

Enter target column (q for exit): 4

```
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-7-*BM*  *BM*  *BM*  *BM*
---****  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-5-****  ****  ****  ****
---****  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  *WM*  ****  ****
---  ****  ****  ****  ****
---****  ****  ****  ****
-3-*WM*  ****  *WM*  *WM*
---****  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-1-*WM*  *WM*  *WM*  *WM*
---****  ****  ****  ****
```

-----1---2---3---4---5---6---7---8--

Black's Move

Enter your row (q for exit): 6

Enter your column (q for exit): 6

To

Enter target row (q for exit): 5

Enter target column (q for exit): 5

```
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-7-*BM*  *BM*  *BM*  *BM*
---****  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  *BM*  ****  *BM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-5-****  ****  *BM*  ****
---****  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  *WM*  ****  ****
---  ****  ****  ****  ****
---****  ****  ****  ****
-3-*WM*  ****  *WM*  *WM*
---****  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-1-*WM*  *WM*  *WM*  *WM*
---****  ****  ****  ****
```

-----1---2---3---4---5---6---7---8--

White's Move

Enter your row (q for exit): 4

Enter your column (q for exit): 4

To

Enter target row (q for exit): 6

Enter target column (q for exit): 6

```
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****

---****  ****  ****  ****
-7-*BM*  *BM*  *BM*  *BM*
---****  ****  ****  ****

---  ****  ****  ****  ****
-6-  *BM*  *BM*  *WM*  *BM*
---  ****  ****  ****  ****

---****  ****  ****  ****
-5-****  ****  ****  ****
---****  ****  ****  ****

---  ****  ****  ****  ****
-4-  ****  ****  ****  ****
---  ****  ****  ****  ****

---****  ****  ****  ****
-3-*WM*  ****  *WM*  *WM*
---****  ****  ****  ****

---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****

---****  ****  ****  ****
-1-*WM*  *WM*  *WM*  *WM*
---****  ****  ****  ****
```

-----1---2---3---4---5---6---7---8--

Black's Move

Enter your row (q for exit): █

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

..... continue to end of game

```

---      ****      ****      ****      ****
-8-      ****      ****      *WM*      ****
---      ****      ****      ****      ****
---****      ****      ****      ****
-7-****      ****      ****      *BM*
---****      ****      ****      ****
---      ****      ****      ****      ****
-6-      ****      ****      *WM*      ****
---      ****      ****      ****      ****
---****      ****      ****      ****
-5-****      ****      ****      ****
---****      ****      ****      ****
---      ****      ****      ****      ****
-4-      ****      *WM*      ****      ****
---      ****      ****      ****      ****
---****      ****      ****      ****
-3-****      ****      *WM*      ****
---****      ****      ****      ****
---      ****      ****      ****      ****
-2-      *WM*      ****      ****      *WM*
---      ****      ****      ****      ****
---****      ****      ****      ****
-1-****      *WM*      *WM*      ****
---****      ****      ****      ****
-----
-1-2-3-4-5-6-7-8-
-----

```

White's Move

```

Enter your row (q for exit): 6
Enter your column (q for exit): 6
To
Enter target row (q for exit): 8
Enter target column (q for exit): 8

```

```

---      ****      ****      ****      ****
-8-      ****      ****      *WM*      *WM*
---      ****      ****      ****      ****
---****      ****      ****      ****
-7-****      ****      ****      ****
---****      ****      ****      ****
---      ****      ****      ****      ****
-6-      ****      ****      ****      ****
---      ****      ****      ****      ****
---****      ****      ****      ****
-5-****      ****      ****      ****
---****      ****      ****      ****
---      ****      ****      ****      ****
-4-      ****      *WM*      ****      ****
---      ****      ****      ****      ****
---****      ****      ****      ****
-3-****      ****      *WM*      ****
---****      ****      ****      ****
---      ****      ****      ****      ****
-2-      *WM*      ****      ****      *WM*
---      ****      ****      ****      ****
---****      ****      ****      ****
-1-****      *WM*      *WM*      ****
---****      ****      ****      ****
-----
-1-2-3-4-5-6-7-8-
-----

```

Player 2 Wins!

```

***** Updated Stats for Players 1 and 2 *****
[name=Alex, wins=2, losses=1, win/loss_ratio=2.000000]
[name=Liam, wins=1, losses=2, win/loss_ratio=0.500000]
Enter any character to return to the main menu: [ ]

```


Example of Capture Chain

```
--- **** **** **** ****
-8- *BM* *BM* *BM* *BM*
--- **** **** **** ****
---**** **** **** ****
-7-*BM* **** *BM* *BM*
---**** **** **** ****
--- **** **** **** ****
-6- *BM* *BM* *WM* *BM*
--- **** **** **** ****
---**** **** **** ****
-5-**** *WM* **** ****
---**** **** **** ****
--- **** **** **** ****
-4- **** **** *BM* ****
--- **** **** **** ****
---**** **** **** ****
-3-*WM* **** **** *WM*
---**** **** **** ****
--- **** **** **** ****
-2- *WM* *WM* *WM* *WM*
--- **** **** **** ****
---**** **** **** ****
-1-*WM* *WM* *WM* *WM*
---**** **** **** ****
```

-----1---2---3---4---5---6---7---8--

White's Move

Enter your row (q for exit): 3

Enter your column (q for exit): 7

To

Enter target row (q for exit): 5

Enter target column (q for exit): 5

```
--- **** **** **** ****
-8- *BM* *BM* *BM* *BM*
--- **** **** **** ****
---**** **** **** ****
-7-*BM* **** *BM* *BM*
---**** **** **** ****
--- **** **** **** ****
-6- *BM* *BM* *WM* *BM*
--- **** **** **** ****
---**** **** **** ****
-5-**** *WM* *WM* ****
---**** **** **** ****
--- **** **** **** ****
-4- **** **** **** ****
--- **** **** **** ****
---**** **** **** ****
-3-*WM* **** **** ****
---**** **** **** ****
--- **** **** **** ****
-2- *WM* *WM* *WM* *WM*
--- **** **** **** ****
---**** **** **** ****
-1-*WM* *WM* *WM* *WM*
---**** **** **** ****
```

-----1---2---3---4---5---6---7---8--

```

White's Move
Capture Chain!
Enter target row (q for exit): 7
Enter target column (q for exit): 3
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
-----  ****  ****  ****
-7-*BM* *WM*  *BM*  *BM*
-----  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  ****  *WM*  *BM*
---  ****  ****  ****  ****
-----  ****  ****  ****
-5-****  *WM*  ****  ****
-----  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  ****  ****  ****
---  ****  ****  ****  ****
-----  ****  ****  ****
-3-*WM*  ****  ****  ****
-----  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
-----  ****  ****  ****
-1-*WM* *WM*  *WM*  *WM*
-----  ****  ****  ****
-----1---2---3---4---5---6---7---8--
-----

```

```

Black's Move
Enter your row (q for exit): 

```

Example of Invalid Move

```

White's Move
Enter your row (q for exit): 1
Enter your column (q for exit): 1
To
Enter target row (q for exit): 1
Enter target column (q for exit): 1
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
-----  ****  ****  ****
-7-*BM*  *BM*  *BM*  *BM*
-----  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
-----  ****  ****  ****
-5-****  ****  ****  ****
-----  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  ****  ****  ****
---  ****  ****  ****  ****
-----  ****  ****  ****
-3-*WM* *WM*  *WM*  *WM*
-----  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
-----  ****  ****  ****
-1-*WM* *WM*  *WM*  *WM*
-----  ****  ****  ****
-----1---2---3---4---5---6---7---8--
-----
Invalid Move!
White's Move
Enter your row (q for exit): 

```

Example of Piece Becoming Kinged

```
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  ****
---  ****  ****  ****  ****
----****  ****  ****  ****
-7-*BM*  *BM*  *BM*  *BM*
----****  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  *BM*  *WM*  *BM*
---  ****  ****  ****  ****
----****  ****  ****  ****
-5-****  *WM*  ****  *BM*
----****  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  ****  ****  ****
---  ****  ****  ****  ****
----****  ****  ****  ****
-3-****  ****  *WM*  *WM*
----****  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
----****  ****  ****  ****
-1-*WM*  *WM*  *WM*  *WM*
----****  ****  ****  ****

-----1---2---3---4---5---6---7---8--
-----
```

White's Move

Enter your row (q for exit): 6

Enter your column (q for exit): 6

To

Enter target row (q for exit): 8

Enter target column (q for exit): 8

```
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *WK*
---  ****  ****  ****  ****
----****  ****  ****  ****
-7-*BM*  *BM*  *BM*  ****
----****  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  *BM*  ****  *BM*
---  ****  ****  ****  ****
----****  ****  ****  ****
-5-****  *WM*  ****  *BM*
----****  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  ****  ****  ****
---  ****  ****  ****  ****
----****  ****  ****  ****
-3-****  ****  *WM*  *WM*
----****  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
----****  ****  ****  ****
-1-*WM*  *WM*  *WM*  *WM*
----****  ****  ****  ****

-----1---2---3---4---5---6---7---8--
-----
```

Black's Move

Enter your row (q for exit): █

Example of Quitting Mid-Game

```
***** START OF GAME *****
---  ****  ****  ****  ****
-8-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-7-*BM*  *BM*  *BM*  *BM*
---****  ****  ****  ****
---  ****  ****  ****  ****
-6-  *BM*  *BM*  *BM*  *BM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-5-****  ****  ****  ****
---****  ****  ****  ****
---  ****  ****  ****  ****
-4-  ****  ****  ****  ****
---  ****  ****  ****  ****
---****  ****  ****  ****
-3-*WM*  *WM*  *WM*  *WM*
---****  ****  ****  ****
---  ****  ****  ****  ****
-2-  *WM*  *WM*  *WM*  *WM*
---  ****  ****  ****  ****
---****  ****  ****  ****
-1-*WM*  *WM*  *WM*  *WM*
---****  ****  ****  ****
-----
---1---2---3---4---5---6---7---8--
-----
White's Move
Enter your row (q for exit): q
Quitting the match... Nobody wins!
***** Updated Stats for Players 1 and 2 *****
[name=a, wins=0, losses=0, win/loss_ratio=0.000000]
[name=b, wins=0, losses=0, win/loss_ratio=0.000000]
Enter any character to return to the main menu: █
```