

Plot Four

Guideline:

1. Use Git : Meaningful commit, git strategy (github flow)
2. TDD: Test for check credential
3. Dockerize: Run project anywhere

1. Input game parameters

Description

Plot Four is a classic game where players drop colorful discs onto a vertical board. The main goal of the game is to form a line of four discs of the same color horizontally, vertically, or diagonally.

In this project, you will create a software version of this game. Typically, the game board has 6 rows and 7 columns, but in this version, the number of rows and columns can vary from 5 to 9.

In this stage, the program should read the players' names and the board size from the console input.

The board size is input in the following format: `<Rows> X <Columns>` or `<Rows> x <Columns>`, for example, 7 X 8 or 8x9. Whitespaces (spaces and tabs) have no effect.

Objectives

The program should print the program title `Plot Four`, ask for the 1st player's name with the prompt `First player's name:`, and read it. Then it should ask for the 2nd player's name with the prompt `Second player's name:` and read it.

Subsequently, the program should ask for the board dimensions with the following prompt:

```
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
```

Once the dimensions are entered, it should read them (Examples 1, 3). Ignore any whitespaces. If users press the Enter button right away (ignoring the dimension prompt), then the board size is 6 rows and 7 columns (see Example 2).

If the number of rows is outside the 5-9 range, print the following message Board rows should be from 5 to 9 and ask for dimensions once again (see Example 3).

If the number of columns is outside the 5-9 range, print the following message Board columns should be from 5 to 9 and ask for dimensions once again (see Example 3).

If users fail to input dimensions in the correct format, print Invalid input and ask for dimensions once again (see Example 4).

Finally, output the following message:

```
<1st player`s name> VS <2nd players name>  
<Rows> X <Columns> board
```

Examples

The greater-than symbol followed by a space (>) represents the user input. Note that it's not part of the input.

Example 1: *defining the board size*

```
Plot Four  
First player`s name:  
> Ava  
Second player`s name:  
> Oliver  
Set the board dimensions (Rows x Columns)  
Press Enter for default (6 x 7)  
> 7 x 9  
Ava VS Oliver  
7 X 9 board
```

Example 2: *pressing Enter to get the default board size*

```
Plot Four  
First player`s name:  
> Ava  
Second player`s name:  
> Oliver  
Set the board dimensions (Rows x Columns)  
Press Enter for default (6 x 7)  
>  
Ava VS Oliver6 X 7 board
```

Example 3: *invalid board size*

```

Plot Four
First player`s name:
> Oliver
Second player`s name:
> Ava
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 4x7
Board rows should be from 5 to 9
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 10x7
Board rows should be from 5 to 9
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 7 x 4
Board columns should be from 5 to 9
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 7 X 10
Board columns should be from 5 to 9
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 5X9
Oliver VS Ava
5 X 9 board

```

Example 4: *invalid input*

```

Plot Four
First player`s name:
> Ava
Second players name:
> Oliver
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 6 7
Invalid input
Set the board dimensions (Rows x Columns)

```

```

Press Enter for default (6 x 7)
> 6_7
Invalid input
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 6 V 7
Invalid input
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 6x7
Ava VS Oliver
6 X 7 board

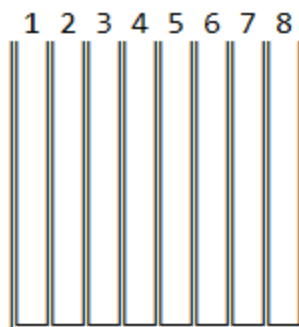
```

2. Game board

Description

In this stage, you need to draw the game board by using the `||`, `└`, `=`, `┐`, `┌` box-drawing characters. You can find more information about these characters in the corresponding [Wikipedia article](#), but you can also simply copy them.

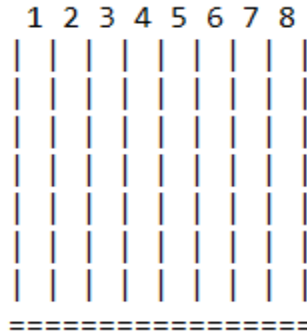
Construct a board in the manner shown in the following example for a 7x8 board:



Print the column number above each respective column and use the above-mentioned box-drawing characters for creating the board lines. You can find more board types in the Examples section.

There is the possibility, due to a known issue, that the `||`, `└`, `=`, `┐`, `┌` box-drawing characters can't be correctly printed at the console output. Instead the ? character is

printed for each of them. If this situation arises, then implement the board by using the plain text | and = plain text characters as following. Either case will be accepted as a valid solution. Also, a plain text board example is available at each stage.



The board size can vary, so your program should adapt to any possible size.

Objectives

Draw and print the board set by users according to the procedure above;

Print the column numbers on the board. Mind the spaces between characters.

Examples

The greater-than symbol followed by a space (`>`) represents the user input. Note that it's not part of the input.

Example 1: *printing the board*

```
Plot Four
First player`s name:
> Sophia
Second player`s name:
> John
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 8 x 8
Sophia VS John
8 X 8 board
  1 2 3 4 5 6 7 8
|| || || || || || || ||
```



Example 2: *the default size board*

```
Plot Four
First player`s name:
> Sophia
Second player`s name:
> John
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
>
Sophia VS John
6 X 7 board
 1 2 3 4 5 6 7
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
```

Example 3: *plain text board*

```
Plot Four
First player`s name:
> Sophia
Second player`s name:
> John
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
```

```

> 7 x 8
Sophia VS John
7 X 8 board
 1 2 3 4 5 6 7 8
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
=====

```

3. Game logic

Description

Players use red and yellow colored discs in the "hardware" version of the game. In this project, we are going to substitute them with `o` and `*` characters. The `o` is for the first player.

Each player inputs a column number one after another. The program must read the input and print the appropriate character (`o` or `*`) on the first available position at the bottom of that column. If the user input isn't correct, print the appropriate message and ask for a new one (see Examples). The program should also check whether a column is full or not. If it is, no more discs can be added to it.

If players input end instead of a column number, terminate the program and print the respective message.

Objectives

In addition to the functionality from the previous stage, your game should perform the following:

1. Ask each player to input a column number by prompting `<First player`s name>`s turn:` or `<Second player`s name>`s turn:`. Read the column number and print `o` or `*` on the first available position of that column. The first

player is 0; the second player is *. If either player inputs end, terminate the program and print **Game over!** (see Example 1).

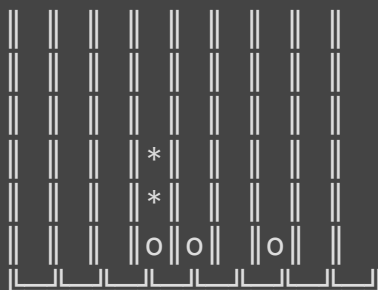
2. If the input contains an integer number outside the scope of available columns, warn the players with the **The column number is out of range (1 - <Max column number>)** message and ask for it once again. If players' input doesn't contain an integer, warn the players with **Incorrect column number** and ask for it once again (see Example 2).
3. If the column is full, print the following message **Column <Column number> is full** and ask to input another column number (see Example 2).

Examples

The greater-than symbol followed by a space (>) represents the user input. Note that it's not part of the input.

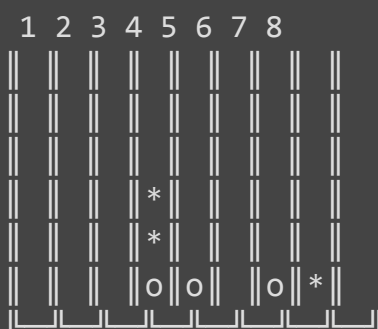
Example 1: normal execution

```
Plot Four
First player`s name:
> Mia
Second player`s name:
> Bill
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 6x8
Mia VS Bill
6 X 8 board
 1 2 3 4 5 6 7 8
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
└─┴─┴─┴─┴─┴─┴─┴─┘
Mia`s turn:
> 4
 1 2 3 4 5 6 7 8
|| || || || || || || ||
```

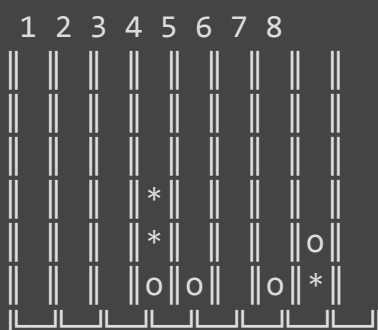
Bill`s turn:

> 8



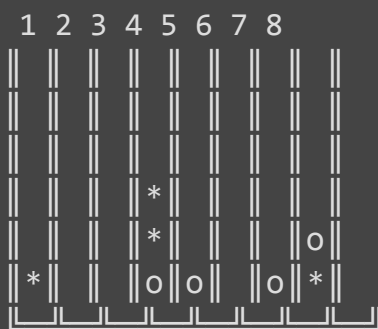
Mia`s turn:

> 8



Bill`s turn:

> 1



Mia`s turn:

> end

Game over!

Example 2: warning messages

```
Plot Four
First player`s name:
> Mia
Second player`s name:
> Bill
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 7 x 8
Mia VS Bill
7 X 8 board
  1 2 3 4 5 6 7 8
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|_| |_| |_| |_| |_| |_| |_|
Mia`s turn:
> 0
The column number is out of range (1 - 8)
Mia`s turn:
> 9
The column number is out of range (1 - 8)
Mia`s turn:
> a12
Incorrect column number
Mia`s turn:
> 1
  1 2 3 4 5 6 7 8
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
|| || || || || || || ||
```


Game over!

```

Plot Four
First player`s name:
> Mia
Second player`s name:
> Bill
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 5x7
Mia VS Bill
5 X 7 board
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

=====
Mia`s turn:
> 2
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| |o| | | | |

=====
Bill`s turn:
> 3
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| |o*| | | | |

=====
Mia`s turn:
> 2
 1 2 3 4 5 6 7
| | | | | | |

```

```

| | | | | | |
| | | | | | |
| |o| | | | |
| |o|*| | | |

```

```
=====
```

Bill`s turn:

> 2

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

```

| | | | | | |
| | | | | | |
| |*| | | | |
| |o| | | | |
| |o|*| | | |

```

```
=====
```

Mia`s turn:

> 1

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

```

| | | | | | |
| | | | | | |
| |*| | | | |
| |o| | | | |
|o|o|*| | | |

```

```
=====
```

Bill`s turn:

> 4

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

```

| | | | | | |
| | | | | | |
| |*| | | | |
| |o| | | | |
|o|o|*|*| | |

```

```
=====
```

Mia`s turn:

> end

Game over!

4. Winning condition

Description

Now, it is time to implement the winning condition. A player wins when they place four discs of the same color in a row horizontally, vertically, or diagonally. After each move, the program checks if the condition is met. Also, if the board is full and the win condition isn't fulfilled, claim it a draw.

Objectives

In addition to what we have added before, your program should do the following:

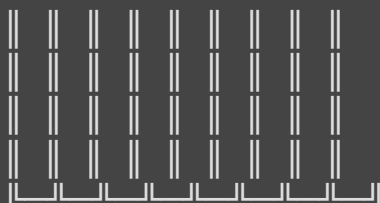
1. Check the board for the winning condition. If a player wins, output **Player <Player`s name> won;**
2. If the board is full, but neither of the players has won, print **It is a draw;**
3. Regardless of whether it is a draw or somebody's victory, print **Game Over!** and terminate the program.

Examples

The greater-than symbol followed by a space (>) represents the user input. Note that it's not part of the input.

Example 1: *the first player wins by placing four discs in a horizontal row*

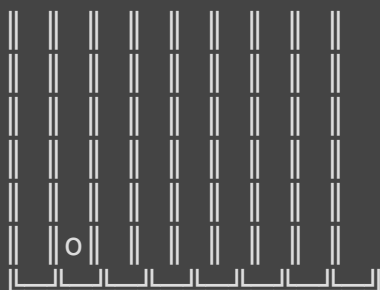
```
Plot Four
First player`s name:
> Paul
Second player`s name:
> Joanne
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 6x8
Paul VS Joanne
6 X 8 board
 1 2 3 4 5 6 7 8
|| || || || || || || ||
|| || || || || || || ||
```



Paul`s turn:

> 2

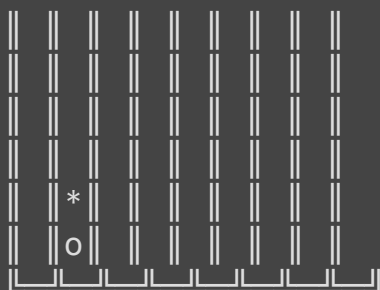
1 2 3 4 5 6 7 8



Joanne`s turn:

> 2

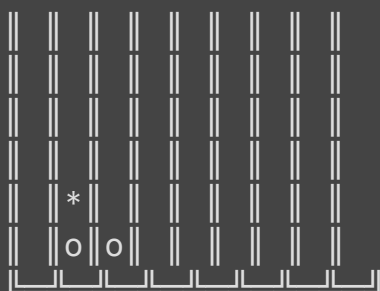
1 2 3 4 5 6 7 8



Paul`s turn:

> 3

1 2 3 4 5 6 7 8

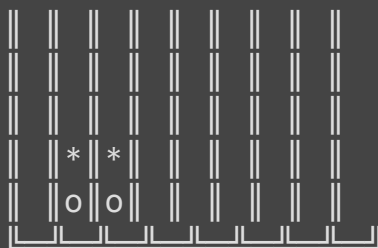


Joanne`s turn:

> 3

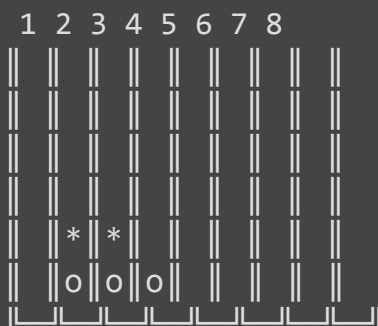
1 2 3 4 5 6 7 8





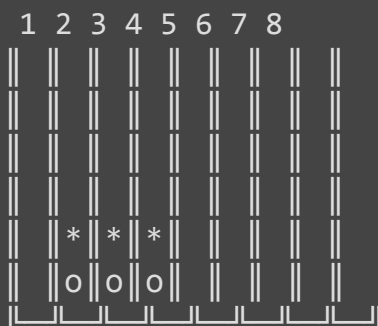
Paul`s turn:

> 4



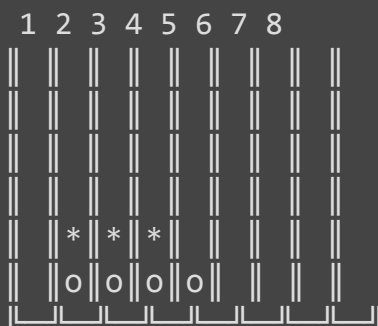
Joanne`s turn:

> 4



Paul`s turn:

> 5



Player Paul won

Game over!

Example 2: *the second player wins by placing four discs in a vertical row*

```
Plot Four
First player`s name:
> Paul
Second player`s name:
> Joanne
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 5x7
Paul VS Joanne
5 X 7 board
 1 2 3 4 5 6 7
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
└─┴─┴─┴─┴─┴─┴─┘

Paul`s turn:
> 3
 1 2 3 4 5 6 7
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
└─┴─┴─┴─┴─┴─┴─┘
      o

Joanne`s turn:
> 4
 1 2 3 4 5 6 7
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
└─┴─┴─┴─┴─┴─┴─┘
      o *

Paul`s turn:
> 3
```



```

|| || || o * || || ||
|| || || o * || || ||
|| || o || o * || || ||
└─┴─┴─┴─┴─┴─┴─┘

```

Joanne`s turn:

> 4

```

 1 2 3 4 5 6 7
|| || || || * || || ||
|| || || o * || || ||
|| || || o * || || ||
|| || o || o * || || ||
└─┴─┴─┴─┴─┴─┴─┘

```

Player Joanne won

Game over!

Example 3: *the first player wins by placing four discs in a diagonal row*

Plot Four

First player`s name:

> Paul

Second player`s name:

> Joanne

Set the board dimensions (Rows x Columns)

Press Enter **for** default (6 x 7)

> 7x7

Paul VS Joanne

7 X 7 board

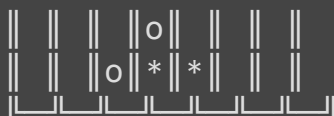
```

 1 2 3 4 5 6 7
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
|| || || || || || ||
└─┴─┴─┴─┴─┴─┴─┘

```

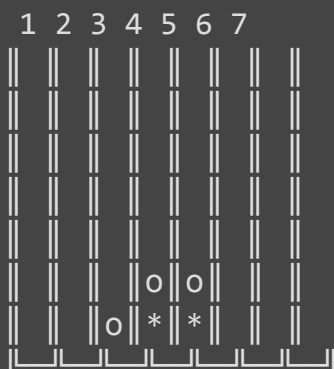
Paul`s turn:

> 3



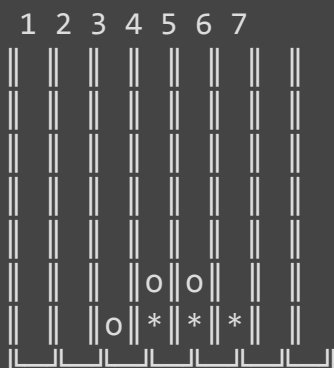
Paul`s turn:

> 5



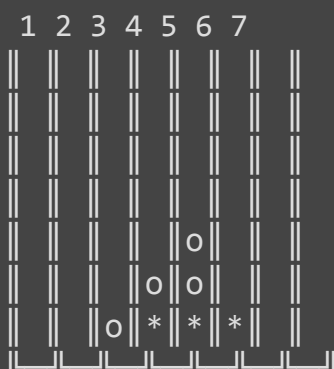
Joanne`s turn:

> 6



Paul`s turn:

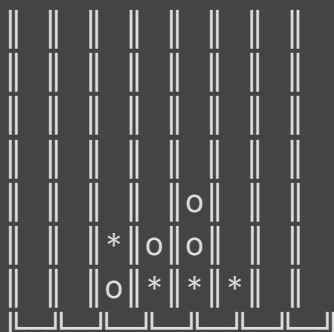
> 5



Joanne`s turn:

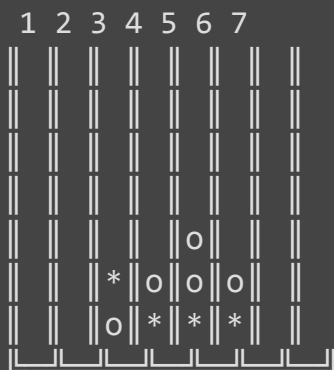
> 3

1 2 3 4 5 6 7



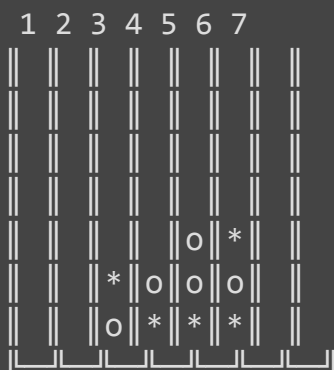
Paul`s turn:

> 6



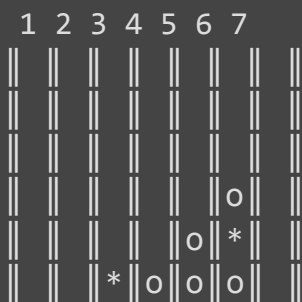
Joanne`s turn:

> 6



Paul`s turn:

> 6



```

|| || || o || * || * || * || || ||
|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

```

Player Paul won
Game over!

Example 4: a draw

```

Plot Four
First player`s name:
> Paul
Second player`s name:
> Joanne
Set the board dimensions (Rows x Columns)
Press Enter for default (6 x 7)
> 5 X 5
Paul VS Joanne
5 X 5 board
  1 2 3 4 5
|| || || || || || | | | | |
|| || || || || ||
|| || || || || ||
|| || || || || ||
|| || || || || ||
|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Paul`s turn:
> 1
  1 2 3 4 5
|| || || || || || | | | | |
|| || || || || ||
|| || || || || ||
|| || || || || ||
|| o || || || ||
|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Joanne`s turn:
> 1
  1 2 3 4 5
|| || || || || || | | | | |
|| || || || || ||
|| || || || || ||
|| || || || || ||
|| || || || || ||
|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

```

```

||*|| || || || ||
||o|| || || || ||
||_|_|_|_|_|

```

Paul`s turn:

> 1

```

  1 2 3 4 5
||  || || || ||
||  || || || ||
||o|| || || ||
||*|| || || ||
||o|| || || ||
||_|_|_|_|_|

```

Joanne`s turn:

> 1

```

  1 2 3 4 5
||  || || || ||
||*|| || || ||
||o|| || || ||
||*|| || || ||
||o|| || || ||
||_|_|_|_|_|

```

Paul`s turn:

> 1

```

  1 2 3 4 5
||o|| || || ||
||*|| || || ||
||o|| || || ||
||*|| || || ||
||o|| || || ||
||_|_|_|_|_|

```

Joanne`s turn:

> 2

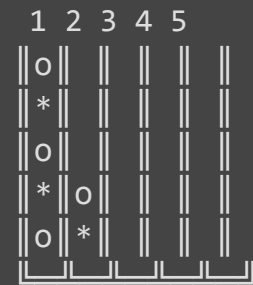
```

  1 2 3 4 5
||o|| || || ||
||*|| || || ||
||o|| || || ||
||*|| || || ||
||o||*|| || ||
||_|_|_|_|_|

```

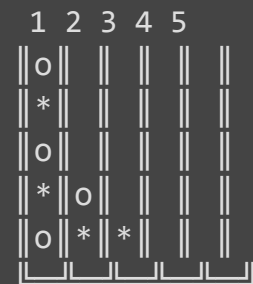
Paul`s turn:

> 2



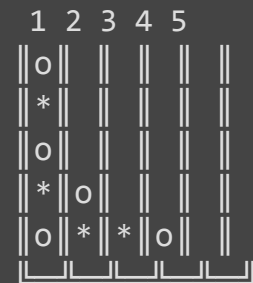
Joanne`s turn:

> 3



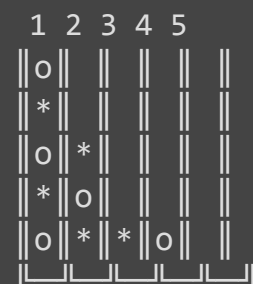
Paul`s turn:

> 4



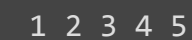
Joanne`s turn:

> 2



Paul`s turn:

> 2



O				
*	O			
O	*			
*	O			
O	*	*	O	

Joanne`s turn:

> 2

1	2	3	4	5
O	*			
*	O			
O	*			
*	O			
O	*	*	O	

Paul`s turn:

> 3

1	2	3	4	5
O	*			
*	O			
O	*			
*	O	O		
O	*	*	O	

Joanne`s turn:

> 3

1	2	3	4	5
O	*			
*	O			
O	*	*		
*	O	O		
O	*	*	O	

Paul`s turn:

> 3

1	2	3	4	5
O	*			
*	O	O		
O	*	*		

```

||*||o||o||  || | |
||o||*||*||o||  ||
||_|_|_|_|_|

```

Joanne`s turn:

> 3

```

  1 2 3 4 5
||o||*||*||  || | |
||*||o||o||  ||
||o||*||*||  ||
||*||o||o||  ||
||o||*||*||o||  ||
||_|_|_|_|_|

```

Paul`s turn:

> 5

```

  1 2 3 4 5
||o||*||*||  || | |
||*||o||o||  ||
||o||*||*||  ||
||*||o||o||  ||
||o||*||*||o||o||
||_|_|_|_|_|

```

Joanne`s turn:

> 4

```

  1 2 3 4 5
||o||*||*||  || | |
||*||o||o||  ||
||o||*||*||  ||
||*||o||o||*||  ||
||o||*||*||o||o||
||_|_|_|_|_|

```

Paul`s turn:

> 4

```

  1 2 3 4 5
||o||*||*||  || | |
||*||o||o||  ||
||o||*||*||o||  ||
||*||o||o||*||  ||
||o||*||*||o||o||
||_|_|_|_|_|

```

Joanne`s turn:

> 4

```
  1 2 3 4 5
||o||*||*||  || | |
||*||o||o||*||
||o||*||*||o||
||*||o||o||*||
||o||*||*||o||o||
||_||_||_||_||_||
```

Paul`s turn:

> 4

```
  1 2 3 4 5
||o||*||*||o|| | |
||*||o||o||*||
||o||*||*||o||
||*||o||o||*||
||o||*||*||o||o||
||_||_||_||_||_||
```

Joanne`s turn:

> 5

```
  1 2 3 4 5
||o||*||*||o|| | |
||*||o||o||*||
||o||*||*||o||
||*||o||o||*||*||
||o||*||*||o||o||
||_||_||_||_||_||
```

Paul`s turn:

> 5

```
  1 2 3 4 5
||o||*||*||o|| | |
||*||o||o||*||
||o||*||*||o||o||
||*||o||o||*||*||
||o||*||*||o||o||
||_||_||_||_||_||
```

Joanne`s turn:

> 5

```
  1 2 3 4 5
```

```

||o||*||*||o|| | |
||*||o||o||*||*||
||o||*||*||o||o||
||*||o||o||*||*||
||o||*||*||o||o||

```

Paul`s turn:

> 5

1 2 3 4 5

```

||o||*||*||o||o||
||*||o||o||*||*||
||o||*||*||o||o||
||*||o||o||*||*||
||o||*||*||o||o||

```

It is a draw

Game over!

Example 5: plain text board

Plot Four

First player`s name:

> Paul

Second player`s name:

> Joanne

Set the board dimensions (Rows x Columns)

Press Enter **for** default (6 x 7)

> 6x7

Paul VS Joanne

6 X 7 board

1 2 3 4 5 6 7

```

| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

```

=====

Paul`s turn:


```

> 7
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | o

```

```
=====
```

Joanne`s turn:

```

> 6
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | * | o

```

```
=====
```

Paul`s turn:

```

> 7
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | o
| | | | | * | o

```

```
=====
```

Joanne`s turn:

```

> 5
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | o
| | | | * | * | o

```

```
=====
```

```

Paul`s turn:
> 7
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | o
| | | | | | o
| | | | * * o

=====
Joanne`s turn:
> 4
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | o
| | | | | | o
| | | * * * o

=====
Paul`s turn:
> 7
 1 2 3 4 5 6 7
| | | | | | |
| | | | | | |
| | | | | | o
| | | | | | o
| | | | | | o
| | | * * * o

=====
Player Paul won
Game over!

```