

# 2-D Arrays: Tic Tac Toe

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## — Problem Analysis —

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- Comments about the problem
  - I need to keep track of the rows and columns.
  - I need to be able to manipulate this data.
  - I need to know how to print this data in a way that is understandable.
  - I need to be able to get user input in a way they can understand.
  - I need to know how to ask a user if they want to restart the game.
  - I need to know how to check if someone has won the game.
- Description of Knowledge Base
  - I can use 2D arrays
  - I can change what's in them
  - I can print this in lines by array entry
  - I can get the user input with input
  - I can use while
  - I can use for
  - I can use if
  - I can use try
  - I can use input to restart the game
  - I can check the array for a win condition
- ## Program Design
- I need a get turn method
  - It will get a valid move in the form of x,y coords starting from 0,0 in the top left to 2,2 in the bottom right
  - It will return a modified version of the board with the correct piece in the right spot
- Check Horizontal Method
  - This method checks to see if any of the horizontals have a winning match and returns the character of the winning version
  - It takes just the game board as a parameter

- Check Vertical Win
  - Same as horizontal but checks up and down the columns
- Check Diagonal Win
  - Same as previous but checks the diagonal threes
- Get Win Status
  - Checks the horizontal vertical and diagonal wins for if they are true and returns the correct one of they are true (as in a win was found)
- Board Is Full
  - Takes the game board as a parameter
  - Just checks every space to make sure it isn't empty.
- Print Board
  - Takes the board as a parameter and prints the board in a way that is pretty.
  - It prints the first row with string formats and keeps going with the characters
- Setup
  - Gets a game and sets up the board as empty. Asks for the starting piece and sets it.
- Get Next Piece
  - Checks for the original pieces and returns the character for whatever turn it is depending on what it started on and whats in the board.
- Main
  - Has a loop to continue the game and calls all the highest level functions.
  - Prints when someone has won and asks if you want to continue at the end of the game.

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## — Program Implementation / Testing —

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INPUT	EXPECTED OUT	ACTUAL OUT
x01	x in the far left middle	x in the far left middle
o22	o in the bottom right	o in the bottom right
x20	x in the upper right	x in the upper right
o02	o in the bottom left	o in the bottom left
o11	o in the middle middle	o in the middle middle

