

**Part 0:**

1. How many classes are there in tictactoe.java?

There is one class defined which is named tictactoe.

2. How many objects are there in tictactoe.java?

4 Explicitly created objects (including strings):

```
Scanner in
String[] board
String turn
String winner
```

3. How many methods are there in tictactoe.java?

Three that were defined inside tictactoe.java: checkwinner(), printBoard(), main(),

There were several other methods that were called that were externally defined: equals(), asList(), contains(), println(), valueOf(), nextInt(), equalsIgnoreCase(), close().

4. Briefly explain how tictactoe.java works.

The main() function is run when executing the program. The board object (a 9 char string) is initialized with numbers and printed using the printBoard() function iterating through the characters in the string. The printBoard() function outputs each character of the public string object that belongs to the class in a manner that looks like a tic-tac-toe array each turn. While there's no current winner in the game, main() will get user input for the player ("x" or "o"). User input is requested until a digit is entered. The user's input is checked in a try/except block which tests if it's between (0,9]. Once appropriate input is entered, the input is checked to see if that array element has already been assigned. This is done by testing to see if the array char is still a digit. If it is still the initialized digit, then the player (either an "x" or "o") is substituted into the string. If it is not the initialized value, then it's been determined that the array element has already been assigned and it prints an appropriate error message and requests input again. After acceptable input has been entered, it calls printBoard() to print the updated gameboard and tests if there's a winner. Checkwinner() iterates through all 8 win outcomes (3 horizontal, 3 vertical and 2 diagonal) and assigned line to be the concatenated string of those 3 characters. If the concatenated string contains all X's or all O's then a winner has been determined and it will return the player ("x" or "o"). If there's no winner then it checks to see if there's been a draw by seeing if there's no digits remaining in the gameboard. If there's no numbers remaining then it returns "draw". If it's not a draw then it prints the turn message for the next turn and returns null.

5. Draw a graph indicating the classes, objects, and methods used in tictactoe.java.

class tictactoe
<i>attributes:</i>
-board:string[] -turn:string
<i>methods:</i>
+checkWinner():string +printBoard():void +main(string[]):void
<i>objects:</i>
None instantiated, all methods were static