



```
1 import sys
2
3 #from IPython.display import clear_output
4
5 def display_board(board):
6
7     #clear_output()
8
9     print(board[7]+' | '+board[8]+' | '+board[9])
10    print('———')
11    print(board[4]+' | '+board[5]+' | '+board[6])
12    print('———')
13    print(board[1]+' | '+board[2]+' | '+board[3])
14
15 def player_input():
16
17     """ OUTPUT = (Player 1 marker, PLayer 2 marker) """
18
19     marker = ''
20
21     #can use ~ while not (marker == 'X' or marker == 'O')
22
23     while marker != 'X' and marker != 'O':
24         marker = input("Player 1, choose X or O: ").upper()
25
26     if marker == 'X':
27         return ('X','O')
28     else:
29         return ('O','X')
30
31 def place_marker(board, marker, position):
32
33     board[position] = marker
34
35 def win_check(board, mark):
36
37     # can do ~ (board[1] == board[2] == board[3] == mark) ...
38     # similarly for other 2 rows, 3 columns and 2 diagonals.
39
40     return ((board[7] == mark and board[8] == mark and board[9] == mark) or # across the top
41             (board[4] == mark and board[5] == mark and board[6] == mark) or # across the middle
42             (board[1] == mark and board[2] == mark and board[3] == mark) or # across the bottom
43             (board[7] == mark and board[4] == mark and board[1] == mark) or # down the left
```



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44     (board[8] == mark and board[5] == mark and board[2] == mark) or          # down the middle
45     (board[9] == mark and board[6] == mark and board[3] == mark) or          # down the right
46     (board[7] == mark and board[5] == mark and board[3] == mark) or          # diagonal 1
47     (board[9] == mark and board[5] == mark and board[1] == mark))             # diagonal 2
48
49 import random
50
51 def choose_first():
52
53     flip = random.randint(0,1)
54
55     if flip == 0:
56         return "Player 1"
57     else:
58         return "Player 2"
59
60 def space_check(board,position):
61
62     return board[position] == ' '
63
64 def full_board_check(board):
65
66     for i in range(1,10):
67         if space_check(board,i):
68             return False
69
70     return True
71
72 def player_choice(board):
73
74     position = 0
75
76     while position not in range(1,10) or not space_check(board,position):
77         position = int(input("Choose a position (1-9): "))
78
79     return position
80
81 def replay():
82
83     choice = input ("Play again? Yes or No: ")
84
85     return choice == "Y"

```



```
86
87 # While loop to keep running the game
88
89 print ("Welcome to Tic Tac Toe game.")
90
91 while True:
92
93     # Play the game
94
95     ## Set up - Board, Who's first, markers X,O
96
97     the_board = [' ']*10
98     player1_marker, player2_marker = player_input()
99
100     turn = choose_first()
101     print (turn + " will go first.")
102
103     play_game = input("Ready to play? Y or N?")
104     if play_game == "Y":
105         game_on = True
106     else:
107         game_on = False
108
109     ## Game play
110
111     ### Player one turn
112
113     while game_on:
114         if turn == "Player 1":
115
116             # Show the board
117             display_board(the_board)
118
119             # Choose the position
120             position = player_choice(the_board)
121
122             # Place the marker on position
123             place_marker(the_board, player1_marker, position)
124
125             # Check if they won
126             if win_check(the_board,player1_marker):
127                 display_board(the_board)
```



```
128         print ("Player 1 has won!")
129         game_on = False
130
131     # Check if there's tie
132     else:
133         if full_board_check(the_board):
134             display_board(the_board)
135             print ("The game is tie!")
136             game_on = False
137     # No tie and no win? Player 2 turn
138     else:
139         turn = "Player 2"
140
141     ### Player two turn
142
143     else:
144         # Show the board
145         display_board(the_board)
146
147         # Choose the position
148         position = player_choice(the_board)
149
150         # Place the marker on position
151         place_marker(the_board, player2_marker, position)
152
153         # Check if they won
154         if win_check(the_board, player2_marker):
155             display_board(the_board)
156             print ("Player 2 has won!")
157             game_on = False
158
159         # Check if there's tie
160         else:
161             if full_board_check(the_board):
162                 display_board(the_board)
163                 print ("The game is tie!")
164                 game_on = False
165         # No tie and no win? Player 1 turn
166         else:
167             turn = "Player 1"
168
169     if not replay():
170         break
171
172 # Break out of while loop by replay()
```