PYTHON PROJECT

TIC TAC TOE

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QUICK SUMMARY

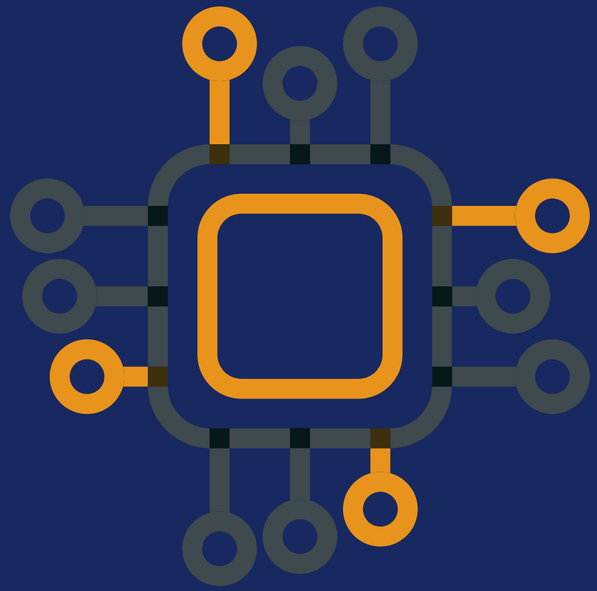
It is one of the most fun games you can play anywhere – all you need is a pen and paper! Usually, two players can play Tic-Tac-Toe at a time. The players create a 3×3 square grid.

While the first player puts “X” in any one of the squares, and the second player will put an “O” in any square. This process will continue until all the squares are filled with each player putting X and O alternatively. The player who succeeds with three consecutive X or O on the grid wins.

ABOUT OUR GAME

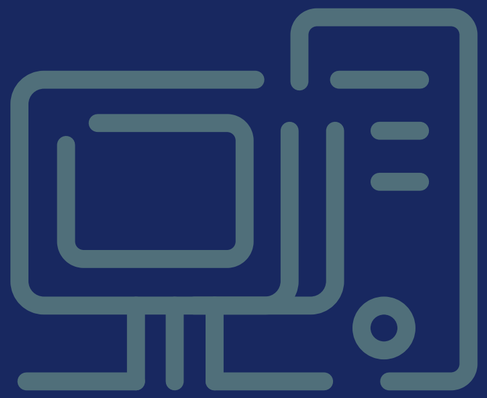
The code consists of 11 steps

Creating a Field
InsertLetter()
spaceIsFree(position)
printField(field)
isWinner()
main()
isFieldFull()
playerMove()
compMove()
selectRandom()
Starting The Game



Creating a Field

```
1   field= ["-", "-", "-",
2          "-", "-", "-",
3          "-", "-", "-"]
```



TO DO THIS IN PYTHON WE WILL CREATE A LIST CALLED FIELD THAT WILL START OFF WITH 10 EMPTY VALUES. THE REASON WE HAVE 10 EMPTY VALUES RATHER THAN 9 IS BECAUSE WHEN WE GET INPUT FROM THE USER THEY CAN TYPE NUMBERS 1-9 NOT 0-8. SO TO MAKE OUR LIVES EASIER WE ARE GOING MAKE THE FIRST VALUE OF OUR LIST AN EMPTY STRING. THIS WAY WHEN WE INDEX ELEMENTS IN OUR LIST WE CAN USE 1-9 NOT 0-8.

insertLetter()

THIS FUNCTION IS GOING TO TAKE TWO PARAMETERS: LETTER & POS. IT IS SIMPLY GOING TO INSERT THE GIVEN LETTER AT THE GIVEN POSITION.

```
5    def insertLetter(letter, position):
6        field[position] = letter
```

spaceIsFree(position)

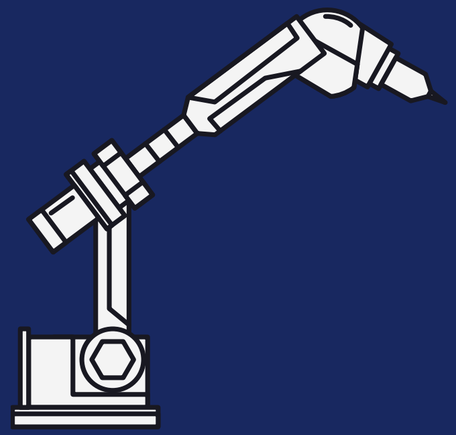
THIS FUNCTION WILL SIMPLY TELL US IF THE GIVEN SPACE IS FREE. MEANING IT DOES NOT ALREADY CONTAIN A LETTER. IT HAS ONE PARAMETER, POSITION, WHICH WILL BE AN INTEGER FROM 1-9.

```
8    def spaceIsFree(position):
9        return field[position] == ' '
```

printField(field)

THIS FUNCTION TAKES THE FIELD AS A PARAMETER AND WILL DISPLAY IT TO THE CONSOLE

```
11    def printField(field):
12        print("\033[4m"+field[1]+"|"+field[2]+"|"+field[3]+
13        "\n"+field[4]+"|"+field[5]+"|"+field[6]+
14        "\n\033[0m"+field[7]+"|"+field[8]+"|"+field[9])
15
```



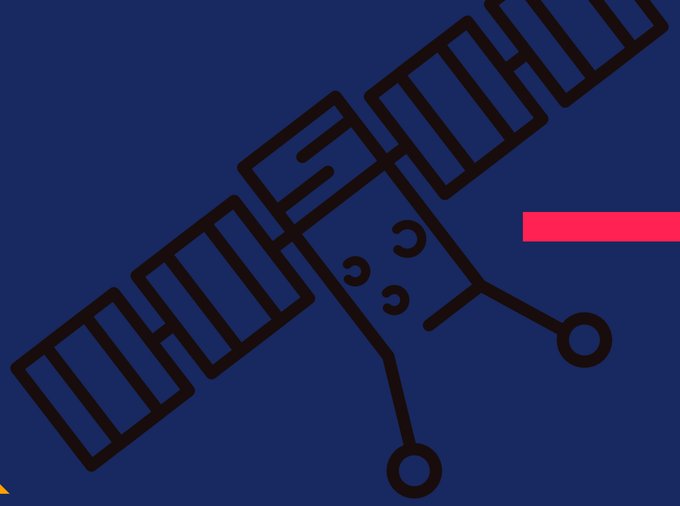
isWinner()

THIS FUNCTION WILL TELL US IF THE GIVEN LETTER HAS WON BASED ON THE CURRENT FIELD. IT HAS TWO PARAMETERS: FI(FIELD) & LE(LETTER). THE LETTER MUST BE A “X” OR AN “O”. WE WILL SIMPLY CHECK EACH POSSIBLE WINNING LINE ON THE FIELD AND SEE IF IT IS POPULATED BY THE GIVEN LETTER.

```
17  def isWinner(fi, le):
18      return (fi[7] == le and fi[8] == le and fi[9] == le)
19       or (fi[4] == le and fi[5] == le and fi[6] == le)
20       or(fi[1] == le and fi[2] == le and fi[3] == le)
21       or(fi[1] == le and fi[4] == le and fi[7] == le)
22       or(fi[2] == le and fi[5] == le and fi[8] == le)
23       or(fi[3] == le and fi[6] == le and fi[9] == le)
24       or(fi[1] == le and fi[5] == le and fi[9] == le)
25       or(fi[3] == le and fi[5] == le and fi[7] == le)
26
```

main()

```
93  def main():
94      print('Welcome to Tic Tac Toe!')
95      printField(field)
96
97      while not(isFieldFull(field)):
98          if not(isWinner(field, 'O')):
99              playerMove()
100             printField(field)
101         else:
102             print('Sorry, O\'s won this time!')
103             break
104
105         if not(isWinner(field, 'X')):
106             move = compMove()
107             if move == 0:
108                 print('Tie Game!')
109             else:
110                 insertLetter('O', move)
111                 print('Computer placed an \'O\' in position', move , ':'
112                 printField(field)
113         else:
114             print('X\'s won this time! Good Job!')
115             break
116
```



THIS FUNCTION IS WHAT WE WILL CALL TO START THE GAME. IT WILL BE CALLING ALL OF THE DIFFERENT FUNCTIONS IN OUR PROGRAM AND DICTATE THE FLOW OF THE PROGRAM.

isFieldFull(field)

```
87    def isFieldFull(field):
88        if field.count(' ') > 1:
89            return False
90        else:
91            return True
```

THIS FUNCTION TAKES FIELD AS PARAMETER AND WILL SIMPLY RETURN TRUE IF THE FIELD IS FULL AND FALSE IF IT IS NOT.

selectRandom(li)

```
80    def selectRandom(li):
81        import random
82        ln = len(li)
83        r = random.randrange(0,ln)
84        return li[r]
85
```

THIS FUNCTION WILL RANDOMLY DECIDE ON A MOVE TO TAKE GIVEN A LIST OF POSSIBLE POSITIONS.

playerMove()

```
27  def playerMove():
28      run = True
29      while run:
30          move = input('Please select a position to place an \'X\' (1-9): ')
31          try:
32              move = int(move)
33              if move > 0 and move < 10:
34                  if spaceIsFree(move):
35                      run = False
36                      insertLetter('X', move)
37                  else:
38                      print('Sorry, this space is occupied!')
39              else:
40                  print('Please type a number within the range!')
41          except:
42              print('Please type a number!')
```

IN THIS FUNCTION WE WILL BE ASKING THE USER TO INPUT A MOVE AND VALIDATING IT. IF THE MOVE IS VALID WE WILL ADD THAT LETTER TO THE FIELD. OTHERWISE WE WILL CONTINUE TO ASK THE USER FOR INPUT.

compMove()

I WANT TO PLAY WITH COMPUTER,THATS WAY IM USED AI! THIS FUNCTION WILL BE RESPONSIBLE FOR MAKING THE COMPUTERS MOVE. IT WILL EXAMINE THE FIELD AND DETERMINE WHICH MOVE IS THE BEST TO MAKE.
THE ALGORITHM WE WILL FOLLOW TO DO THIS IS LISTED BELOW.IF THE CURRENT STEP CANNOT BE COMPLETED PROCEED TO THE NEXT.
1. IF THERE IS A WINNING MOVE TAKE IT
.2. IF THE PLAYER HAS A POSSIBLE WINNING MOVE ON THEIR NEXT TURN MOVE INTO THAT POSITION.
3. TAKE ANY ONE OF THE CORNERS. IF MORE THAN ONE IS AVAILABLE RANDOMLY DECIDE.
4. TAKE THE CENTER POSITION.
5. TAKE ONE OF THE EDGES. IF MORE THAN ONE IS AVAILABLE RANDOMLY DECIDE.
6. IF NO MOVE IS POSSIBLE THE GAME IS A TIE.

```
45  def compMove():
46      possibleMoves = [x for x, letter in enumerate(field) if letter == ' ' and x != 0]
47      move = 0
48
49      for let in ['O', 'X']:
50          for i in possibleMoves:
51              fieldCopy = field[:]
52              fieldCopy[i] = let
53              if isWinner(fieldCopy, let):
54                  move = i
55                  return move
56
57      cornersOpen = []
58      for i in possibleMoves:
59          if i in [1,3,7,9]:
60              cornersOpen.append(i)
61
62      if len(cornersOpen) > 0:
63          move = selectRandom(cornersOpen)
64          return move
65
66      if 5 in possibleMoves:
67          move = 5
68          return move
69
70      edgesOpen = []
71      for i in possibleMoves:
72          if i in [2,4,6,8]:
73              edgesOpen.append(i)
74
75      if len(edgesOpen) > 0:
76          move = selectRandom(edgesOpen)
77
78      return move
```

Starting the game

```
117   while True:
118       answer = input('Do you want to play again? (Y/N)')
119       if answer.lower() == 'y' or answer.lower == 'yes':
120           field = [' ' for x in range(10)]
121           print('-----------------------------------')
122           main()
123       else:
124           break
```

NOW THAT WE HAVE ALL OUR FUNCTIONS COMPLETED ALL THAT'S LEFT TO DO IS START THE GAME. IF WE JUST WANTED TO RUN THE GAME ONCE ALL WE WOULD HAVE TO DO IS CALL MAIN. HOWEVER, IN OUR CASE WE WANT THE GAME TO KEEP RUNNING UNTIL THE USER DOESN'T WANT TO PLAY ANYMORE, SO WE WILL CREATE A SMALL WHILE LOOP IN THE MAIN LINE.

NOW THAT OUR GAME IS FINISHED HERE IS THE SOME EXAMPLES.

```
Please select a position to place an 'X' (1-9): 1
X|_|_
_|_|_
 | |
Computer placed an 'O' in position 9 :
X|_|_
_|_|_
 | |O
Please select a position to place an 'X' (1-9): 5
X|_|_
_|X|_
 | |O
Computer placed an 'O' in position 7 :
X|_|_
_|X|_
O| |O
Please select a position to place an 'X' (1-9): 3
X|_|X
_|X|_
O| |O
Computer placed an 'O' in position 8 :
X|_|X
_|X|_
O|O|O
Sorry, O's won this time!
```

```
_|O|O
_|X|_
 |X|
Please select a position to place an 'X' (1-9): 1
X|O|O
_|X|_
 |X|
Computer placed an 'O' in position 9 :
X|O|O
_|X|_
 |X|O
Please select a position to place an 'X' (1-9): 6
X|O|O
_|X|X
 |X|O
Computer placed an 'O' in position 4 :
X|O|O
O|X|X
 |X|O
Please select a position to place an 'X' (1-9): 7
X|O|O
O|X|X
X|X|O
Tie Game!
```

THANK YOU FOR ATTENTION!