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# Tic-Tac-Toe
# Basic game loop structure
#     - move_input()
#     - update_board()
#     - render_board()
# WIN_SET contains sets of all the spots on the board that equal a win
import random

class Tictactoe:

    #constructor
    def __init__(self):

        #static set of valid 'win' moves
        self.WIN_SET = (
            (0,1,2), (3,4,5), (6,7,8),      #horizontal
            (0,3,6), (1,4,7), (2,5,8),      #vertical
            (0,4,8), (2,4,6))               #diagonal

        self.board = [' '] * 9
        self.current_player = 'x'
        self.player_choice = ' '
        self.players = {'x': ' ', 'o': ' '}

        self.winner = None
        self.move = None

    #methods
    def choose_side(self):
        while True:
            t.player_choice = input("""Please choose a side: 'X' or 'O': """)
            t.player_choice = t.player_choice.lower()

            #make sure its a valid choice
            if t.player_choice == 'x' or t.player_choice == 'o':
                print("You've chosen: " + t.player_choice)
                break
            else:
                print("Invalid entry.")
                t.player_choice = ' '
                continue

        #player 'x' goes first
        #player 'o' ai goes first
        if t.player_choice == 'x':
            self.players['x'] = "Human"
            self.players['o'] = "Super AI"
        else:
            self.players['x'] = "Super AI"
            self.players['o'] = "Human"

    def check_move_valid(self):
        global move

        if move <= 8 and move >= 0:
            if t.board[move] == ' ':
                return True
            else:
                print("That area is already filled. Please enter a different number.")
                return False

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else:
    print("Not a valid position. Must be a number between [0-8].")

def check_win_result(self):

    #if matching symbols in WIN_SET (e.g. 0,4,8)
    #row[0] = 0, row[1] = 4, row[2] = 8
    for row in self.WIN_SET:
        if t.board[row[0]] == t.board[row[1]] == t.board[row[2]] != ' ':
            print(t.board[row[0]] + " wins!")
            t.winner = "true"

    if ' ' not in t.board and t.winner == None:
        print("Tie")
        t.winner = "false"

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# Human and AI functions

def human_move(self):
    return int(input("Enter a number [0-8]: "))

def ai_move(self):
    return random.randrange(9)

def ai_move_hard(self):
    #best move if ai goes first
    if t.board[4] == ' ':
        return 4
    else:
        #get positions the player has taken so far
        player_pos = [i for i in range(len(t.board)) if t.board[i] !=
t.current_player and t.board[i] != ' ']

        #block the players winning move by comparing what squares the player has
        against what they need to win
        if len(player_pos) == 2:
            for row in self.WIN_SET:
                if player_pos[0] in row and player_pos[1] in row:
                    #find the last square the player needs to win and take it!
                    if player_pos[0] != row[0]:
                        return row[0]
                    elif player_pos[1] != row[1]:
                        return row[1]
                    else:
                        return row[2]
            else:
                return random.choice(t.choose_empty_pos())
        else:
            return random.choice(t.choose_empty_pos())

def choose_empty_pos(self):
    #chooses a random, empty square from the remaining squares on the board
    empty_pos = [i for i in range(len(t.board)) if t.board[i] == ' ']
    return empty_pos

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# Game loop methods

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def next_move(self):
    global move

    if t.current_player == 'x':
        if t.players['x'] == "Human":
            move = t.human_move()
            print("--Player--")
        else:
            t.players['x'] == "Super AI"
            move = t.ai_move_hard()
            print("--Computer--")
    else:
        if t.players['o'] == "Human":
            move = t.human_move()
            print("--Player--")
        else:
            t.players['o'] == "Super AI"
            move = t.ai_move_hard()
            print("--Computer--")

def update_model(self):
    if t.check_move_valid():

        #set the list element to match the current players symbol
        t.board[move] = t.current_player
        #print(t.board[0:8])

        #check to see if anyone has won
        t.check_win_result()

        #switch players
        if t.current_player == 'x':
            t.current_player = 'o'
        else:
            t.current_player = 'x'

def render_board(self):
    print('-----')
    print('| %s | %s | %s |' % (self.board[0], self.board[1], self.board[2]))
    print('-----')
    print('| %s | %s | %s |' % (self.board[3], self.board[4], self.board[5]))
    print('-----')
    print('| %s | %s | %s |' % (self.board[6], self.board[7], self.board[8]))
    print('-----')

def position_board(self):
    print("HOW TO PLAY: Enter a number when prompted to fill the corresponding
space")
    print('-----')
    print('| 0 | 1 | 2 |')
    print('-----')
    print('| 3 | 4 | 5 |')
    print('-----')
    print('| 6 | 7 | 8 |')
    print('-----')

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# Main

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if __name__ == '__main__':

    t = Tictactoe()
    t.position_board()      #shows board for moveset
    t.choose_side()        #choose a side

    #game loop
    while t.winner is None:
        t.next_move()
        t.update_model()
        t.render_board()
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