# Tic Tac Toe

import random

def drawBoard(board):

# This function prints out the board that it was passed.

# "board" is a list of 10 strings representing the board (ignore index 0)

print(' | |')

print(' ' + board[1] + ' | ' + board[2] + ' | ' + board[3])

print(' | |')

print('-----------')

print(' | |')

print(' ' + board[4] + ' | ' + board[5] + ' | ' + board[6])

print(' | |')

print('-----------')

print(' | |')

print(' ' + board[7] + ' | ' + board[8] + ' | ' + board[9])

print(' | |')

def inputPlayerLetter():

# Let's the player type which letter they want to be.

# Returns a list with the player's letter as the first item, and the computer's letter as the second.

letter = ''

while not (letter == 'X' or letter == 'O'):

print('Do you want to be X or O?')

letter = input().upper()

# the first element in the tuple is the player's letter, the second is the computer's letter.

if letter == 'X':

return ['X', 'O']

else:

return ['O', 'X']

def whoGoesFirst():

# Randomly choose the player who goes first.

if random.randint(0, 1) == 0:

return 'computer'

else:

return 'player'

def playAgain():

# This function returns True if the player wants to play again, otherwise it returns False.

print('Do you want to play again? (yes or no)')

return input().lower().startswith('y')

def makeMove(board, letter, move):

board[move] = letter

def isWinner(board, letter):

# Given a board and a player's letter, this function returns True if that player has won.

return ((board[7] == letter and board[8] == letter and board[9] == letter) or # across the top

(board[4] == letter and board[5] == letter and board[6] == letter) or # across the middle

(board[1] == letter and board[2] == letter and board[3] == letter) or # across the bottom

(board[7] == letter and board[4] == letter and board[1] == letter) or # down the left side

(board[8] == letter and board[5] == letter and board[2] == letter) or # down the middle

(board[9] == letter and board[6] == letter and board[3] == letter) or # down the right side

(board[7] == letter and board[5] == letter and board[3] == letter) or # diagonal

(board[9] == letter and board[5] == letter and board[1] == letter)) # diagonal

def getBoardCopy(board):

# Make a duplicate of the board list and return it the duplicate.

dupeBoard = []

for i in board:

dupeBoard.append(i)

return dupeBoard

def isSpaceFree(board, move):

# Return true if the passed move is free on the passed board.

return board[move] == ' '

def getPlayerMove(board):

# Let the player type in his move.

move = ' '

while move not in '1 2 3 4 5 6 7 8 9'.split() or not isSpaceFree(board, int(move)):

print('What is your next move? (1-9)')

move = input()

return int(move)

def chooseRandomMoveFromList(board, movesList):

# Returns a valid move from the passed list on the passed board.

# Returns None if there is no valid move.

possibleMoves = []

for i in movesList:

if isSpaceFree(board, i):

possibleMoves.append(i)

if len(possibleMoves) != 0:

return random.choice(possibleMoves)

else:

return None

def getComputerMove(board, computerLetter):

# Given a board and the computer's letter, determine where to move and return that move.

if computerLetter == 'X':

playerLetter = 'O'

else:

playerLetter = 'X'

# Here is our algorithm for our Tic Tac Toe AI:

# First, check if we can win in the next move

for i in range(1, 10):

copy = getBoardCopy(board)

if isSpaceFree(copy, i):

makeMove(copy, computerLetter, i)

if isWinner(copy, computerLetter):

return i

# Check if the player could win on his next move, and block them.

for i in range(1, 10):

copy = getBoardCopy(board)

if isSpaceFree(copy, i):

makeMove(copy, playerLetter, i)

if isWinner(copy, playerLetter):

return i

# Try to take one of the corners, if they are free.

move = chooseRandomMoveFromList(board, [1, 3, 7, 9])

if move != None:

return move

# Try to take the center, if it is free.

if isSpaceFree(board, 5):

return 5

# Move on one of the sides.

return chooseRandomMoveFromList(board, [2, 4, 6, 8])

def isBoardFull(board):

# Return True if every space on the board has been taken. Otherwise return False.

for i in range(1, 10):

if isSpaceFree(board, i):

return False

return True

print('Welcome to Tic Tac Toe!')

while True:

# Reset the board

theBoard = [' '] \* 10

playerLetter, computerLetter = inputPlayerLetter()

turn = whoGoesFirst()

print('The ' + turn + ' will go first.')

gameIsPlaying = True

while gameIsPlaying:

if turn == 'player':

# Player's turn.

drawBoard(theBoard)

move = getPlayerMove(theBoard)

makeMove(theBoard, playerLetter, move)

if isWinner(theBoard, playerLetter):

drawBoard(theBoard)

print('Hooray! You have won the game!')

gameIsPlaying = False

else:

if isBoardFull(theBoard):

drawBoard(theBoard)

print('The game is a tie!')

break

else:

turn = 'computer'

else:

# Computer's turn.

move = getComputerMove(theBoard, computerLetter)

makeMove(theBoard, computerLetter, move)

if isWinner(theBoard, computerLetter):

drawBoard(theBoard)

print('The computer has beaten you! You lose.')

gameIsPlaying = False

else:

if isBoardFull(theBoard):

drawBoard(theBoard)

print('The game is a tie!')

break

else:

turn = 'player'

if not playAgain():

break