import pygame  
import sys  
import time  
  
import tictactoe as ttt  
  
pygame.init()  
size = width, height = 600, 400  
  
# Colors  
black = (0, 0, 0)  
white = (255, 255, 255)  
  
screen = pygame.display.set\_mode(size)  
  
mediumFont = pygame.font.Font("OpenSans-Regular.ttf", 28)  
largeFont = pygame.font.Font("OpenSans-Regular.ttf", 40)  
moveFont = pygame.font.Font("OpenSans-Regular.ttf", 60)  
  
user = None  
board = ttt.initial\_state()  
ai\_turn = False  
  
while True:  
  
 for event in pygame.event.get():  
 if event.type == pygame.QUIT:  
 sys.exit()  
  
 screen.fill(black)  
  
 # Let user choose a player.  
 if user is None:  
  
 # Draw title  
 title = largeFont.render("Play Tic-Tac-Toe", True, white)  
 titleRect = title.get\_rect()  
 titleRect.center = ((width / 2), 50)  
 screen.blit(title, titleRect)  
  
 # Draw buttons  
 playXButton = pygame.Rect((width / 8), (height / 2), width / 4, 50)  
 playX = mediumFont.render("Play as X", True, black)  
 playXRect = playX.get\_rect()  
 playXRect.center = playXButton.center  
 pygame.draw.rect(screen, white, playXButton)  
 screen.blit(playX, playXRect)  
  
 playOButton = pygame.Rect(5 \* (width / 8), (height / 2), width / 4, 50)  
 playO = mediumFont.render("Play as O", True, black)  
 playORect = playO.get\_rect()  
 playORect.center = playOButton.center  
 pygame.draw.rect(screen, white, playOButton)  
 screen.blit(playO, playORect)  
  
 # Check if button is clicked  
 click, \_, \_ = pygame.mouse.get\_pressed()  
 if click == 1:  
 mouse = pygame.mouse.get\_pos()  
 if playXButton.collidepoint(mouse):  
 time.sleep(0.2)  
 user = ttt.X  
 elif playOButton.collidepoint(mouse):  
 time.sleep(0.2)  
 user = ttt.O  
  
 else:  
  
 # Draw game board  
 tile\_size = 80  
 tile\_origin = (width / 2 - (1.5 \* tile\_size),  
 height / 2 - (1.5 \* tile\_size))  
 tiles = []  
 for i in range(3):  
 row = []  
 for j in range(3):  
 rect = pygame.Rect(  
 tile\_origin[0] + j \* tile\_size,  
 tile\_origin[1] + i \* tile\_size,  
 tile\_size, tile\_size  
 )  
 pygame.draw.rect(screen, white, rect, 3)  
  
 if board[i][j] != ttt.EMPTY:  
 move = moveFont.render(board[i][j], True, white)  
 moveRect = move.get\_rect()  
 moveRect.center = rect.center  
 screen.blit(move, moveRect)  
 row.append(rect)  
 tiles.append(row)  
  
 game\_over = ttt.terminal(board)  
 player = ttt.player(board)  
  
 # Show title  
 if game\_over:  
 winner = ttt.winner(board)  
 if winner is None:  
 title = f"Game Over: Tie."  
 else:  
 title = f"Game Over: {winner} wins."  
 elif user == player:  
 title = f"Play as {user}"  
 else:  
 title = f"Computer thinking..."  
 title = largeFont.render(title, True, white)  
 titleRect = title.get\_rect()  
 titleRect.center = ((width / 2), 30)  
 screen.blit(title, titleRect)  
  
 # Check for AI move  
 if user != player and not game\_over:  
 if ai\_turn:  
 time.sleep(0.5)  
 start\_time = round(time.time() \* 1000)  
 move = ttt.minimax(board)  
 end\_time = round(time.time() \* 1000)  
 print('minimax time: ', int(end\_time - start\_time), ' milliseconds')  
 board = ttt.result(board, move)  
 ai\_turn = False  
 else:  
 ai\_turn = True  
  
 # Check for a user move  
 click, \_, \_ = pygame.mouse.get\_pressed()  
 if click == 1 and user == player and not game\_over:  
 mouse = pygame.mouse.get\_pos()  
 for i in range(3):  
 for j in range(3):  
 if (board[i][j] == ttt.EMPTY and tiles[i][j].collidepoint(mouse)):  
 board = ttt.result(board, (i, j))  
  
 if game\_over:  
 againButton = pygame.Rect(width / 3, height - 65, width / 3, 50)  
 again = mediumFont.render("Play Again", True, black)  
 againRect = again.get\_rect()  
 againRect.center = againButton.center  
 pygame.draw.rect(screen, white, againButton)  
 screen.blit(again, againRect)  
 click, \_, \_ = pygame.mouse.get\_pressed()  
 if click == 1:  
 mouse = pygame.mouse.get\_pos()  
 if againButton.collidepoint(mouse):  
 time.sleep(0.2)  
 user = None  
 board = ttt.initial\_state()  
 ai\_turn = False  
  
 pygame.display.flip()