COS30002

Lab Report – Task 3 (14/3/2021)

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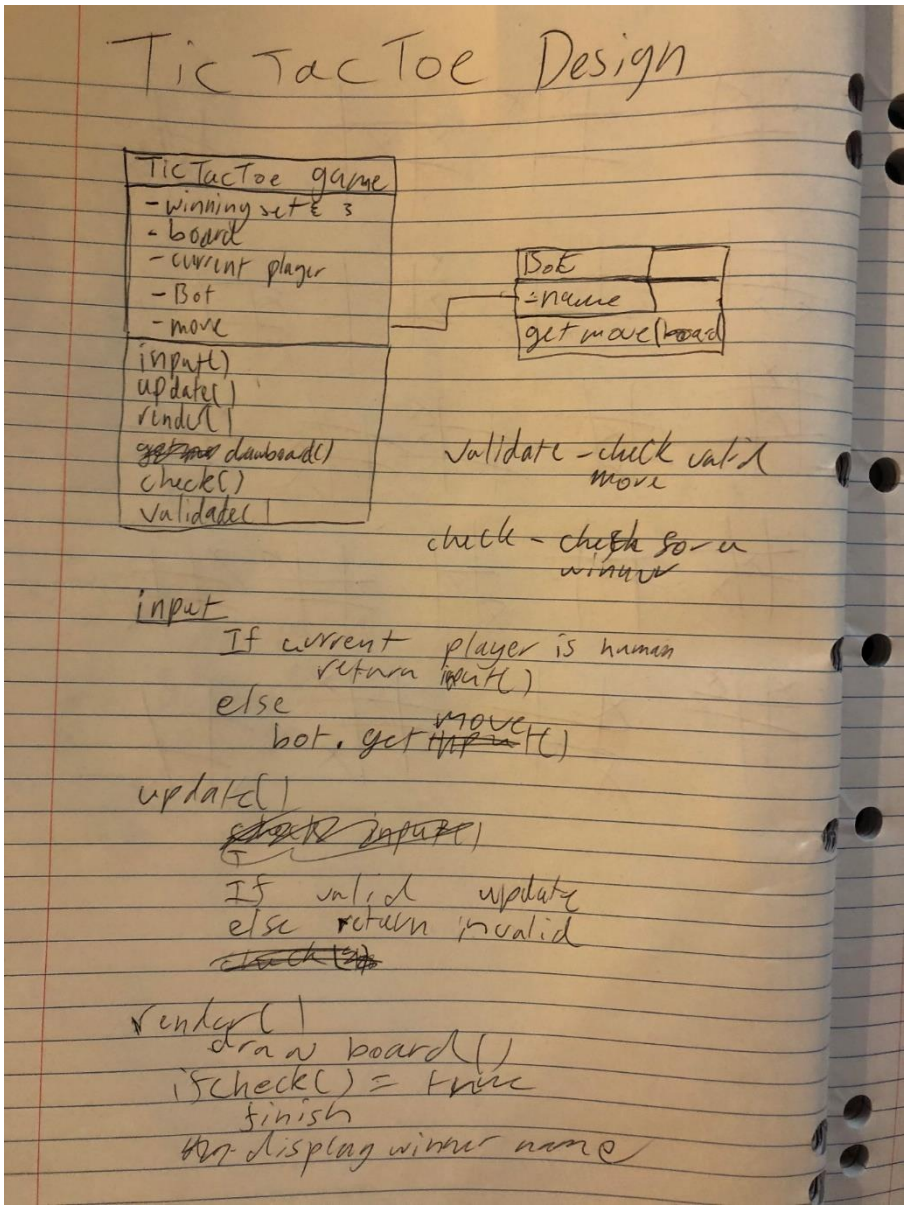
- Designed TicTacToe program
- Learnt about basic game architecture and game loops
- Designed 2 AI bots
- Implemented designs into code
- Made both AI bots play against each other

Software Design



AI design

Bot 1 (centre strategy):

- If winning move available select the last spot
- If opponent can make a winning move select the 3rd space to block them
- If centre space isn't taken select the centre space
- Else random

Bot 2 (defensive):

- If winning move available select the last spot
- If opponent can make a winning move select the 3rd space to block them
- Pick a random space adjacent to opponents last move
- Else random

Bot Code

```
    def get_definately_not_an_ai_move(self):
        '''Get a "human" players raw input '''
        if self.go_last_space() <= 8:
            return self.go_last_space()

        #go to a random space next to the last move
        if self.move != None:
            return choice(self.adjacent.get(self.move, (randrange(9))))

        return randrange(9)


    def get_ai_move(self):
        '''Get the AI's next move '''

        if self.go_last_space() <= 8:
            return self.go_last_space()

        if self.board[4] == ' ':
            return 4

        return randrange(9)

    def go_last_space(self):
        #search the board for potential winning spaces and return the last one
        board = self.board
        for row in self.WIN_SET:
            if (board[row[0]] == board[row[1]] != ' ') and (board[row[2]] == '
 '):
                return row[2]
            if (board[row[1]] == board[row[2]] != ' ') and (board[row[0]] == '
 '):
                return row[0]
            if (board[row[0]] == board[row[2]] != ' ') and (board[row[1]] == '
 '):
                return row[1]
        #return an invalid move otherwise to tell the ai to make a different m
ove
        return 9

    adjacent = {
        0: (1, 3),
        1: (0, 4, 2),
        2: (1, 5),
        3: (0, 4, 6),
```

```
        4: (1, 3, 5, 7),
        5: (2, 4, 8),
        6: (3, 7),
        7: (6, 4, 8),
        8: (7, 5)
    }
```

AI battles

When the AI played against each other it would always end in a tie. But after I changed the program so the starting player was randomised things became more interesting. It would still often be a tie but bot 1 (the one that goes for the centre) would win every couple of rounds. I ran the program many times and I only managed to get the other AI to win once.

```
The current player is: Super AI
    o | x | o
   -----------
    x | o |
   -----------
    x |   | o
----------------------------------------
Super AI is the WINNER!!!
----------------------------------------
```

```
The current player is: Human
    x | o | x
   -----------
    o | o | x
   -----------
    o | x | x
----------------------------------------
Human is the WINNER!!!
----------------------------------------
```