APP Project

"AI" Game Using Binary Tree in Python

Team Members

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Source Code:

```
import os


class Node:
    def __init__(self, question, movie=None):
        self.question = question
        self.movie = movie
        self.left = None
        self.right = None


class BinaryTree:
    def __init__(self):
        self.root = None

    def build_tree(self, file_path):
        with open(file_path, 'r') as file:
            lines = file.readlines()
            self.root = self.build_tree_recursive(lines)

    def build_tree_recursive(self, lines):
        if not lines:
            return None

        line = lines.pop(0).strip()
        parts = line.split(" ", 1)
        address = int(parts[0])
```

```
        rest = parts[1]

        if rest.startswith("It's "):
            # It's a movie node
            movie = rest.replace("It's ", "")
            return Node(None, movie)

        question = rest
        left_child = self.build_tree_recursive(lines)
        right_child = self.build_tree_recursive(lines)
        node = Node(question)
        node.left = left_child
        node.right = right_child

        return node

    def play_game(self, node=None):
        if node is None:
            node = self.root

        print("Please answer a series of questions and I will tell you what movie you are thinking about:")
        while node.left or node.right:
            answer = input(node.question).strip().upper()
            if answer == 'Y':
                node = node.left
            elif answer == 'N':
                node = node.right
            else:
                print("Please answer with 'Y' or 'N'.")
        print(f"It's '{node.movie}'.")

    def display(self, node=None, indent="", last='updown'):
```

```
        if node is not None:
            if last == 'updown':  # root
                print(indent + "Root -> " + (node.question if node.question else f"Movie: {node.movie}"))
                indent += "     "
            elif last == 'right':  # right child
                print(indent + " ┌── " + (node.question if node.question else f"Movie: {node.movie}"))
                indent += "|    "
            elif last == 'left':  # left child
                print(indent + " └── " + (node.question if node.question else f"Movie: {node.movie}"))
                indent += "     "

            self.display(node.left, indent, 'left')
            self.display(node.right, indent, 'right')


def print_help():
    print("P Play the game")
    print("L Load another game file")
    print("D Display the binary tree")
    print("H Help information")
    print("X Exit the program")

if __name__ == "__main__":
    tree = BinaryTree()
    file_path = "game1.txt"  # Default game file
    tree.build_tree(file_path)

    print_help()  # Print help information at the start
    while True:
        print("…your choice: ", end='')
        choice = input().strip().upper()
```

```
if choice == 'P':
    tree.play_game()
elif choice == 'L':
    file_list = [f for f in os.listdir('.') if f.endswith('game.txt')]
    for fIndex in range(len(file_list)):
        print(f"{fIndex+1}: {file_list[fIndex]}")
    fileIndex = input("Enter the game file to load: ").strip()
    tree.build_tree(file_list[fIndex-1])
    print("Game file loaded successfully.")
elif choice == 'D':
    tree.display(tree.root)
elif choice == 'H':
    print_help()
elif choice == 'X':
    print("Exiting the program.")
    break
else:
    print("Invalid choice. Please try again.")
```

Input File:

200 Is it animated? (Y/N)

180 Is it an animated superhero movie? (Y/N)

160 Does it involve humans? (Y/N)

158 Is it a marvel movie? (Y/N)

157 It's "Spider-Man Multiverse"

159 It's "Justice League Dark"

162 Does it involve ghosts? (Y/N)

161 It's "Monster House"

163 It's "Diary of a Wimpy kid"

190 Is it an animated animal movie? (Y/N)

188 Does it involve fishes? (Y/N)

187 It's "Finding Nemo"

189 It's "Lion King"

192 Does it involve cars? (Y/N)

191 It's "Cars"

193 It's "Toy Story"

220 Is it romantic? (Y/N)

210 Is it a rom-com? (Y/N)

208 Is it based on festive season?(Y/N)

207 It's "Falling for Christmas"

209 It's "Friends With Benefit"

212 Is it based on wars? (Y/N)

211 It's "Brothers"

213 It's "The Change-Up"

230 Is it a horror movie? (Y/N)

228 Is it based on real life?(Y/N)

227 It's "Conjuring"

229 It's "Consecration"

232 Is it mysterious movie?(Y/N)

231 It's "Zodiac"

233 It's "Interstellar"

Output:

```
P Play the game
L Load another game file
D Display the binary tree
H Help information
X Exit the program
…your choice: p
Please answer a series of questions and I will tell you what movie you are thinking about:
Is it animated? (Y/N)y
Is it animated superhero movie? (Y/N)y
Does it involve humans? (Y/N)y
Is it a marvel movie? (Y/N)y
It's '"Spider-Man Multiverse"'.
```

Test Case 1

```
…your choice: p
Please answer a series of questions and I will tell you what movie you are thinking about:
Is it animated? (Y/N)n
Is it romantic? (Y/N)n
Is it horror movie? (Y/N)n
Is it mysterious movie?(Y/N)n
It's '"Interstellar"'.
```

Test Case 2

```
…your choice: p
Please answer a series of questions and I will tell you what movie you are thinking about:
Is it animated? (Y/N)y
Is it animated superhero movie? (Y/N)n
Is it animated animal movie? (Y/N)y
Does it involve fishes? (Y/N)n
It's '"Lion King"'.
```

Test Case 3

```
…your choice: p
Please answer a series of questions and I will tell you what movie you are thinking about:
Is it animated? (Y/N)n
Is it romantic? (Y/N)y
Is it rom-com? (Y/N)n
Is it based on wars? (Y/N)y
It's '"Brothers"'.
```

Test Case 4

```
…your choice: p
Please answer a series of questions and I will tell you what movie you are thinking about:
Is it animated? (Y/N)y
Is it animated superhero movie? (Y/N)y
Does it involve humans? (Y/N)n
Does it involve ghosts? (Y/N)n
It's '"Diary of a Wimpy kid"'.
```

Test Case 5