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Programme : BSE in Computer Science

Course Code : CSC1024

Project : A Mastermind Game on Python

Video link : https://drive.google.com/file/d/1EUdQ7cBhZsYp3cmsc7LOaIjteiEvIPVr/view?usp=sharing

Introduction

Objective:

- To make a Mastermind game on a programming language with dynamic semantics

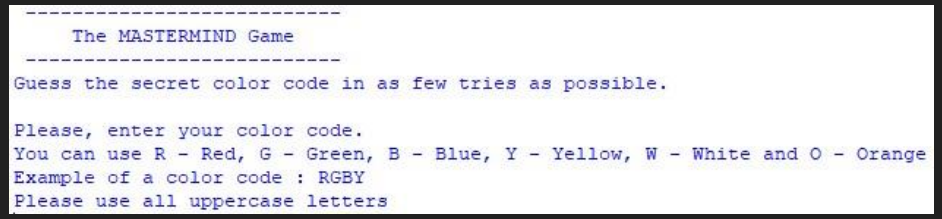
About the Mastermind game:

- It is a code breaking game that consist of 2 players

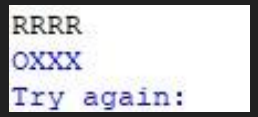
Background:

- The Mastermind game or Master Mind was invented by Mordecai Meirowitz who a telecommunications specialist and an Israeli postmaster

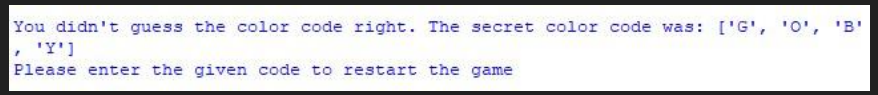
Demonstration of how the game works



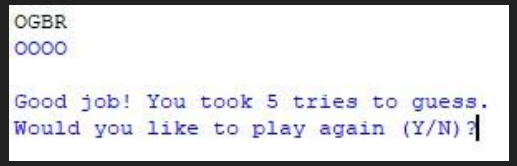
- The player will be given 6 different colors and they will have to enter 4 of them as their guessing code.



- The game will then tell you which individual color code(In black) from the list is wrong. "X" signifies for incorrect and "O" signifies for correct.



- It will continue to ask the player to choose colors until he/she wins or exhaust his/her number of attempts. The game will then give you the correct color code and the player will have to insert the code to restart the game.



- If the player manages to guess the code correctly, a message will be displayed to congratulate the player and the number of attempts will be displayed.
- A second option will appear to ask if the player wants to continue playing or not.

Design of the Display User Menu

1)

```
# Display Menu
print (" ----------------------------")
print ("     The MASTERMIND Game    ")
print (" ----------------------------")
print ("Guess the secret color code in as few tries as possible.\n")
print ("Please, enter your color code.")
print ("You can use R - Red, G - Green, B - Blue, Y - Yellow, W - White and O - Orange")
print ("Example of a color code : RGBY")
print ("Please use all uppercase letters")
```

>>>

```
 ----------------------------
     The MASTERMIND Game
 ----------------------------
Guess the secret color code in as few tries as possible.

Please, enter your color code.
You can use R - Red, G - Green, B - Blue, Y - Yellow, W - White and O - Orange
Example of a color code : RGBY
Please use all uppercase letters
```

(While loop command)

2)

```
while game:
        generated_color = ""
        guesses = ""
        users_guess = input()
        attempts += 1
```

3)

```
RRRR
OXXX
Try again:
GGGG
OXXX
Try again:
BBBB
OXXX
Try again:
YYYY
OXXX
```

- The display is pretty simple but informative about how to play the game
- The player's guess is fixed to individual alphabets to imply each respective color codes
- The player can only user uppercase letters when attempting a guess.
- The while loop was used so that the system will continually ask the player for an input until the player gets the correct guess or when the player exhausts their attempts

Lists in the Mastermind game

```
# List of Colors
colors = ["R", "G", "B", "Y", "W", "O"]
```

- A list called “colors” was made to store the color codes that the player and the system can select from.

```
# System randomwly generates four-color code
passcode = random.sample(colors,4)
```

- The other list which is “passcode” is made to store the randomly generated color code for the player to guess later

Randomly generating a 4 digit color code

```
import random
```

- A random library was imported through the command "import random"

```
# List of Colors
colors = ["R", "G", "B", "Y", "W", "O"]
# System randomwly generates four-color code
passcode = random.sample(colors,4)
```

- The system will then choose random colors from the List of Colors for the player to guess
- By using "random.sample(colors,4)", the system will then pick 4 colors randomly with a random order.

  Additional info: "Print(passcode)" can be insert to display the random 4 color code.

Decision making and iterative process in the mastermind game

```
while game:
        generated_color = ""
        guesses = ""
        users_guess = input()
        attempts += 1
```

- While loop is used to count the number of attempts from the player based of the player's guess
- "generated_color" is where the system generated 4 color code is stored.
- "users_guess" is where the player's guess code is stored
- When the player makes a wrong guess, it will loop back and start over and the attempts will +1 for each loopback.

```
if len(users_guess) != len(passcode):
        print ("Error! The secret code has exactly four colors. Please enter four color codes!")
        continue
for i in range(4):
        if users_guess[i] not in colors:
                print ("Error! Unknown color code! Refer above for the color codes list")
                continue
```

- The if statement is used to determine the condition between the player's guess and the generated 4 color code.
- If the number of code guess from the player is less than 4, it will print the message "Error! The secret code has exactly four colors. Please enter four color codes!"
- If the guess code is not from the color list, it will print the message "Error! Unknown color code! Refer above for the color codes list"

```
if attempts >= 1 and attempts <4 and generated_color != "0000":
        print ("Try again: ")
elif attempts >= 4:
        print ("You didn't guess the color code right. The secret color code was: " + str(passcode))
        print ("Please enter the given code to restart the game")
```

- The elif statement is used to count the number of attempts the player has used.
- When the attempts count exceeds 4, it will print the message "You didn't guess the color code right. The secret color code was: " and the string statement was used to print the correct color code.
- The player is than required to input the correct color code given to restart the game.

```
if generated_color == "0000":
        if attempts == 1:
                print ("Amazing!! You guessed it correctly on first try!")
        else:
                print ("Good job! You took " + str(attempts) + " tries to guess.")
```

- And if statement here is used to determine the correct color code guessed by the player.
- If the requirement is met, it will print the message “Amazing!! You guessed it correctly on first try!” if the player manages to guess it correctly on first try
- Else it will print the message "Good job! You took " + str(attempts) + " tries to guess." with a string used to count the attempts the player used before guessing the correct code.

```
for i in range(4):
        if users_guess[i] == passcode[i]:
                generated_color += "O"
        if users_guess[i] != passcode[i] and users_guess[i] in passcode:
                guesses += "X"
```

- The if statement is used to determine if the player's guess is correct or not
- The "O" defines the correct code guessed by the player
- The "X" defines the incorrect code guessed by the player
- It is an INDIVIDUAL identification for each single code as to give a hint to the player for which single code in the 4 generated code of which one is correct and which one is incorrect
- When there is at least one incorrect code, the system will loop and ask the player to guess again until the player guessed it correctly or use up the attempts available

```
# continue playing or stop playing
        while game == False:
                finish_game = input("Would you like to play again (Y/N)?")
                attempts = 0
                if finish_game =="N":
                        print ("Thank you for playing! Goodbye!")
                elif finish_game == "Y":
                        game = True
                        print ("That was fun! Let's play again...")
                        print ("Guess the secret color code in as few tries as possible.\n")
                        print ("Please, enter your color code.")
                        print ("You can use R - Red, G - Green, B - Blue, Y - Yellow, W - White and O - Orange")
                        print ("Example of a color code : RGBY")
```

- After finishing the game, the system will ask the player if the player wants to play again.
- The player is asked to input "Y" for yes and "N" for no.
- Has to be in uppercase alphabets

User-defined function in the Mastermind game

```
def lets_begin(text):
    print (text)
    return
lets_begin("Welcome to the Mastermind game")
```

- A defined user function to display a message at the beginning
- Before the game begins, the function “lets_begin” is called and the greeting message is "Welcome to the Mastermind Game!" is printed.

```
Welcome to the Mastermind Game!
 ---------------------------
     The MASTERMIND Game
 ---------------------------
Guess the secret color code in as few tries as possible.

Please, enter your color code.
You can use R - Red, G - Green, B - Blue, Y - Yellow, W - White and O - Orange
Example of a color code : RGBY
Please use all uppercase letters
```

Conclusion and improvements goals in the future

- I learned how to use many statements to program as I have no experience in programming before joining CSC1024
- I have learned how to use the python system and its language.
- I hope to improve and master the python system and be better at using it.