



CSC1024 PROGRAMMING PRINCIPLES

Programming Project: A Master Mind
Computer Game



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Presentation Video Web link:
[https://www.youtube.com/watch?
v=auMqQWSrjhg](https://www.youtube.com/watch?v=auMqQWSrjhg)



• • • INPUT AND DISPLAY DATA

```
# Game Start Display
def menu():
    print("\t <MASTERMIND GAME>")
    print("\n\t Start Game    [1]")
    print("\t How to play? [2]")
    print("\t Exit Game      [3]")

# User input for either command
menu()
gcmd=int(input("\n\t Enter a number: "))
```

Output:

```
<MASTERMIND GAME>

Start Game    [1]
How to play?  [2]
Exit Game     [3]

Enter a number:
```

This code is to display the menu for the mastermind game at the start

Under it, the code is to accept input from the user to issue a command to start, view instructions or exit game



• • • ERROR HANDLING/DATA VALIDATION

```
if len(player_guess) != len(colour_code):
    print ("\nThe secret code has exactly four colours, so don't enter more or less than four!")
    continue
for i in range(1):
    if player_guess[i] not in colours:
        print ("\nPlease enter a valid colour: RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P")
        continue
```

If user enters an input not registered in the code, the system prints an error

```
    print(colour_code)
else:
    print("Invalid input, enter Y/N")
```

```
else:
    print("Invalid input, please enter 1, 2 or 3")
```

Output:

```
Game start! Enter 4 colours
RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P
aaaaa

The secret code has exactly four colours, so don't enter more or less than four!
AAAA

Please enter a valid colour: RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P
```

You did it ! You needed 3 attempts to guess.

Do you want to play again? (Y/N)F
Invalid input, enter Y/N

<MASTERMIND GAME>

Start Game [1]
How to play? [2]
Exit Game [3]

Enter a number: 6
Invalid input, please enter 1, 2 or 3

Lists



```
#List of possible colours  
colours = ["R", "G", "B", "Y", "O", "P"]
```

This code stores the possible colours into a list



• • • RANDOM CHOICE FROM A LIST



```
import random
```



```
# computer randomly picks four-colour code  
colour_code = random.sample(colours,4)
```

This code picks a random four colour code from the list below

```
#List of possible colours  
colours = ["R", "G", "B", "Y", "O", "P"]
```



● ● ● IF STATEMENT, AND RELATIONAL AND LOGICAL OPERATORS.

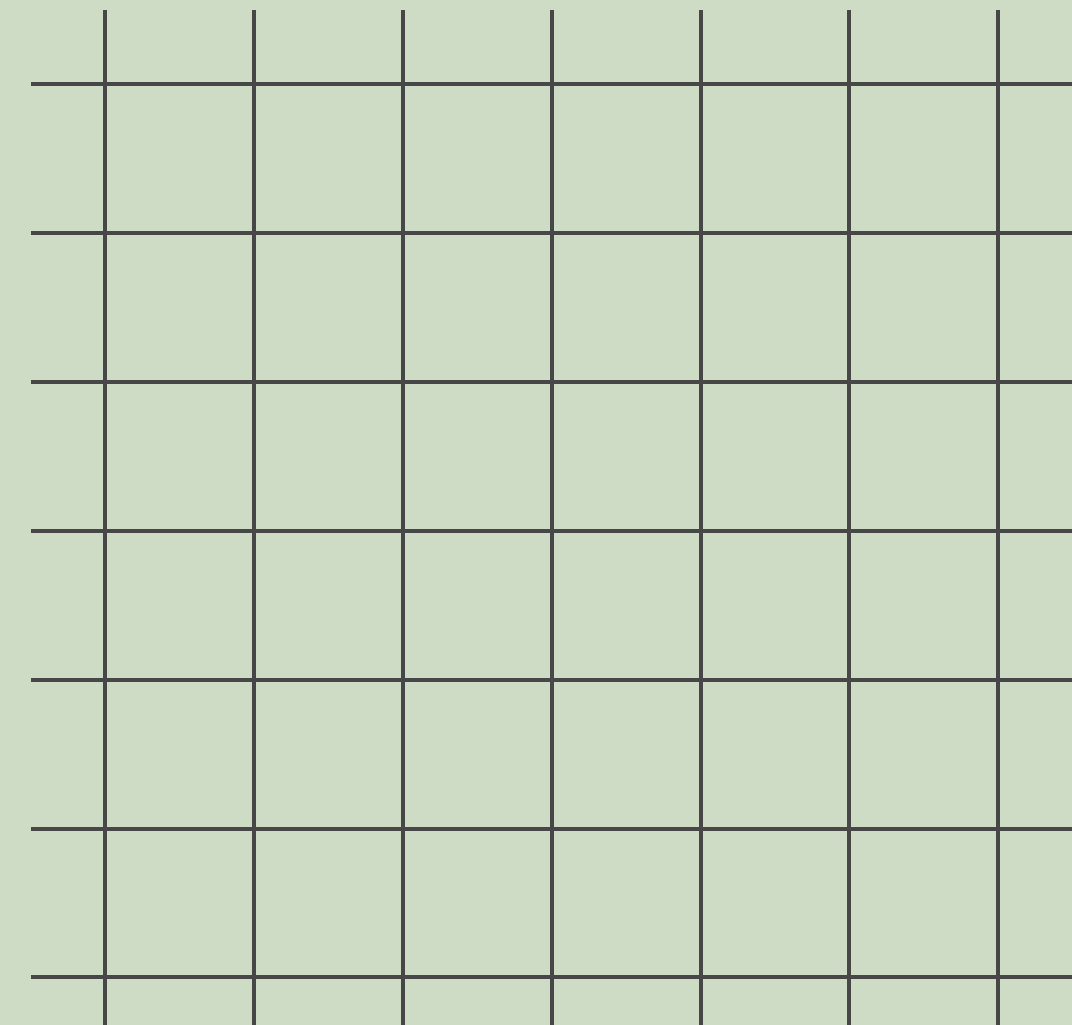
```
# checking if player's input is correct
if len(player_guess) != len(colour_code):
    print ("\nThe secret code has exactly four colours, so don't enter more or less than four!")
    continue
```

If statement check if player entered the wrong amount of inputs for the colours, if its correct it will continue.

Output:

```
Game start! Enter 4 colours
RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P
YYYYY

The secret code has exactly four colours, so don't enter more or less than four!
█
```



```
while gcmd != 3:
    if gcmd == 2:
        # Check if User enter 2 to view instructions
        print("\n\t <How to Play> \n")
        print("\nMastermind is a two-player code-breaking game in which one player hides a random code")
        print("consisting of colours while the other player has to guess it using clues given by the user for each turn.")
        print("\nThe code can be made up of any combination of the colours RED, GREEN, BLUE, YELLOW, ORANGE, PURPLE")
        print("(Enter input as RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P) ")
        print("Computer will automatically generate four random colours from list.")
        print("If the system prints out an X it means the colour is correct and in the right place")
        print("If the system prints out an o it means the colour is correct but in the wrong place")
        print("If the system prints out nothing it means the colour is wrong")
        print("Player must guess 4 colours numbers correctly from the list to win")
        gcmd=input("\n\t Enter [1] or [3] to reutrn to menu: ")
```

If user inputs 2 in the menu it will display the how to play menu.

Output:

<How to Play>

Mastermind is a two-player code-breaking game in which one player hides a random code consisting of colours while the other player has to guess it using clues given by the user for each turn.

The code can be made up of any combination of the colours RED, GREEN, BLUE, YELLOW, ORANGE, PURPLE (Enter input as RED=R, GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P)

Computer will automatically generate four random colours from list.

If the system prints out an X it means the colour is correct and in the right place

If the system prints out an o it means the colour is correct but in the wrong place

If the system prints out nothing it means the colour is wrong

Player must guess 4 colours numbers correctly from the list to win

The image shows a full-page view of a blank sheet of graph paper. The background is a solid light green color. Overlaid on this background is a uniform grid of thin, dark gray lines. The grid consists of 8 vertical columns and 9 horizontal rows, creating a total of 72 small square cells. The lines are evenly spaced across the entire page, leaving a small margin at the top and bottom edges. There are no markings, numbers, or other graphical elements present on the grid.

IF STATEMENT, AND RELATIONAL AND LOGICAL OPERATORS.

```
elif gcmd ==1:
    # List of possible colours
    # game start
    colours = ["R", "G", "B", "Y", "O", "P"]
    attempts = 0
    game = True

    # computer randomly picks four colour code
    colour_code = random.sample(colours,4)
    print(colour_code)
    print("Game start! Enter 4 colours")
    print("RED=R, GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P")
    # player guesses the number
    while game:
        correct_colour = ""
        guessed_colour = ""
        player_guess = input().upper()
        attempts += 1

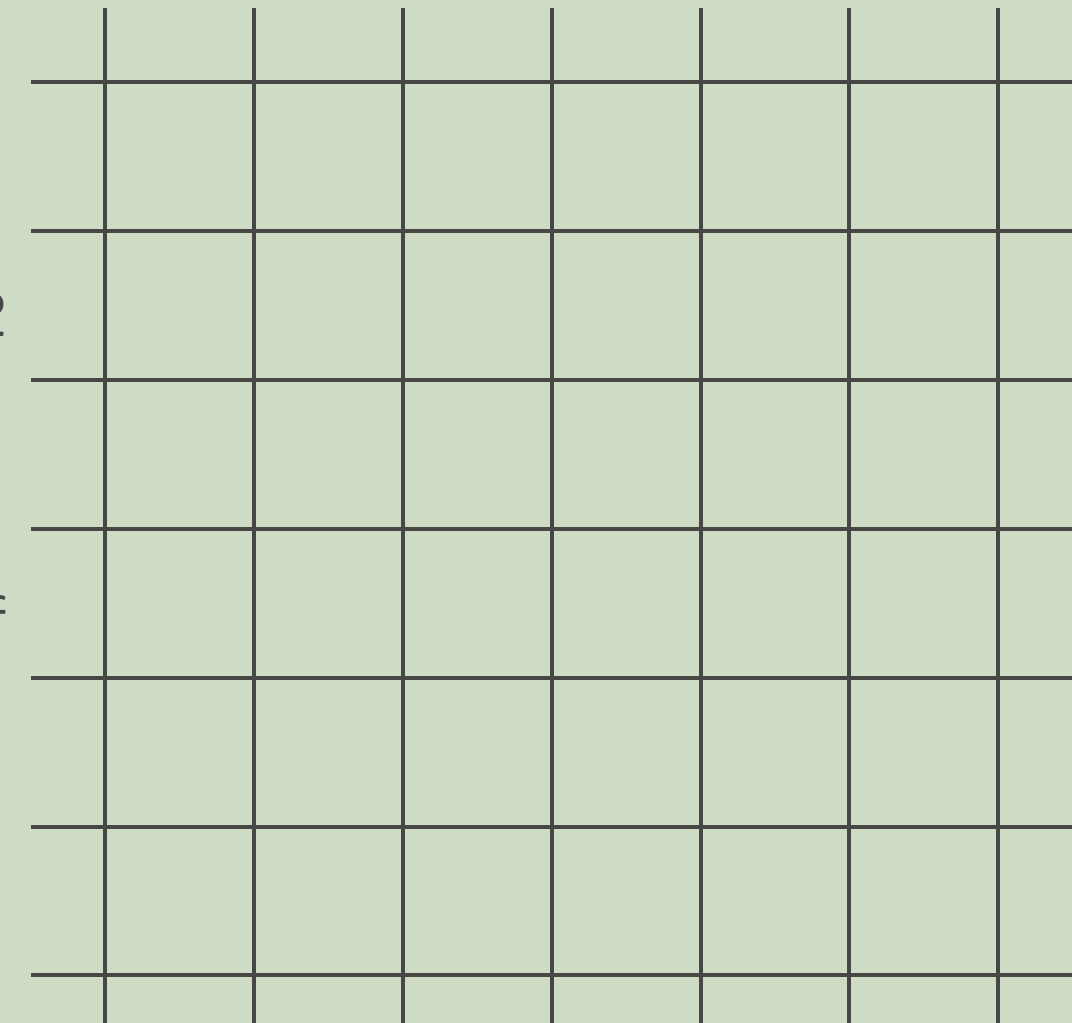
        # checking if player's input is correct
        if len(player_guess) != len(colour_code):
            print("\nThe secret code has exactly four colours, so don't enter more or less than four!")
```

Else if the user inputs 1 in the menu it will start the code for the game

```
else:
    print("Invalid input, please enter 1, 2 or 3")

    print()
    menu()
    gcmd=int(input("\n\t Enter a number: "))
print("Now exiting")
exit()
```

If input is not 1,2 or 3 computer will print this statement and ask for input again. If user inputs 3 it will end the program



LOOPS

```
# replay
while game == False:
    replay = input("\nDo you want to play again? (Y/N)").upper()
    attempts = 0
    if replay == "N":
        print("Thank you for playing!")
        exit()
    elif replay == "Y":
        print("Starting game again")
        print("Game start! Enter 4 colours")
        print("RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P")
        game = True
        colour_code = random.sample(colours,4)
        print(colour_code)
    else:
        print("Invalid input, enter Y/N")
```

Output: Enter N

```
You did it ! You needed 4 attempts to guess.

Do you want to play again? (Y/N)k

Do you want to play again? (Y/N)k

Do you want to play again? (Y/N)N
Thank you for playing!
```

While loop when game ends ask user to continue or end game while variable game=false. If N it will exit program, if Y it will continue program

Output: Enter Y

```
Game start! Enter 4 colours
RED=R. GREEN=G, BLUE=B, YELLOW=Y, ORANGE=O, PURPLE=P
GPYR
XXXX

You guessed the code on your first try!

Do you want to play again? (Y/N)Y
Starting game again
['Y', 'P', 'R', 'B']
```

● ● ● LOOPS

```
for i in range(4):  
    if player_guess[i] == colour_code[i]:  
        correct_colour += "X"  
    if player_guess[i] != colour_code[i] and player_guess[i] in colour_code:  
        guessed_colour += "0"
```

for loop checks if the colours are correct, and if they are in the right position. If they are correct but in wrong position it will print "0", if they are correct and in correct position it will print out "X".

Output:

```
Next attempt:
```

```
GYRO
```

```
XXXX
```

```
You did it ! You needed 3 attempts to guess.
```

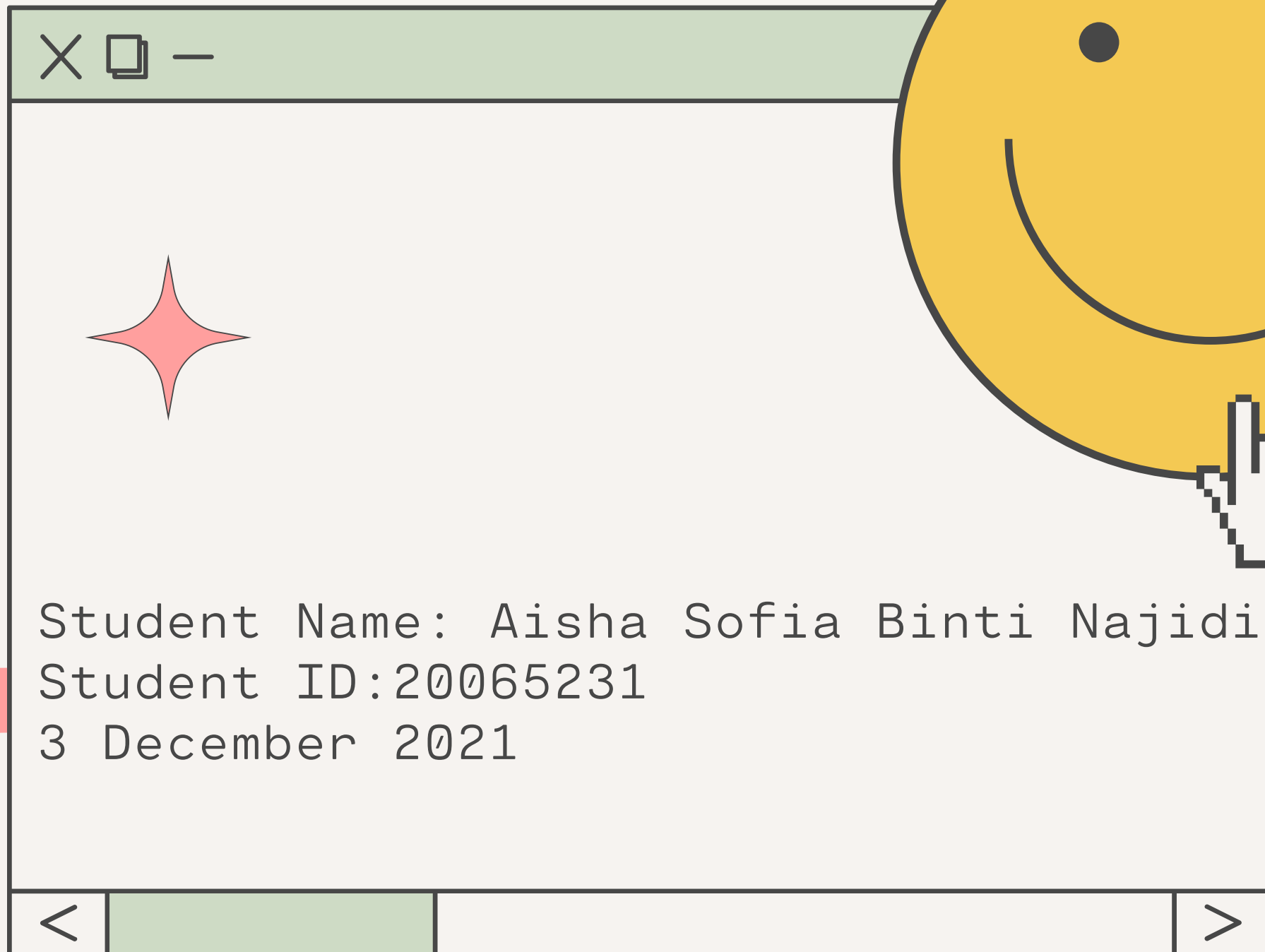
USER-DEFINED FUNCTION

this user defined function
prints out the menu

```
def menu():  
    print("\t <MASTERMIND GAME>")  
    print("\n\t Start Game    [1]")  
    print("\t How to play? [2]")  
    print("\t Exit Game     [3]")
```

```
else:  
    print("Invalid input, please enter 1, 2 or 3")  
  
print()  
menu()
```

```
<MASTERMIND GAME>  
  
Start Game    [1]  
How to play? [2]  
Exit Game     [3]  
  
Enter a number: 4  
Invalid input, please enter 1, 2 or 3  
  
<MASTERMIND GAME>  
  
Start Game    [1]  
How to play? [2]  
Exit Game     [3]  
  
Enter a number: 
```



Thank you!

