



CSC1024 PROGRAMMING PRINCIPLES

Programming Project: A Mastermind Computer Game

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Presentation video web link:

<https://youtu.be/kV3qjdhlK60>



Desmostration



Programming Techniques

INPUT

```
print()
guess1=(input('Please enter your guess:').upper()) #Read user input
if guess1 not in list:
    while guess1 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess1 =(input('Please enter your guess:').upper())
```

Please enter your guess:p

```
while True:
    print()
    print('Do you want to play again?')
    print('You only can type YES or NO.')
    user=(input().upper())
```

Do you want to play again?
You only can type YES or NO.
no

Program generate results

Using input for players response—
Whether they want to play again

```
guess2 =(input('Please enter your guess:').upper()) #Read user input
if guess2 not in list:
    while guess2 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess2 =(input('Please enter your guess:').upper())
```

```
guess3 =(input('Please enter your guess:').upper()) #Read user input
if guess3 not in list:
    while guess3 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess3 =(input('Please enter your guess:').upper())
```

```
guess4 =(input('Please enter your guess:').upper()) #Read user input
if guess4 not in list:
    while guess4 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess4 =(input('Please enter your guess:').upper())
```

Let players to input what colour is
their guess

LISTS

```
import random
list= ('R','P','B','Y')
mastermindsecret = (random.choices(list,k=4))
print(mastermindsecret)
print()
```

Generating the list for
the program to random
choose the colours

Creating a list
(yourguess) and
print the list for
players to refer
their input in
guess1, guess2,
guess3 and guess4

```
guess1=(input('Please enter your guess:').upper()) #Read user input
if guess1 not in list:
    while guess1 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess1 =(input('Please enter your guess:').upper())

guess2 =(input('Please enter your guess:').upper()) #Read user input
if guess2 not in list:
    while guess2 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess2 =(input('Please enter your guess:').upper())

guess3 =(input('Please enter your guess:').upper()) #Read user input
if guess3 not in list:
    while guess3 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess3 =(input('Please enter your guess:').upper())

guess4 =(input('Please enter your guess:').upper()) #Read user input
if guess4 not in list:
    while guess4 not in list:
        print('Hello:), you only can choose P, B, Y and R.')
        print('P=pink, B=blue, Y=yellow, R=red. Thank you:))')
        guess4 =(input('Please enter your guess:').upper())

tries+=1
print()
yourguess=[guess1,guess2,guess3,guess4]
print('Your input:',yourguess)
print()
```

Your input: ['B', 'Y', 'R', 'B']


```
# Loop to let players can play this game anytime
playing()
print()
while True:
    print()
    print('Do you want to play again?')
    print('You only can type YES or NO.')
    user=(input().upper())
    abcd=['YES', 'NO']
    if user not in abcd:
        while user not in abcd:
            print('Hello:), you can only type yes or no.')
            print('Do you want to play again?')
            user=(input().upper())
    if user == abcd[0]:
        print()
        playing()
    else:
        print('Thank you for your response,hoping you can play again:~')
        break
```

Creating list for making decision—
That means abcd is yes or no.
If the players response out of 'abcd',
then the program will ask them to give
the answer again.



RANDOM CHOICES FROM A LIST

```
import random  
list= ('R','P','B','Y')  
mastermindsecret = (random.choices(list,k=4))  
print(mastermindsecret)
```

```
['Y', 'B', 'P', 'P']
```

Result

‘Import random’ import the random module into the list(R,P,B,Y), then program through ‘random choices’ to random choose the colours for generating secret colours(correct answers)

IF STATEMENT

```
while True:
    print()
    guess1=(input('Please enter your guess:').upper()) #Read user input
    if guess1 not in list:
        while guess1 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess1 =(input('Please enter your guess:').upper())

    guess2 =(input('Please enter your guess:').upper()) #Read user input
    if guess2 not in list:
        while guess2 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess2 =(input('Please enter your guess:').upper())

    guess3 =(input('Please enter your guess:').upper()) #Read user input
    if guess3 not in list:
        while guess3 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess3 =(input('Please enter your guess:').upper())

    guess4 =(input('Please enter your guess:').upper()) #Read user input
    if guess4 not in list:
        while guess4 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess4 =(input('Please enter your guess:').upper())
```

Making decision about players input-
If players don't insert P,B,Y,R in guess1, the program will ask them to insert again

The approach of making decision is same as guess1, just the variables is different (guess2, guess3 and guess4)

IF STATEMENT AND RELATIONAL OPERATOR

```
#mastermindsecret=['Y','Y','B','B']
#position          0   1   2   3
#Define player scores

score1=0
if guess1==mastermindsecret[0]:
    score1+=2
elif guess1 not in mastermindsecret:
    score1+=0
else:
    score1+=1

score2=0
if guess2==mastermindsecret[1]:
    score2+=2
elif guess2 not in mastermindsecret:
    score2+=0
else:
    score2+=1

score3=0
if guess3==mastermindsecret[2]:
    score3+=2
elif guess3 not in mastermindsecret:
    score3+=0
else:
    score3+=1

score4=0
if guess4==mastermindsecret[3]:
    score4+=2
elif guess4 not in mastermindsecret:
    score4+=0
else:
    score4+=1
```

Making decision about the scores-

If players' answer is equivalent to secret colours answer(mastermindsecret) position 0, then obtaining 2 scores. If players' answer is not in 'mastermindsecret', then getting 1 scores. If players's answer is in the 'mastermindsecret' but wrong position, then getting 1 score.

The approach of making decision is same as score1, just the variables is different (score2, score3 and score4).

Can you see that, there are somethings highlight in yellow in the picture? "==" , equivalent is the relational operator

IF STATEMENT, RELATIONAL OPERATOR, LOGICAL OPERATOR

```
score22=((score1==2)+(score2==2)+(score3==2)+(score4==2))
print('Correct colour and in right place:',score22)

score21=((score1==0)+(score2==0)+(score3==0)+(score4==0))
print('Wrong colour and in wrong place: ',score21)

score23=((score1==1)+(score2==1)+(score3==1)+(score4==1))
print('Correct colour but in wrong place:',score23)
```

#calculatre the score

```
sumscore=(score1+score2+score3+score4)
```

```
if sumscore==8:
```

```
    print()
```

```
    print('Congragulation,you guess all corrects.')
```

```
if tries==1 and sumscore==8:
```

```
    print('Great! You took',tries,'guess :)')
```

```
    print('Thank you. Hoping you can play again :)')
```

```
    break
```

```
if tries!=1 and sumscore==8:
```

```
    print('Great! You took',tries,'guesses :)')
```

```
    print('Thank you. Hoping you can play again :)')
```

```
    break
```

Can you see that something underline in green?

'And' is the logical operator.

⚠ '!=' and '==' are relational operator ⚠

This is link to the previous slide picture. Defining the variable score22, then sum up the score if (score1==2), (score2==2), (score3==2) and (score4==2). If score1==2, then the Boolean will present 1(True), same as score2 score3 and score4. Consequently, 1(score1==2)+1(score2==2)+1(score3==2)+(score4==2)=4(score 22). Next, print the result, 'correct colour and in right place: 4'.

The definition of these lines are same as the first two lines

Making decision about giving players information:

If score1 is 2, score2 is 2, score3 is 2 and score4 is 2, then sumscore==8. If sumscore == 8 and guess 1 times, then the program will print 'congragulation...' and 'Great...' and 'Thank...' to the players.

These all lines are basically the same as previous definition of 'if tries==1...'. The difference is the tries!=1 (Means the players try more than one times to guess all corrects).

IF STATEMENT, RELATIONAL OPERATOR, LOGICAL OPERATOR

```
# Loop to let players can play this game anytime
playing()
print()
while True:
    print()
    print('Do you want to play again?')
    print('You only can type YES or NO.')
    user=(input().upper())
    abcd=['YES','NO']
    if user not in abcd:
        while user not in abcd:
            print('Hello:),you can only type yes or no.')
            print('Do you want to play again?')
            user=(input().upper())
        # abcd=['YES','NO']
        #position= 0 1
        if user == abcd[0]:
            print()
            playing()
        else:
            print('Thank you for your response,hoping you can play again:~')
            break
```

Relational operator

This means that if the players don't type the possible answer according to the question('Do...'), the program will ask them to answer again

If the players type 'yes'(The players want to play again, the program will let them to play again. On the other hand, the program will stop

LOOPS

```
while True:
    print()
    guess1=(input('Please enter your guess:').upper()) #Read user input
    if guess1 not in list:
        while guess1 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:~)')
            guess1 =(input('Please enter your guess:').upper())

    guess2 =(input('Please enter your guess:').upper()) #Read user input
    if guess2 not in list:
        while guess2 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:~)')
            guess2 =(input('Please enter your guess:').upper())

    guess3 =(input('Please enter your guess:').upper()) #Read user input
    if guess3 not in list:
        while guess3 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:~)')
            guess3 =(input('Please enter your guess:').upper())

    guess4 =(input('Please enter your guess:').upper()) #Read user input
    if guess4 not in list:
        while guess4 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:~)')
            guess4 =(input('Please enter your guess:').upper())

    tries+=1
    print()
    yourguess=[guess1,guess2,guess3,guess4]
    print('Your input:',yourguess)
```

```
print()
#mastermindsecret=['Y','Y','B','B']
#position          0   1   2   3
#Define player scores

score1=0
if guess1==mastermindsecret[0]:
    score1+=2
elif guess1 not in mastermindsecret:
    score1+=0
else:
    score1+=1

score2=0
if guess2==mastermindsecret[1]:
    score2+=2
elif guess2 not in mastermindsecret:
    score2+=0
else:
    score2+=1

score3=0
if guess3==mastermindsecret[2]:
    score3+=2
elif guess3 not in mastermindsecret:
    score3+=0
else:
    score3+=1

score4=0
if guess4==mastermindsecret[3]:
    score4+=2
elif guess4 not in mastermindsecret:
    score4+=0
else:
    score4+=1
```

```
score22=((score1==2)+(score2==2)+(score3==2)+(score4==2))
print('Correct colour and in right place:',score22)

score21=((score1==0)+(score2==0)+(score3==0)+(score4==0))
print('Wrong colour and in wrong place: ',score21)

score23=((score1==1)+(score2==1)+(score3==1)+(score4==1))
print('Correct colour but in wrong place:',score23)

#calculatre the score
sumscore=(score1+score2+score3+score4)

if sumscore==8:
    print()
    print('Congragulation,you guess all corrects.')
if tries==1 and sumscore==8:
    print('Great! You took',tries,'guess :~)')
    print('Thank you. Hoping you can play again :~)')
    break
if tries!=1 and sumscore==8:
    print('Great! You took',tries,'guesses :~)')
    print('Thank you. Hoping you can play again :~)')
    break
```

'While' that highlighted in blue: Using while loop to loop the whole program that circle in brown. (Players who are guess wrong can continue to guess until they guess correct).

LOOPS

```
while True:
    print()
    guess1=(input('Please enter your guess:').upper()) #Read user input
    if guess1 not in list:
        while guess1 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess1 =(input('Please enter your guess:').upper())

    guess2 =(input('Please enter your guess:').upper()) #Read user input
    if guess2 not in list:
        while guess2 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess2 =(input('Please enter your guess:').upper())

    guess3 =(input('Please enter your guess:').upper()) #Read user input
    if guess3 not in list:
        while guess3 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess3 =(input('Please enter your guess:').upper())

    guess4 =(input('Please enter your guess:').upper()) #Read user input
    if guess4 not in list:
        while guess4 not in list:
            print('Hello:), you only can choose P, B, Y and R.')
            print('P=pink, B=blue, Y=yellow, R=red. Thank you:')
            guess4 =(input('Please enter your guess:').upper())
```

This means that if players do not type the possible answer(P,B,Y and R) many times in guess1, while loop program will ask them to guess again

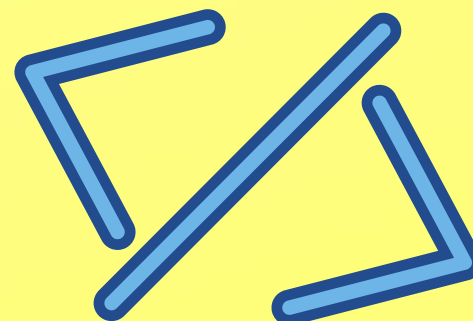
These are all have the same definition as above, just the variables are different

LOOPS

```
# Loop to let players can play this game anytime
playing()
print()
while True:
    print()
    print('Do you want to play again?')
    print('You only can type YES or NO.')
    user=(input().upper())
    abcd=['YES','NO']
    if user not in abcd:
        while user not in abcd:
            print('Hello:),you can only type yes or no.')
            print('Do you want to play again?')
            user=(input().upper())
        # abcd=['YES','NO']
        #position= 0 1
        if user == abcd[0]:
            print()
            playing()
        else:
            print('Thank you for your response,hoping you can play again:')
            break
```

This while loop is for loop the whole program below. Purpose: For the players can play many times after they guess all correct.

This while loop is for the players who do not answer in yes or no many times, the program will ask them to answer again.



USER-DEFINED FUNCTION

```
def playing():  
    # making answer random choices  
    import random  
    list= ('R','P','B','Y')  
    mastermindsecret = (random.choices(list,k=4))  
    print(mastermindsecret)  
    print()  
  
    #greeting  
    print('Hello everyone!!! :)')  
    print('Welcome to play mastermind game!!!')
```

```
# Loop to let players can play this game anytime  
playing()  
print()  
while True:  
    print()  
    print('Do you want to play again?')  
    print('You only can type YES or NO.')  
    user=(input().upper())  
    abcd=['YES','NO']  
    if user not in abcd:  
        while user not in abcd:  
            print('Hello:), you can only type yes or no.')  
            print('Do you want to play again?')  
            user=(input().upper())  
        # abcd=['YES','NO']  
        #position= 0 1  
        if user == abcd[0]:  
            print()  
            playing()  
        else:  
            print('Thank you for your response,hoping you can play again:~')  
            break
```

User-defined function is also useful in creating mastermind game.

If want to repeat the whole program, just put the defined function and call it out.

It also easy to correct the mistakes, because just correct the mistakes in one time.

CONCLUSION

Every programming technique that I show in this presentation is significant in creating this game

This is the first time that I create this game, and I learn Python first time in this course. Therefore, I am not a good programmer.

However, I am very happy for learning Python. I am interested in it.

Hoping I can use Python in the future!!!

**Thank you very much for
listening the presentation**