

ECE 476/676 - Homework #2

Loops, if-Statements, Subroutines - Due Monday, September 9th

Master-Mind

In the game of Master-Mind, you try to guess a 4-digit code with each digit in the range of 0-5. Each time you guess a number, you're told how close your guess was. For each digit in the code:

- If that digit appears in your guess in the correct spot, you get 10 points.
- If that digit appears in your guess in the incorrect spot, you get 1 point.

For example, if the code is 4444 and your guess is 1234, you would get 13 points

- The first three 4's appear in your guess but in the wrong spot (1 point each)
- The last 4 appears in your guess in the correct spot (10 points)

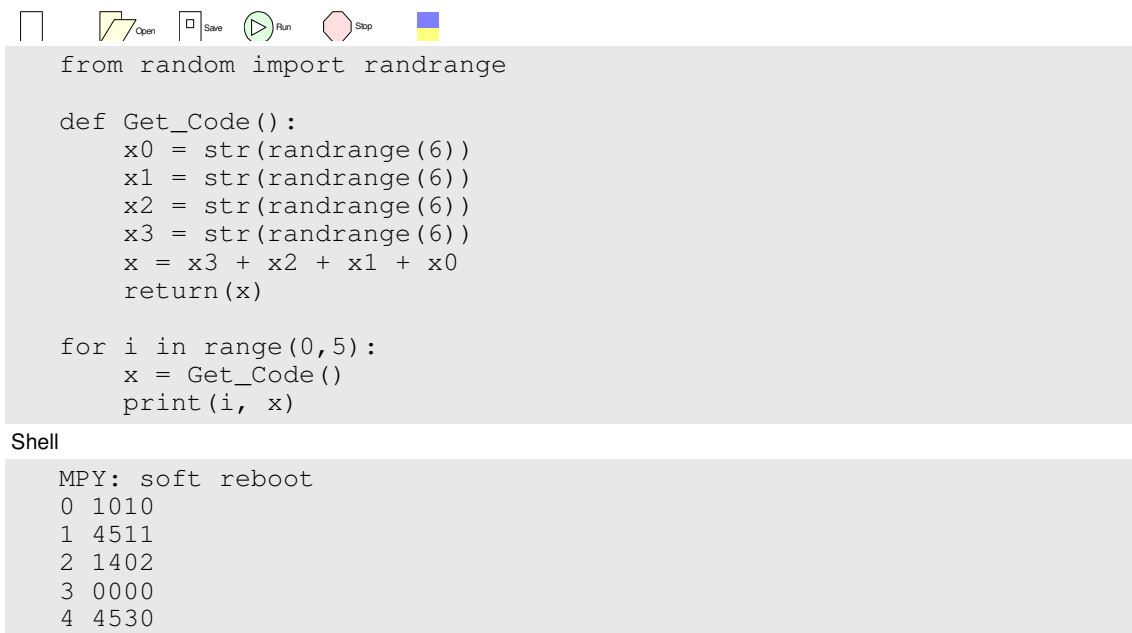
Write a Python program to play MasterMind.

Problem 1) Write a subroutine which returns a 4-digit number (your code)

- Start out with the code always being 1234
- Once your code works make this a random number
- Each digit is in the range of 0-5

Test your code

Note: String variables were easier to use: the sequence '0000' reads out as four digits as a string. Plus, you can pull out the digits by reading the value of $x[i]$ in the string.



```
from random import randrange

def Get_Code():
    x0 = str(randrange(6))
    x1 = str(randrange(6))
    x2 = str(randrange(6))
    x3 = str(randrange(6))
    x = x3 + x2 + x1 + x0
    return(x)

for i in range(0,5):
    x = Get_Code()
    print(i, x)
```

Shell

```
MPY: soft reboot
0 1010
1 4511
2 1402
3 0000
4 4530
```

Comment:

- Each code was a random number with digits from 0..5

Problem 2) Write a subroutine which

- Is passed two numbers (your guess and the code), and
- Returns your score

10-points for each digit in the code that's in the correct spot, 1 point for each digit in the code that's in the wrong spot

Test your subroutine.

>>>



```
from random import randrange

def Get_Code():
    x0 = str(randrange(6))
    x1 = str(randrange(6))
    x2 = str(randrange(6))
    x3 = str(randrange(6))
    x = x3 + x2 + x1 + x0
    return(x)

def Score(x, y):
    score = 0
    for i in range(0,4):
        s = 0
        if(x[i] == y[i]):
            s = 10
        else:
            for j in range(0,4):
                if(i != j):
                    if(x[i] == y[j]):
                        s = 1
            score += s
    return(score)

x = '1123'
y = '1111'
print(x, y, Score(x,y))
y = '1132'
print(x, y, Score(x,y))
y = '1234'
print(x,y,Score(x,y))
```

Shell

```
MPY: soft reboot
1123 1111 20
1123 1132 22
1123 1234 13
```

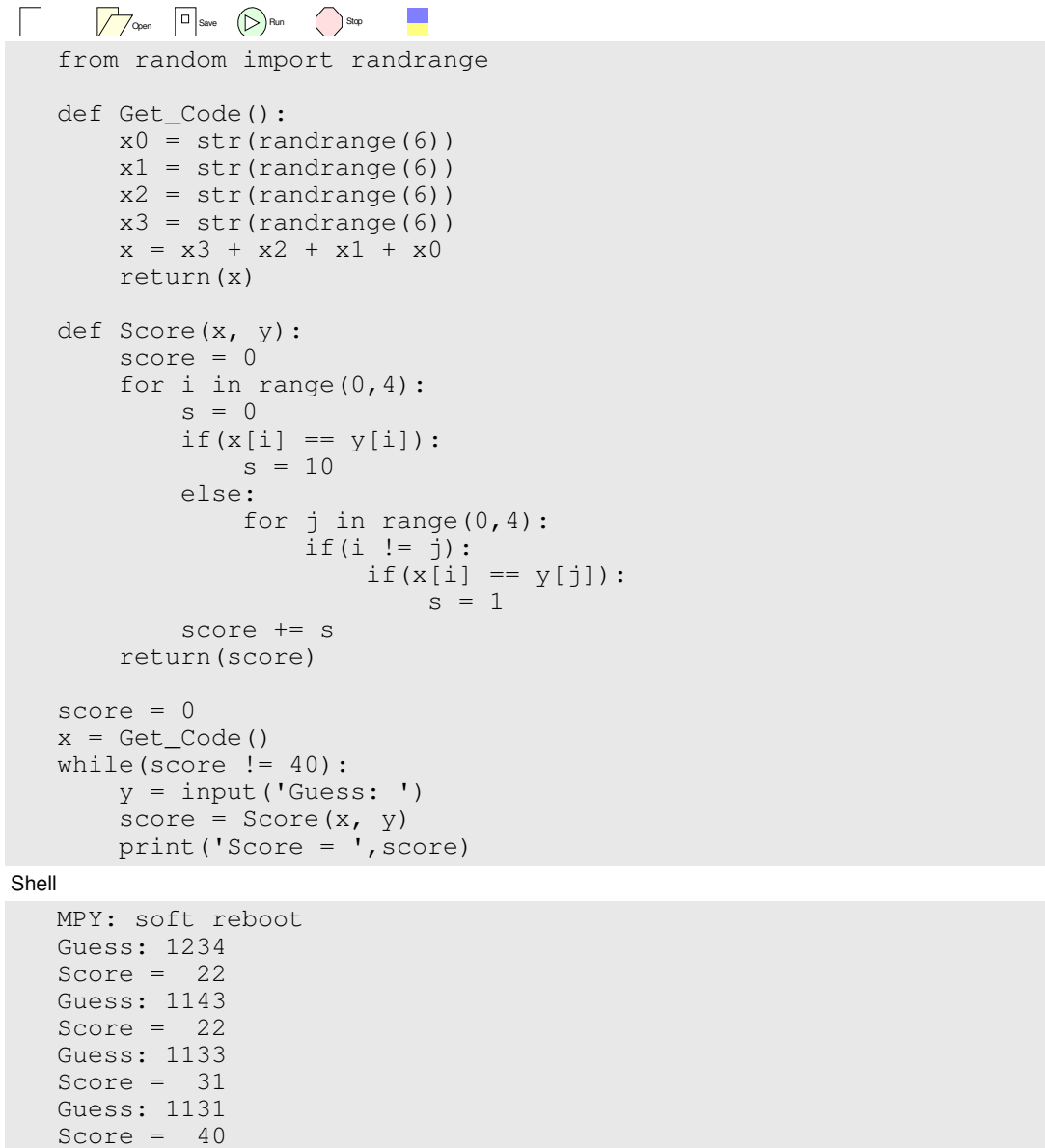
Comment: Scoring is correct. With a key of 1123

- 1111 scores 20 (two numbers correct in the correct spot (11))
- 1132 scores 22 (11 are in the right spot, 23 are in the guess but wrong spot)
- 1234 scores 13 (1 number in right spot (1), 3 numbers in the guess but wrong spot)

Problem 3) Write a program which

- Starts by generating a code (problem #1)
- Then prompts you for a guess (0000 to 5555)
- Scores your guess and tells you your score,
- Keeps playing until your score is 40 (correct code), and
- Keeps track of how many guesses it took you

Test your code.



The image shows a screenshot of a Python IDE. At the top, there are icons for file operations: a folder icon, an 'Open' icon, a 'Save' icon, a 'Run' icon (a green play button), a 'Stop' icon (a red octagon), and a blue square icon. Below these icons is a code editor with the following Python code:

```
from random import randrange

def Get_Code():
    x0 = str(randrange(6))
    x1 = str(randrange(6))
    x2 = str(randrange(6))
    x3 = str(randrange(6))
    x = x3 + x2 + x1 + x0
    return(x)

def Score(x, y):
    score = 0
    for i in range(0,4):
        s = 0
        if(x[i] == y[i]):
            s = 10
        else:
            for j in range(0,4):
                if(i != j):
                    if(x[i] == y[j]):
                        s = 1
            score += s
    return(score)

score = 0
x = Get_Code()
while(score != 40):
    y = input('Guess: ')
    score = Score(x, y)
    print('Score = ',score)
```

Below the code editor is a 'Shell' window showing the execution output:

```
MPY: soft reboot
Guess: 1234
Score = 22
Guess: 1143
Score = 22
Guess: 1133
Score = 31
Guess: 1131
Score = 40
```

The correct code was 1131

Problem 4) Demo your Master-Mind program

- In-Person or a short video works