

Nesting Loops

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You can nest an if statement or for loop inside another if statement or for loop. This documents explores how to do that. Answer the questions below in a document and turn them in. Complete the programming assignments below, save each of them as .py files and turn them in as well.

1 Example: Nested For Loops

Save this code in a .py file, and try running it. What do you see?

```
for i in range(4):
    for j in range(3):
        print("i is " + str(i) + " and j is " + str(j) + ".")
```

Here is another example. Try it. What do you see?

```
for i in range(4):
    print("i is " + str(i) + ".")
    for j in range(3):
        print("    j is " + str(j) + ".")
```

Here is another example. Try it. What do you see?

```
for i in range(4):
    print("i is " + str(i) + ".")
    for j in range(i):
        print("    j is " + str(j) + ".")
```

2 Question

There is exactly one difference between the last example and the example before it. What is this difference, how does it effect the behavior of the code, and why?

3 Example: If statement in a for loop

Save this code in a .py file, and try running it. What do you see?

```
MyStr = "Computer"

for i in range(len(MyStr)):
    if MyStr[i] not in ["a", "e", "i", "o", "u"]:
        print MyStr[i]
```

4 Question

Try the following commands in your IDLE:

- "a" in ["e", "o"]
- "a" not in ["e", "o"]
- 1 in range(5)
- 8 in range(5)

What response do you get in each case? What does the line
if MyStr[i] not in ["a", "e", "i", "o", "u"]:
in the Example 3 do? Describe what the Example 3 does overall.

5 Assignment

Write a program that asks the user for her favorite word then prints out the vowels in that word in the order in which they appear. Here is an example of my program for this assignment:

```
What is your favorite word? onomatopoeia
o
o
a
o
```

```
o
e
i
a
```

6 Assignment

Write a program that

1. Asks the user for an integer n
2. Flips a fair coin n times and tracks how many times it landed on heads and how many times it landed on tails.
3. Prints the results.

Here is sample output from running my code:

```
How many times would you like to flip the coin? 345
In 345 coin flips, heads came up 168 times, and tails came up 177 times.
Heads came up in 48.6956521739% of the coin flips.
```

7 Question

Use your program for Assignment 6 to fill in the table below:

# of coin tosses	% heads				
	run 1	run 2	run 3	run 4	run 5
10					
100					
1000					
10000					

For each row in this table, run your program five times and record the percent of the coin flips that were heads for each run. What do you notice about this percentage as the number of coin tosses increases? Why?

8 Assignment

Modify your Rock-Paper-Scissors game so that it first asks the user how many games of Rock-Paper-Scissors she would like to play, then plays that many games keeping a score of how many games each player won. At the end, the program should print how many games each player won, how many games were tied, and declare a winner for the tournament. Here's one run of my program:

Welcome to Rock, Paper, Scissors!
How many games of Rock, Paper, Scissors would you like to play? 3

This is game 1 of 3.
Please select either Rock, Paper, or Scissors: rock
You selected rock.
I selected scissors.
You win!

This is game 2 of 3.
Please select either Rock, Paper, or Scissors: paper
You selected paper.
I selected scissors.
I win!

This is game 3 of 3.
Please select either Rock, Paper, or Scissors: scissors
You selected scissors.
I selected paper.
You win!

I won 1 games, you won 2 games, and we tied 0 games.
You won the tournament!

You may write your own messages to the user, but your program should function similar to mine.