Challenge 01(Day 4/100): Full Python With DSA in 100 Days with Projects

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Day 4/100 : Concept of Loop in Python

4-1 Loops in Python

Sometimes we need to print or iterate a lot of numbers serially in python to get important data as output.

Suppose we need to print 1 to 10 in output, so we can do that in this way :

Code-1:

```
print(1)
print(2)
print(3)
print(4)
print(5)
print(6)
print(7)
print(8)
print(9)
print(10)
```

Output:

1 2 3 4 5 6 7 8 9 10

But is it even a good method to print a lot of serial output manually just using ***print() function.*** A programming language should have a better method to overcome this issue.

Infact , all programming language including python have a wonderful tool to resolve this repetitive issue. That tool is called “Loop”.” It helps to iterate repetitive operations under simple command.

 **4-2 Types Loops in Python**

Primarily there are two types of loops in python.

1. for loops
2. while loops

We will look into these one by one.

for loop:

Syntax:

```
for i in range(initial, final+1):
    statement
```

Here, “i” is iterating indicator. It indicates where the loop will operate (it can be given range, list, tuple, dictionary etc.) . After that a range must be given with initial and final iteration value. The statement will be executed until it exceeds the range.

Now let’s rerun the code-1 with for loop:

Code-2:

```
for i in range(1,11):
print(i)
```

Output:

1 2 3 4 5 6 7 8 9 10

Hurrah, just 2 lines of code has resolved the work of 10 lines!!!

Let’s learn more about for loop. We can jump on numbers using it.

Syntax:

```
for i in range(initial, final+1, step_size):
    statement
```

Here, here “step_size” indicates how many number we want to jump. Lets see with example.

Code-3:

```
for i in range(1,21,2):
print(i)
```

Output:

1 3 5 7 9 11 13 15 17 19

we can also ad an **“else”** operator ,which will be executed just after finishing the loop. Let’s see:

Code-4:

```
for i in range(1,21,2):
print(i)
else:
    print("done")
```

Output:

```
1  3  5  7  9  11  13  15  17  19
done
```

okay that's enough about for loop. Now let's get into while loop:

while loop:

Syntax:

```
while (condition): # The block keeps executing until the con
        #Body of the loop
```

In while loops, the condition is checked first. If it evaluates to true, the body of the loop is executed otherwise not!

If the loop is entered, the process of [condition check & execution] is continued until the condition becomes False.

Now let's see an example:

Code-5:

```
i = 0
while i < 5: # print "PytronLab" – 5 times!
        print("PytronLab")
        i = i + 1
```

Output:

PytronLab
PtronLab
PytronLab
PytronLab
PytronLab

Okay, now let's get into some additional concept which are related to the loops.

4-3: Break statement in Python

'break' is used to come out of the loop when encountered. It instructs the program to exit the loop now. Let's see the example:

Code-6:

```
for i in range (0,20):
            print(i)       # this will print 0,1,2 and 3
             if i==3:
              break
```

Output:

0

1

2

3

4-4: Continute statement in Python

'continue' is used to stop the current iteration of the loop and continue with the next one. It instructs the Program to "skip this iteration"." let's see the example:

Code-7:

```
for i in range(1,5):
    if i == 2:          # if i is 2, the iteration is skipped
        continue
    print(i)
```

Output:

1
3
4

4-5 Pass statement in Python

pass is a null statement in python. It instructs to "do nothing"."

Code-8:

```
for i in range(1,5):
    pass
```

Output:

(No output)

Okay that enough theory for today now let's make a project for today.

4-6 Magic Square Validator with Loop

Let’s make a Magic Square Validator with python

Project:

```
# Initialize variables to store the grid values
a1, a2, a3 = 0, 0, 0
b1, b2, b3 = 0, 0, 0
c1, c2, c3 = 0, 0, 0

# Input the 9 numbers using loops
print("Enter 9 numbers for the 3x3 grid:")
for i in range(3):
    for j in range(3):
        value = int(input(f"Enter number for position ({i+1}
        if i == 0 and j == 0:
            a1 = value
        elif i == 0 and j == 1:
            a2 = value
        elif i == 0 and j == 2:
            a3 = value
        elif i == 1 and j == 0:
            b1 = value
        elif i == 1 and j == 1:
            b2 = value
        elif i == 1 and j == 2:
            b3 = value
        elif i == 2 and j == 0:
            c1 = value
        elif i == 2 and j == 1:
            c2 = value
        elif i == 2 and j == 2:
            c3 = value

# Calculate sums of rows
row1_sum = a1 + a2 + a3
row2_sum = b1 + b2 + b3
row3_sum = c1 + c2 + c3
```

```
# Calculate sums of columns
col1_sum   =   a1   +   b1   +   c1
col2_sum   =   a2   +   b2   +   c2
col3_sum =     a3   +   b3   +  c3

# Calculate sums of diagonals
diag1_sum = a1 + b2 + c3
diag2_sum = a3 + b2 + c1

# Check if all sums are equal
if (row1_sum == row2_sum == row3_sum == col1_sum == col2_sum
        print("Congratulations! The grid forms a Magic Square.")
else:
        print("The grid does not form a Magic Square.")
```

Input:

Enter 9 numbers for the 3X3 grid:
Enter number for position (1,1): 1
Enter number for position (1,2): 1
Enter number for position (1,3): 1
Enter number for position (2,1): 1
Enter number for position (2,2): 1
Enter number for position (2,3): 1
Enter number for position (3,1): 1
Enter number for position (3,2): 1
Enter number for position (3,3): 1

Output:

Congratulations! The grid forms a Magic Square.

Congratulations , we've made 4 projects and we'll make 96 projects more!!!!

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Profile Link: https://www.linkedin.com/in/ashraful-islam-mahi/

Group link: https://lnkd.in/gr3QdnKR

Page Link: https://lnkd.in/g8A3qRwv

Github Repository: https://github.com/aimG313/challange_01_Full_Python_with_DSA_in_100_days