Python Programming
While Loops Practice 2

Mostafa S. Ibrahim
Teaching, Training and Coaching since more than a decade!

Artificial Intelligence & Computer Vision Researcher
PhD from Simon Fraser University - Canada
Bachelor / Msc from Cairo University - Egypt
Ex-(Software Engineer / ICPC World Finalist)

Practice: Number of digits

```
1
2    num = int(input())
3
4    digits = 0
5
6    while num > 0:
7        digits += 1
8        num //= 10
9
10   print('# of digits of', num, 'is', digits)
11
12   # There are 3 BUGS in this code
13   # Find a test-case per mistake!
```

- Read an integer and count its number of digits
- See the output screenshot
- Note: one trivial way is to convert the number to string
  - Don't use strings

```
/home/moustafa/system-inst
12345
# of digits of 12345 is 5
```

Practice: Number of digits - Fixing bugs!

```python
num = int(input())
num2 = num  # copy

digits = 0

while num > 0:
    digits += 1
    num //= 10

print('# of digits of', num2, 'is', digits)

# There are 2 BUGS in this code
```

- Bug in line 11:
-
- The first bug: num will be zero when the loop ends, as we keep dividing by 10
- Solution: make a copy of it

Practice: Number of digits - Fixing bugs!

```
2    num = int(input())
3    num2 = num  # copy
4
5    if num == 0:
6        digits = 1
7    else:
8        digits = 0
9        while num > 0:
10           digits += 1
11           num //= 10
12
13   print('# of digits of', num2, 'is', digits)
14
15   # There is 1 BUG in this code
16
```

- Our second bug is: the previous code fails for input 0
  - The loop won't be accessed as num > 0 condition
- Solution:
  - Special if condition for this special case

Practice: Number of digits - Fixing bugs!

```python
num = int(input())
num2 = num  # copy

if num == 0:
    digits = 1
else:
    digits = 0

    if num < 0:
        num = -num

    while num > 0:
        digits += 1
        num //= 10

print('# of digits of', num2, 'is', digits)

# Perfect, as long as input is integer
```

- Our previous code will fail for negative numbers
- E.g. if we feed -123, the condition fails!
- Simple trick: if it is negative, multiply by -1
- Works well!

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."