Discussion 1: June 24, 2025

Functions

Functions (such as pow) are called using *call expressions* (such as pow(10, 3) which returns 1000; 10 to the third power). The body of a function can print or return values (or both).

- When print is called anywhere, its arguments are displayed right away.
- Executing a return statement stops the function call and provides the value for its call expression.
- When the end of a function body is reached without a return, the function returns None.

Tip: If a value needs to be used by code outside of a function, then return the value (instead of printing it).

Q1: Multiply

Implement $\mathtt{multiply}$, which takes two numbers x and y. It prints out an equation showing the result of multiplying x and y, then returns the result.

Try to multiply numbers together just once in the body of multiply so that the Python interpreter doesn't have to perform multiplication more *times* than necessary (pun intended).

```
def multiply(x, y):
    """Multiply x by y and print what happened.

>>> multiply(3, multiply(multiply(4, 5), 6))
4 * 5 = 20
20 * 6 = 120
3 * 120 = 360
360
"""
"*** YOUR CODE HERE ***"
```

Calling print on multiple arguments displays those values separated by spaces. For example, the call expression print(1, '+', 2, '=', 3) displays 1 + 2 = 3.

Digits

Each digit of a positive integer corresponds to a power of 10. Here are some examples of manipulating digits, illustrated with n = 357 and d = 9. - Remove the last digit of n: n // 10 is 35. - Remove the last two digits of n: n // pow(10, 2) is 3. - Add together the last two digits of n: n % 10 + n // 10 % 10 is 12. - Put digit d at the end of integer n: n * 10 + d is 3579.

Q2: Cut One Out

Implement cut, which takes non-negative integers n and k and has only a return statement in its body. It returns a positive integer with all of the digits of n except the digit that is k to the left of the rightmost digit (the one's digit).

If k is 0, then it returns n without its one's digit. If there is no digit k to the right of the one's digit, then it returns n.

```
def cut(n, k):
    """Return n with the kth digit from the right removed.

>>> cut(3579, 2)
379
>>> cut(3579, 0)
357
>>> cut(3579, 1)
359
>>> cut(3579, 5)
3579
"""
return ____
```

Please don't look at the hint until everyone in your group agrees that you're stuck and need some extra help.

To implement a function, it can be helpful to open a Python interpreter and focus on an example. Here are all the pieces you need to put together to solve this problem for the example n=3579 and k=2.

```
>>> n = 3579

>>> k = 2

>>> pow(10, k)

100

>>> pow(10, k + 1)

1000

>>> n // 1000

3

>>> 3 * 100

300

>>> 3579 % 100

79

>>> 300 + 79

379
```