What is iteration?

Repeating a set of instructions until a condition is met.

Example: Adding the numbers 1 to n.

- Start a counter at 1 and a sum at 0.
  - While we haven’t reached n,
    - Add our counter to the sum
    - and increment our counter by 1
Cool...
How do we do that in Python?!
While loops

```python
while condition:
    statement 1
    statement 2
    .
    .
    .
```

code outside of loop goes here
While loops

Important notes(!!!!!!!):

- "while" is a keyword (reserved by Python)
- `condition` MUST be a statement that can evaluate to True or False
- `condition` MUST be followed by a colon and indented code ("while" loops create a new block of code)
- If `condition` is True, Python will evaluate EVERY statement once, and then go back to the top to evaluate the `condition` again.
- If `condition` NEVER evaluates to False, the loop will go on FOREVER.
While loops

Examples:

- sum_n(n)
- factorial(n)
- factors(n)
- isPalindrome(s)
- count_midd(s)
- infinite()
For loops

```python
for iterator in iterable:
    statement 1
    statement 2
    
code outside of loop goes here
```
Important notes(!!!!!!!):

- "for" is a keyword (reserved by Python)
- `iterable` MUST be a valid iterable type in Python (strings, ranges, etc)
- `iterable` MUST be followed by a colon and indented code ("for" loops create a new block of code)
- `iterator` is just a variable name – you can call it whatever you want!
- If `iterator` is still within the limit of the `iterable`, Python will evaluate EVERY `statement` once, and then go back to the top to evaluate the `iterator/iterable` bounds again.
- `for` loops are GUARANTEED to end
For loops

Examples:

- print_chars1()
- print_chars2()
- sum_n(n)
- sum_string(s)
- count_midd(s)
- random_circles(n)
Midterm prep questions?