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Last Time
- Stacks & Queues: Applications!

Today
- Recursion
- Midterm on Thursday!

Next Time
- Recursion
Recursion: Beginning Example

Write a code snippet for a method print called on a singly-linked chain of nodes such that print(head) prints the contents of the whole chain:

Iterative version:

```java
void print(ListNode<String> ptr) {
    // code
}
```

Another way:

```java
void print(ListNode<String> ptr) {
    // code
}
```
Recursion: What and Why

What is it?

Bad joke: “In order to understand recursion, you must first understand recursion.”

Why is it useful?

How does it work?

Rules:
Key Recursion Questions

Questions to keep in mind:

● How can you solve the problem in terms of smaller problems of the same kind?

● What instances of the problem can be used as base cases?

● How does the problem size decrease in each recursive call?

● As the problem size decreases will a base case be reached?

Similarities and Differences with Iteration
Computing Factorials: Write a method that computes the factorial of n:

\[ n! = n \times (n - 1) \times (n - 2) \times \ldots \times 2 \times 1 \]

Iterative version:

```java
int factorial(int n) {
}
```

Recursive definition of factorial:

Recursive version:

```java
int factorial(int n) {
}
```
displayReverse() for a chain of nodes: