CSCI 132:

Basic Data Structures and Algorithms

Circular Linked Lists, Program 2

Reese Pearsall

Spring 2025

Announcements

Program 2 Posted

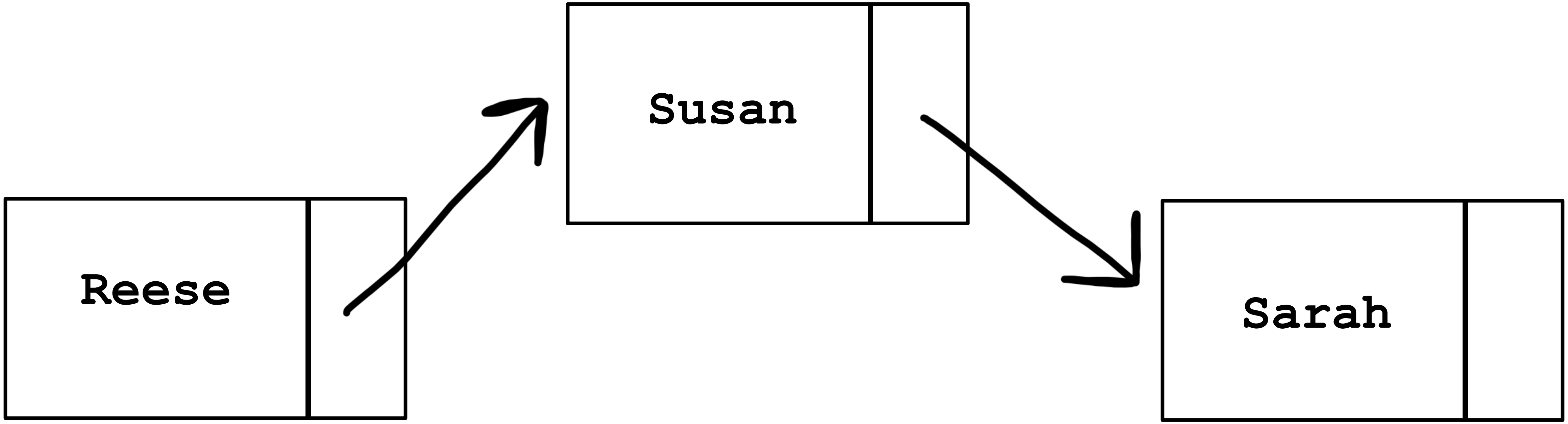
- Due ~two weeks from now

I will be gone on Monday 2/24 and Wednesday 2/26

- Ahmad (TA) is giving the lecture on Monday
- Andras (TA) is giving the lecture on Wednesday

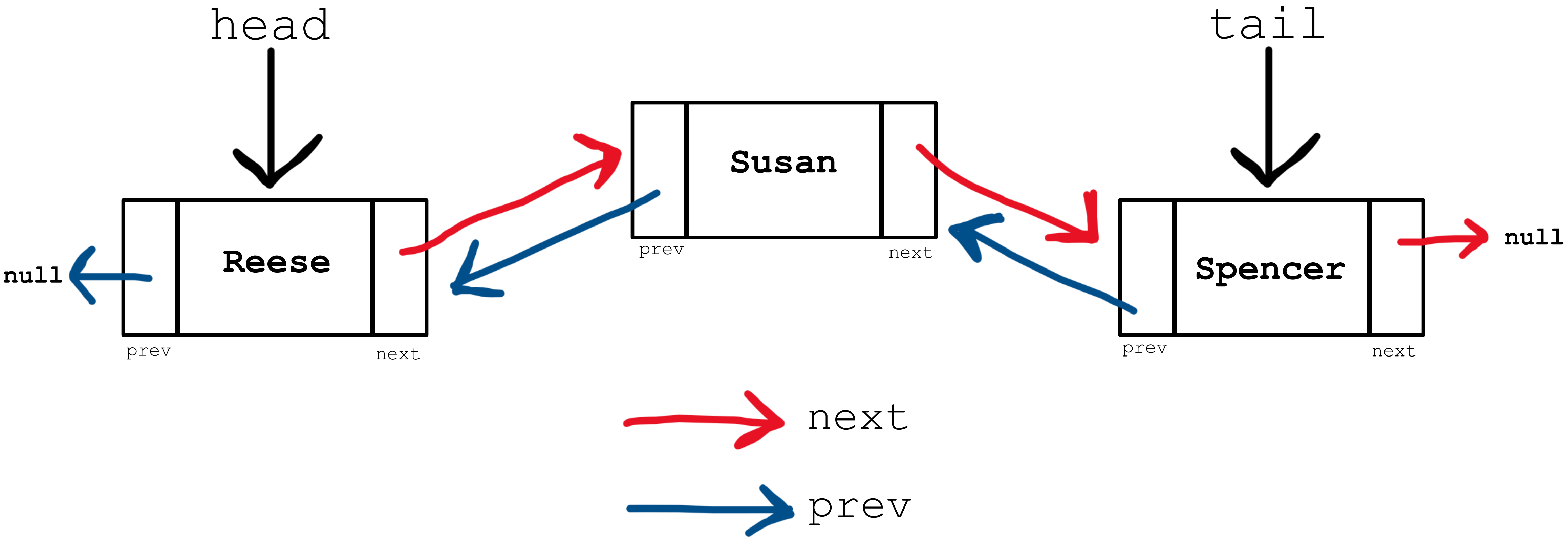
I wont have office hours those days

A **Linked List** is a data structure that consists of a collection of connected nodes

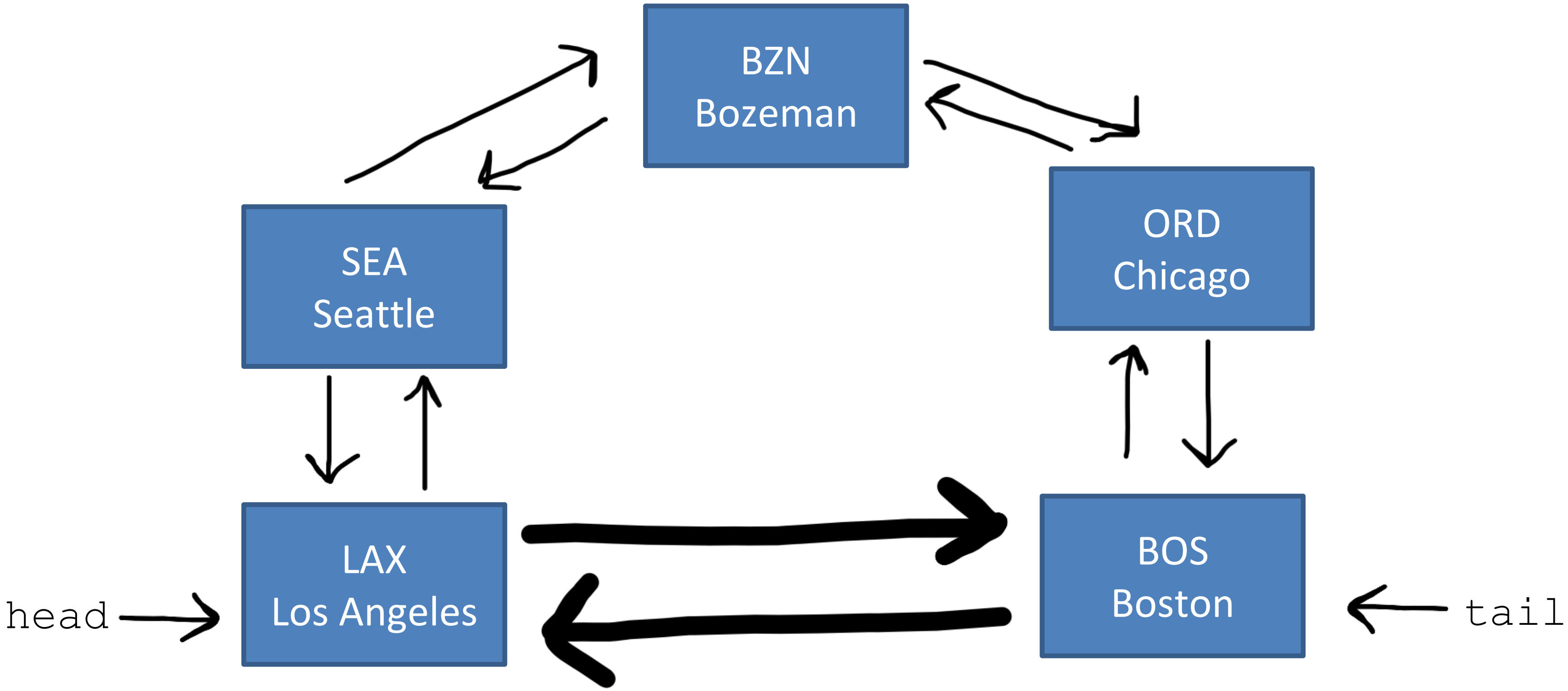


Nodes consists of **data** (String, int, array, etc) and a **pointer to the next node**

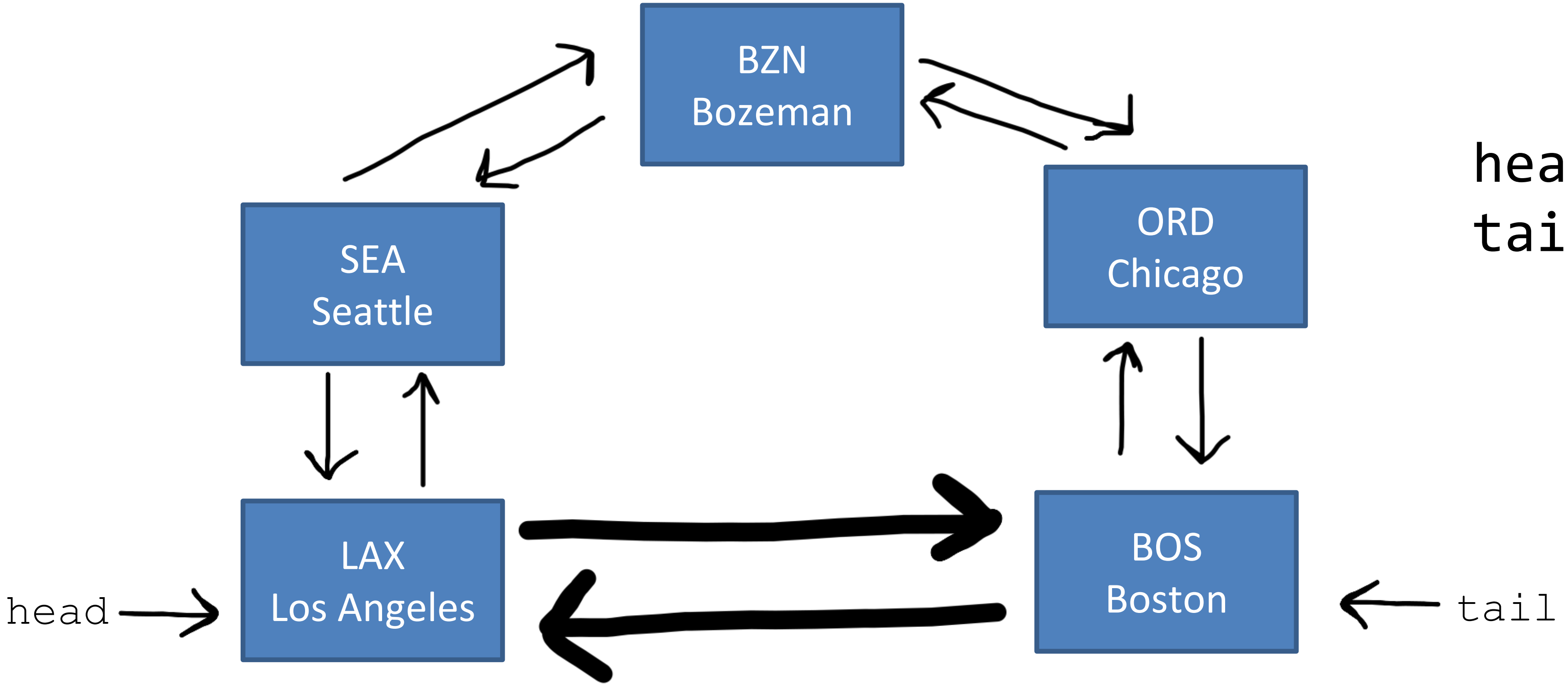
A **Doubly Linked List** keeps track of the <u>next</u> node and the <u>previous</u> node



A **Circular Linked List** is a linked list where the first and last node are connected, which creates a circle



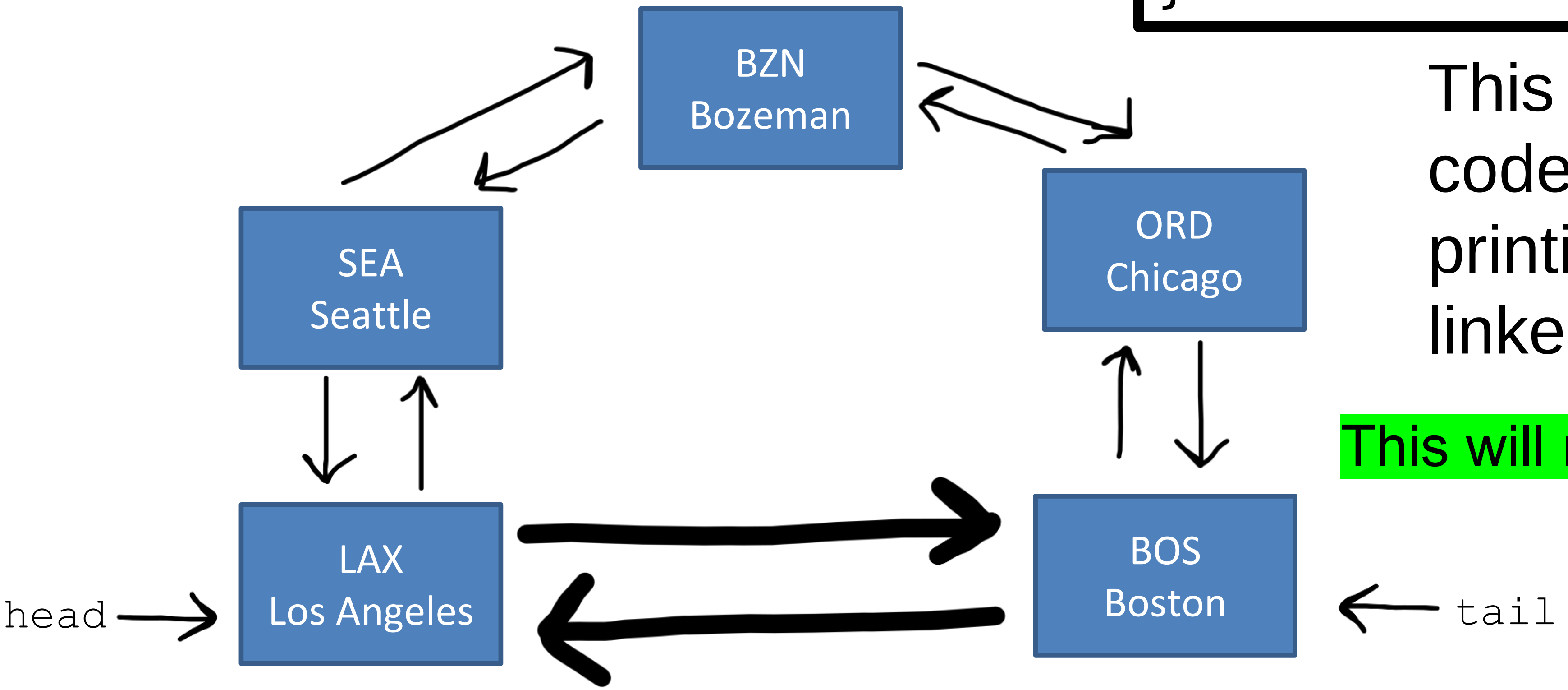
A **Circular Linked List** is a linked list where the first and last node are connected, which creates a circle



```
head.setPrev(tail);
tail.setNext(head);
```

Traversing a Circular Linked List

```
public void printList() {
   Node current = this.head;
   while(current != null) {
      current.printNode();
      current = current.getNext();
   }
}
```



BZN
Bozeman

ORD
Chicago

SEA
Seattle

LAX
Los Angeles

BOS
Boston

head

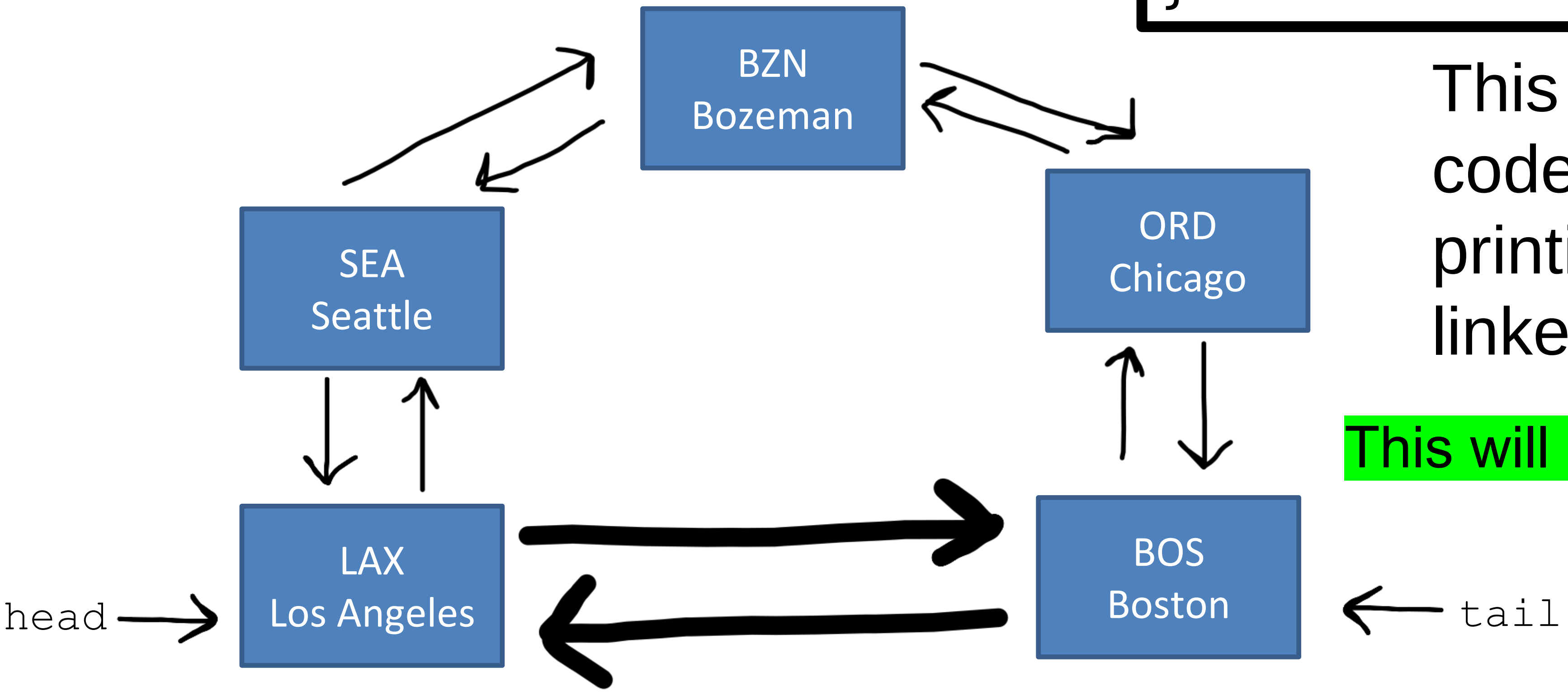
tail

This was our previous code for traversing and printing out nodes in a linked list

This will no longer work because…

Traversing a Circular Linked List

```
public void printList() {
   Node current = this.head;
   while(current != null) {
      current.printNode();
      current = current.getNext();
   }
}
```

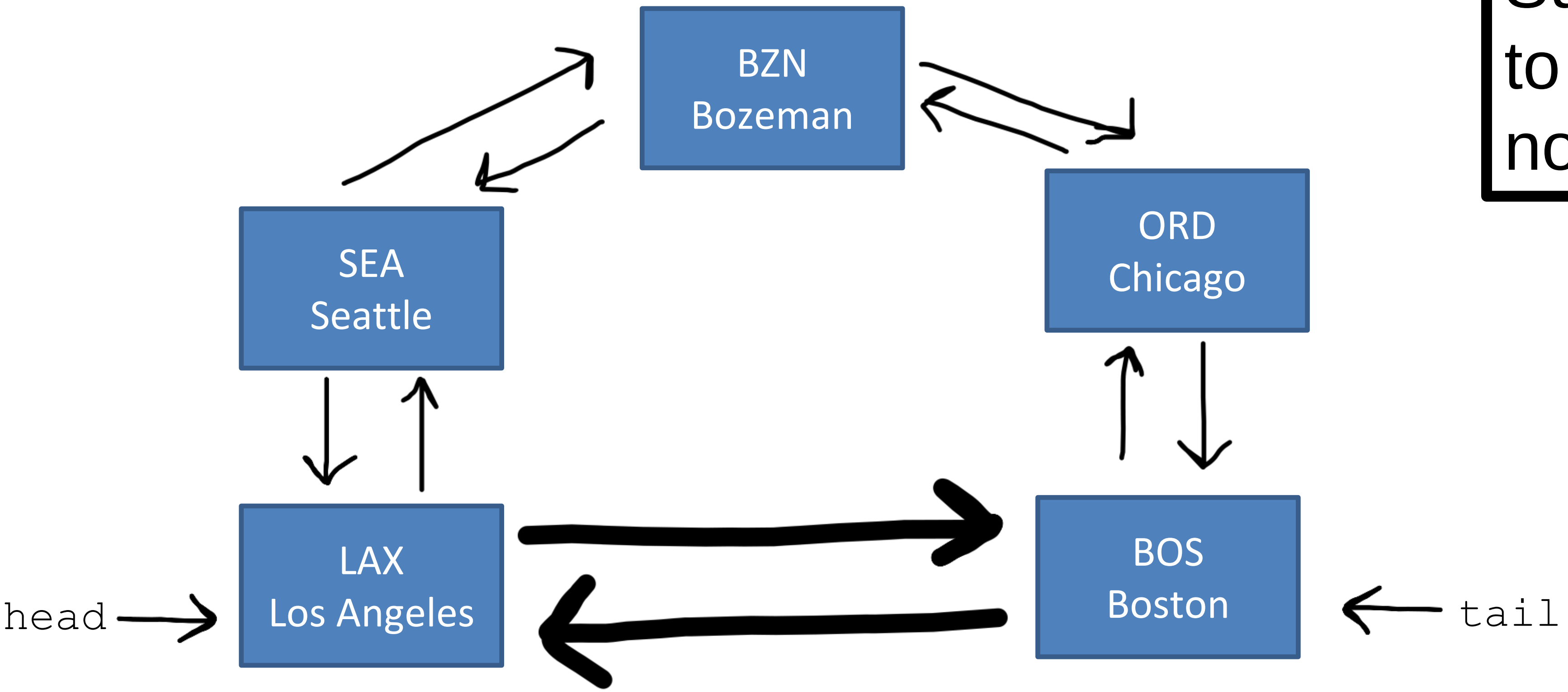


This was our previous code for traversing and printing out nodes in a linked list

This will no longer work because…

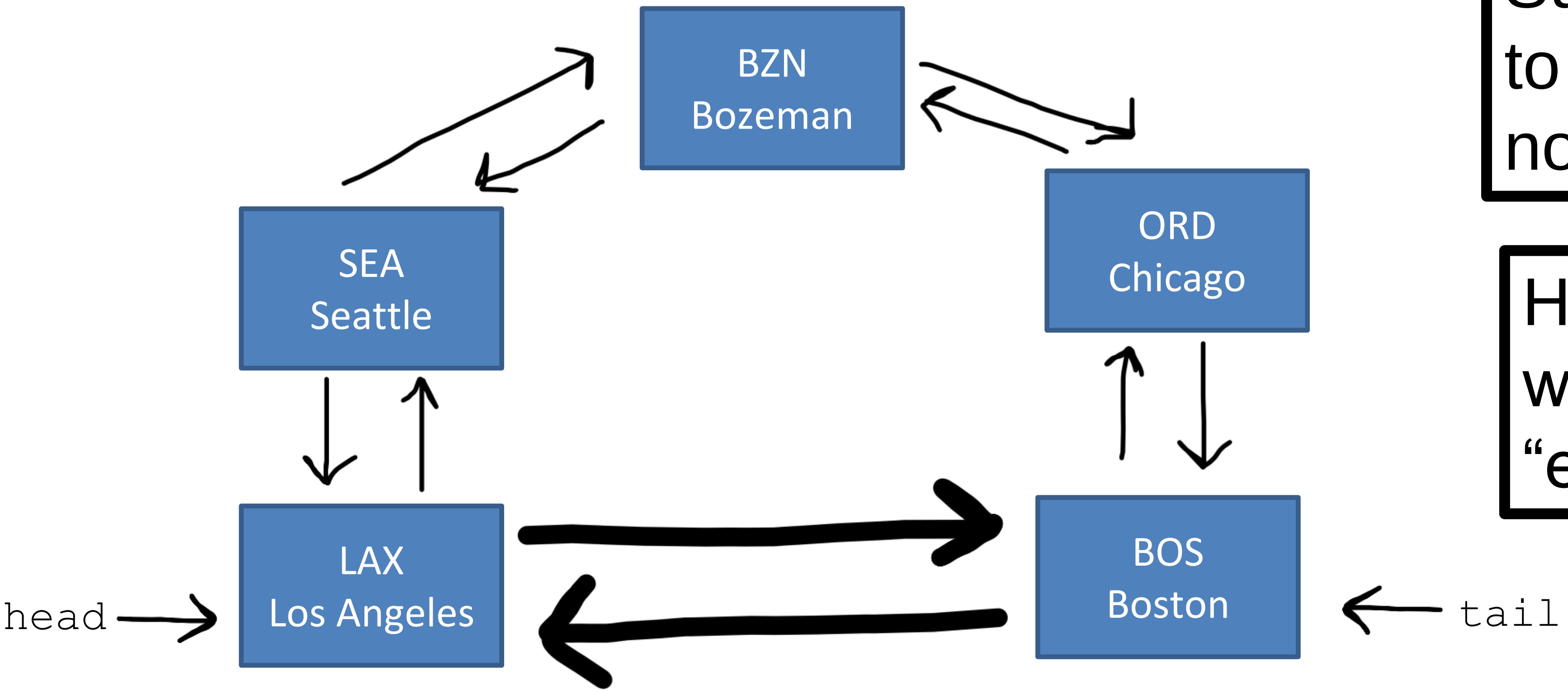
We will never reach `null`

Traversing a Circular Linked List



Suppose our goal is to print out each node only once

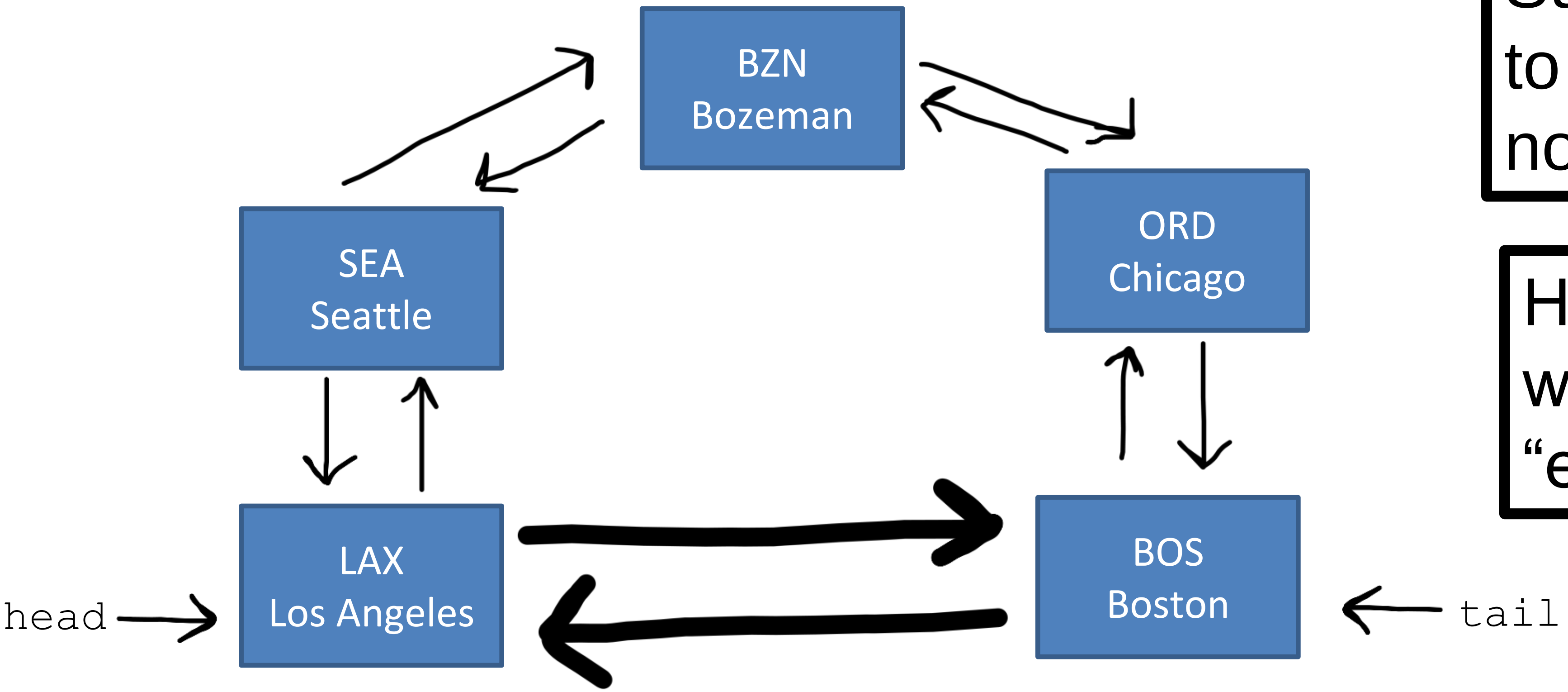
Traversing a Circular Linked List



Suppose our goal is to print out each node only once

How do we know that we’ve reached the “end” of the CLL ?

Traversing a Circular Linked List

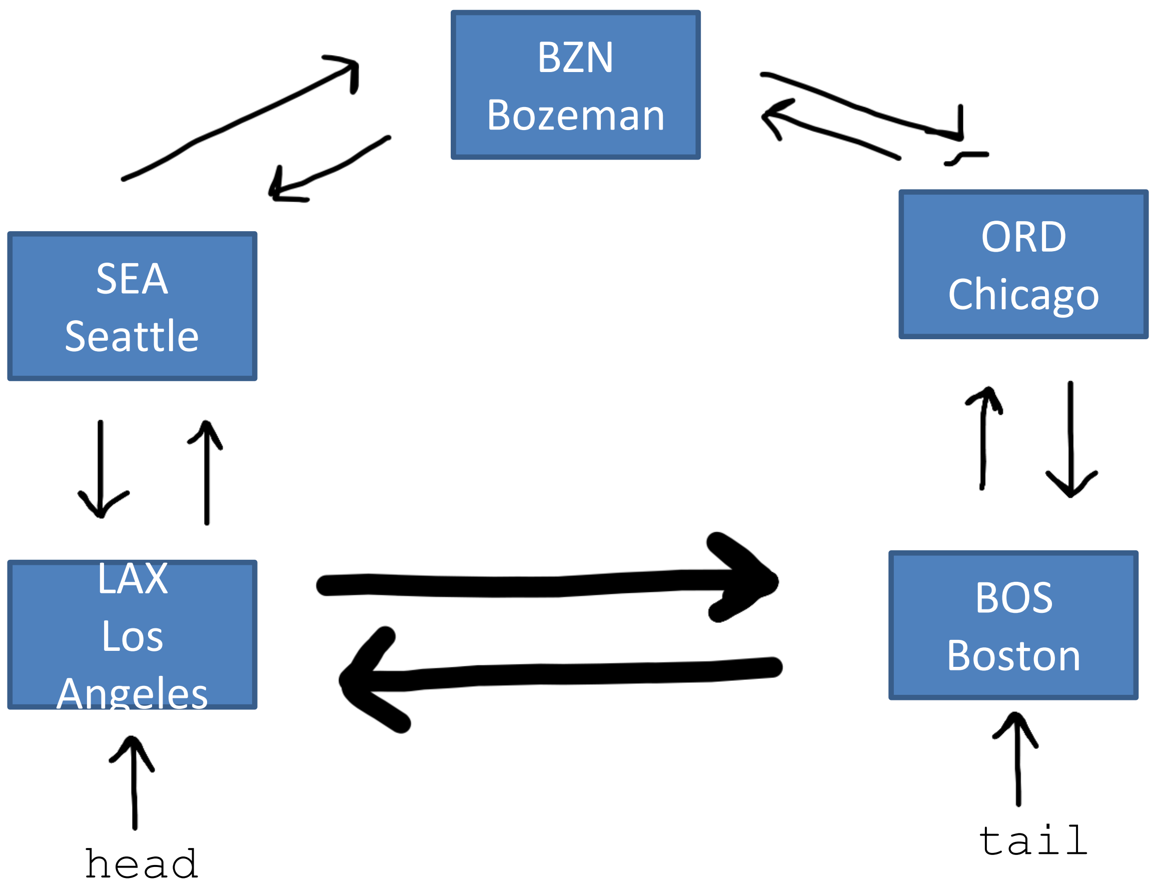


Suppose our goal is to print out each node only once

How do we know that we've reached the "end" of the CLL ?

If we start from the `head`, we should stop looping once we reach the `head` again

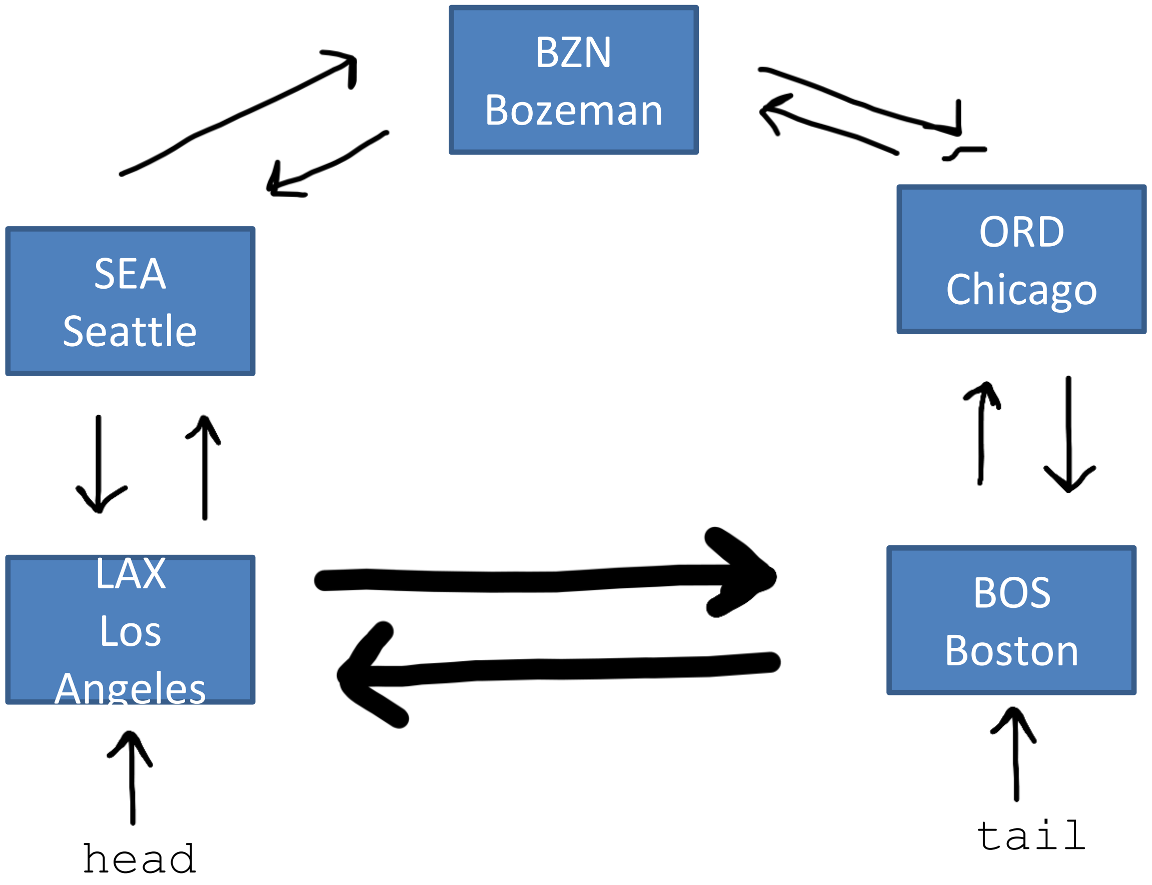
Traversing a Circular Linked List



If we start from the head, we should stop looping once we reach the head again

```
public void printLinkedList() {
    Node current = this.head.getNext();
    while(current != this.head) {
        current.printNode();
        current = current.getNext();
    }
}
```

Traversing a Circular Linked List



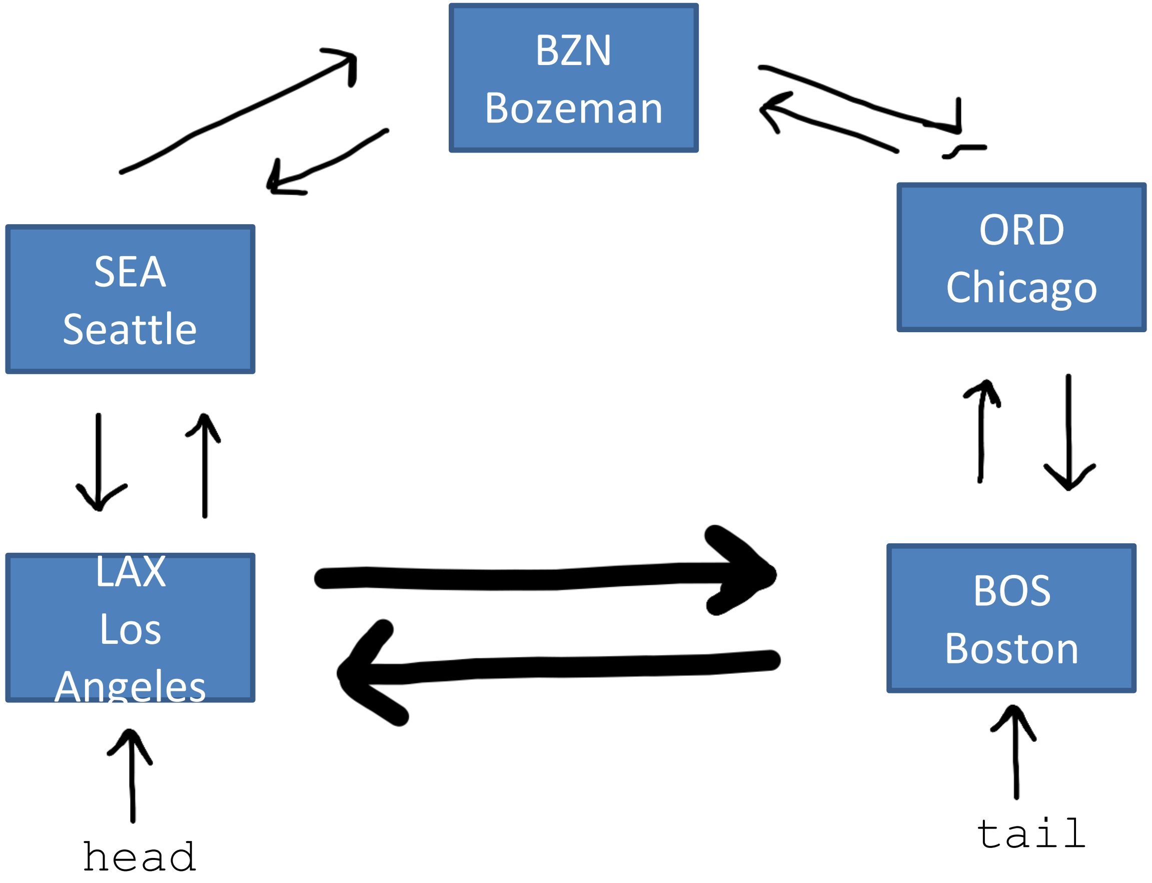
If we start from the `head`, we should stop looping once we reach the `head` again

```
public void printLinkedList() {
    Node current = this.head.getNext();
    while(current != this.head) {
        current.printNode();
        current = current.getNext();
    }
}
```

This **won’t** work because…

Traversing a Circular Linked List

If we start from the `head`, we should stop looping once we reach the `head` again

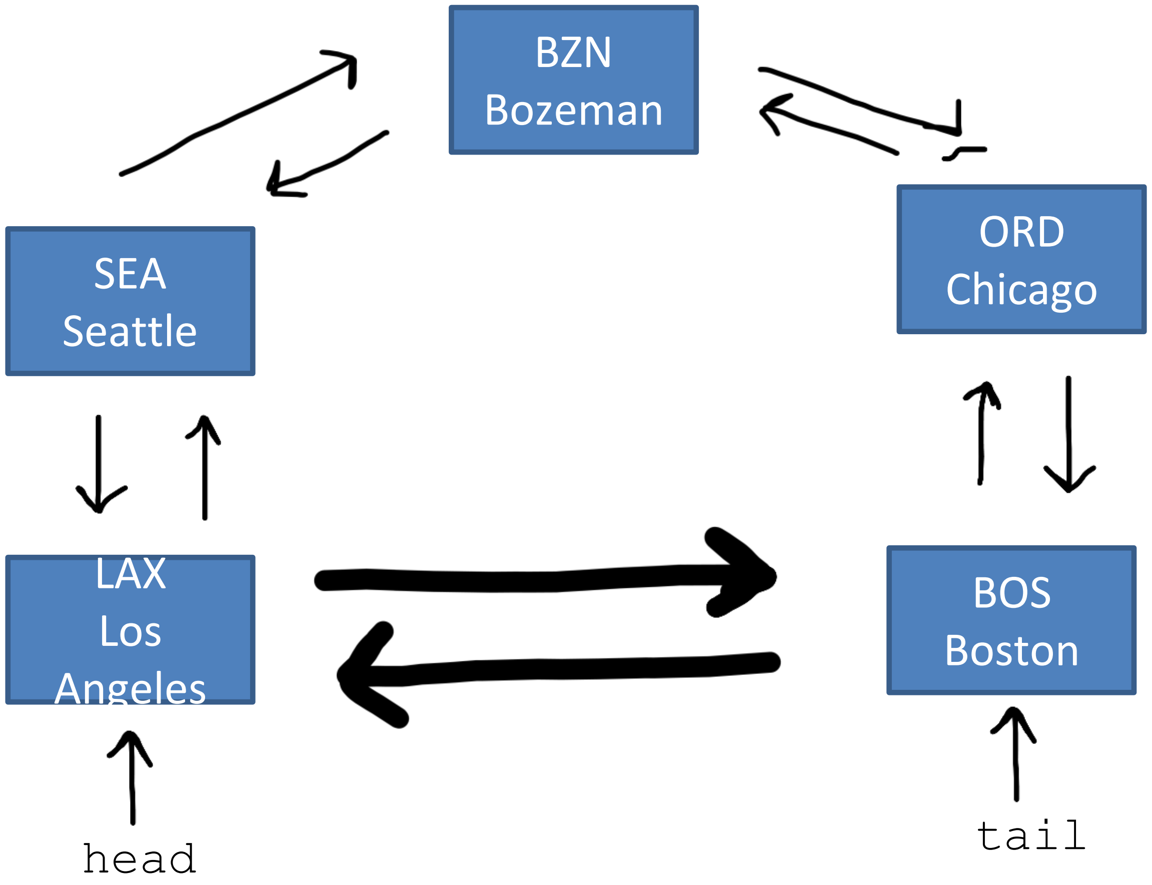


```
public void printLinkedList() {
    Node current = this.head.getNext();
    while(current != this.head) {
        current.printNode();
        current = current.getNext();
    }
}
```

This **won't** work because… The `head` node will never be printed out

Traversing a Circular Linked List

If we start from the head, we should stop looping once we reach the head again



BZN
Bozeman

SEA
Seattle

ORD
Chicago

LAX
Los
Angeles

BOS
Boston

head

tail

```
public void printLinkedList() {
    Node current = this.head;
    do {
        current.printNode();
        current = current.getNext();
    }
    while(current != this.head);
}
```

A **do/while** loop executed the body of the loop, and then checks the looping condition

Program 2