CSE 250 Recitation

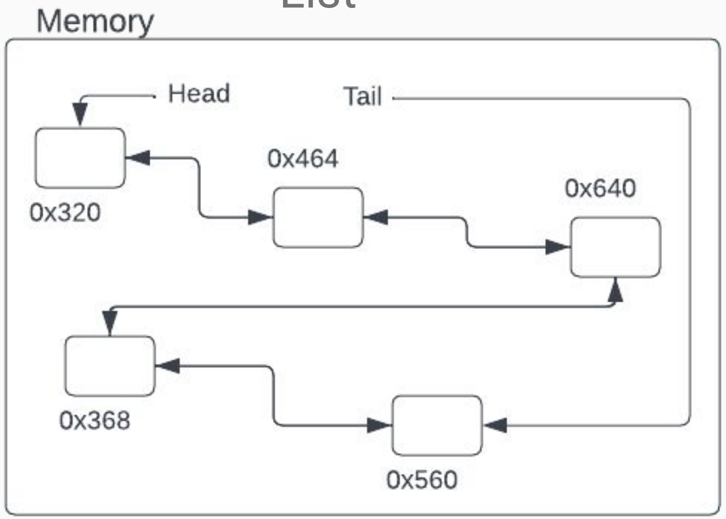
9/18 - 9/19 : PA1, Lists, Arrays, and Code Analysis

PA1: Implementation

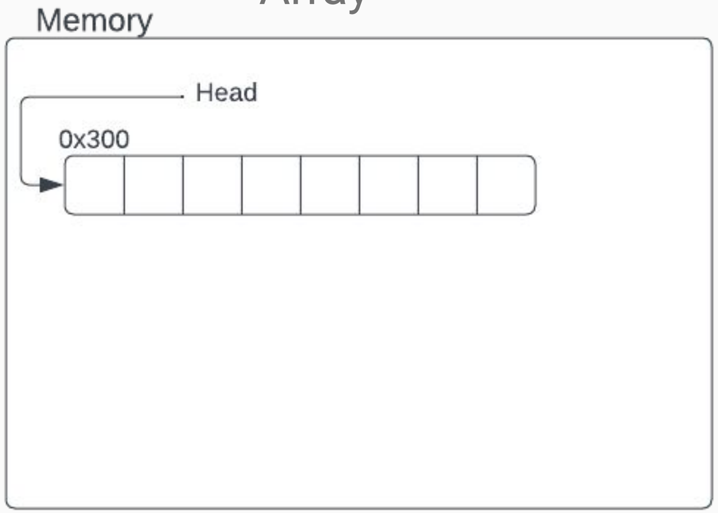
- Now that we have completed the testing phase of **PA1** it is time to move on to figuring out how to implement a linked list
- Similar to last week, the best way to get started is to start drawing picture of linked lists
- However, instead of drawing before and after pictures of your list, this time it is vital to know what is happening while your code is running
- This week's exercise will have you draw some pictures of linked lists and start thinking about the steps your code should be taking while your methods are running

Linked Lists vs. Arrays

List



Array



Linked Lists vs. Arrays

Key features of Linked Lists:

- The list is made up of nodes scattered throughout memory
- In a singly linked list a hold will only carry a reference to the next node
- In doubly linked list a node will hold a reference to the next and previous nodes in the list
- The only way to find a node in the list is to traverse each element (unless you already have a reference to that node)
- Linked Lists will also hold a reference to the head and (usually) the tail

Linked Lists vs. Arrays

Key features of Arrays:

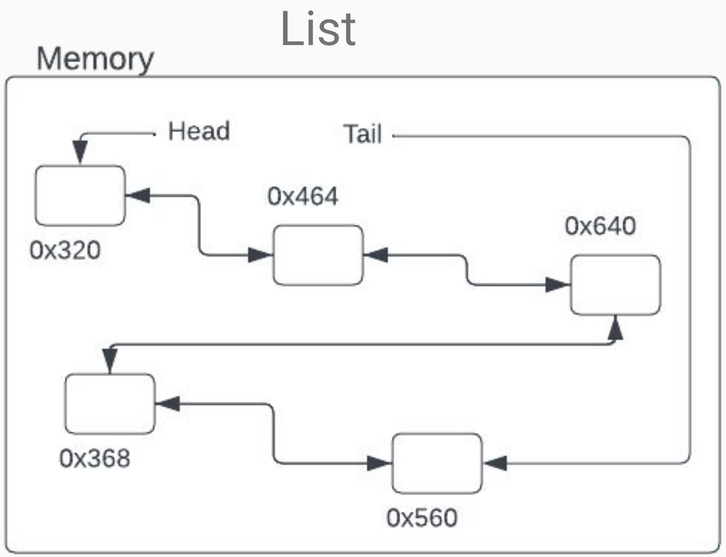
- Arrays are made of one continuous chunk of memory
- Can find an index by doing addition on the array's starting address
- Indices only need to hold the value (no need to carry references to other nodes)

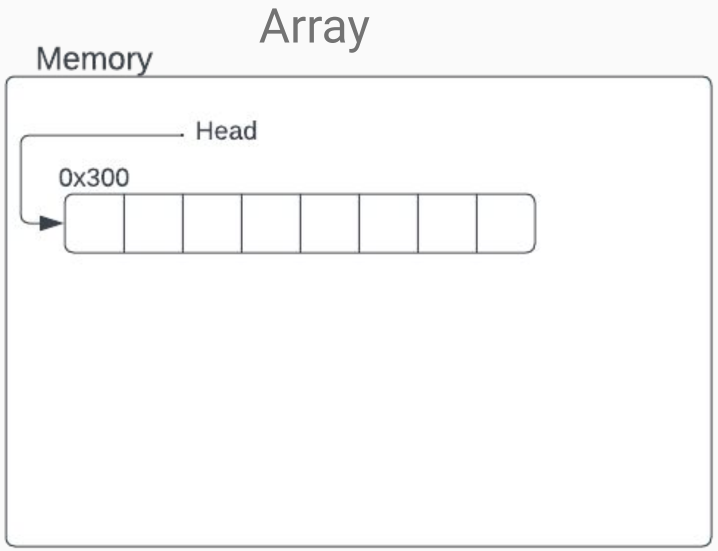
Linked Lists vs. Arrays

Describe an algorithm for each of the following, and determine the complexity:

- Finding an element at a particular index for Arrays and Linked Lists
- Printing out each element of an Array and Linked List
- Changing the value at a particular index for Arrays and Linked Lists
- Changing the value at a particular index in a Linked List if you already have a reference to the node

Linked Lists vs. Arrays





Code Analysis

```
int sumList(List<Integer> list){
  int rslt = 0;
  for(int i = 0; i < list.length; i++){
    int temp = list.get(i);
    rslt += temp;
  }
  return rslt;
}
```

Code Analysis

```java
int sumLinkedList(SortedList<Integer> list){
  int rslt = 0;
  Optional<LinkedListNode> n = Optional.ofNullable(list.headNode);
  while (n.isPresent()){
    int temp = n.get().value;
    rslt += temp;
    n = n.get().next;
  }
  return rslt;
}
```