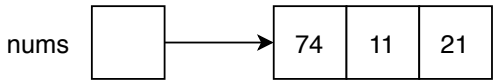
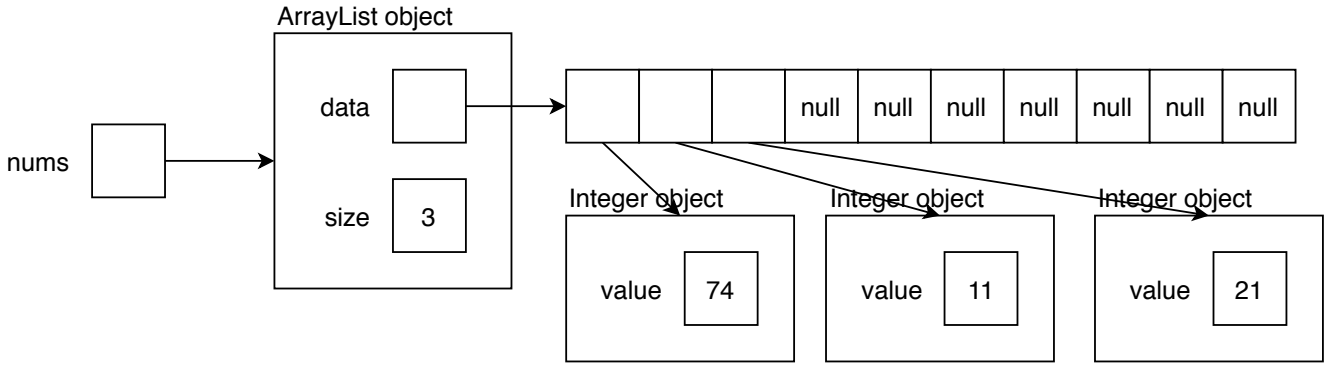
Model 1 Memory Diagrams

The following diagrams are based on the example code from **??**.

Array of ints:



ArrayList of Integers:



Questions (10 min) Start time:

1. What is the `length` of the array inside of the ArrayList? 10

2. How are the contents of the `data` array different from the array of ints?

The `data` array is storing references to `Integer` objects, each of which wraps an `int` value. The array of ints simply stores the values directly.

3. What happens when a fourth element is added to the ArrayList?

(1) An Integer object is created, (2) it's placed in the next available position of the array, and (3) the size attribute is incremented.

4. Explain how an ArrayList can "grow" when adding new elements.

New elements can be stored in available slots at the end of the array. If the data array itself is full, then a larger array can be created.

5. Why do ArrayLists require so much more memory than arrays?

There is a lot of overhead. Each individual value needs to be wrapped inside of an object. And the array itself will likely have unused elements at the end.