6.40 Trace through the execution of the binary search algorithm when searching for the number 86 in the following list of 15 numbers: 1, 10, 25, 62, 74, 75, 80, 84, 85, 86, 87, 100, 106, 111, 121. How many comparisons were required to find the number using the binary search and how many comparisons would have been required using a linear search?

Assume that the 15 numbers are indexed from 0 to 14.
1. We compare the middle number (number[7]: 84) with 86 and determine that 86 might be between number[8] and number[14], inclusive
2. We compare the middle number (number[11]: 100) to 86 and determine that 86 might be between number[8] and number[10], inclusive
3. We compare the middle number (number[9]: 86) to 86 and conclude the search
A binary search requires 3 comparisons to find number 86, while a linear search (assuming we start from number[0]) requires 9 comparisons to find number 86.