Analysis LAB 1 DAT037
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Complexity Analysis

By analysing the the Java code, we have concluded that all methods except member has the time complexity O(1), since these take constant time. Since member contains a while-loop it's some what obvious that it don't take constant time. The time it takes could be described as T(n), where n is data size.

The method member has time complexity of O(log n), because every time the loop runs the array will become half of its original size. If n is the size of the array and number of iteration is i:

$$
\begin{aligned}
n &= 2^i \\
\log(n) &= \log(2^i) \\
\log(n) &= i\log(2) \\
\frac{\log(n)}{\log(2)} &= i \\
O(\log n) &= i
\end{aligned}
\tag{1}
$$

Test

Since genereic methods and classes accepts objects eg, Integer, String and Character. It's decided to test the datatypes mentioned previous. The differnt testcases includes two testfiles named test1.txt and test2.txt, each containing 20 or more elements. When these test are conducted with good result, it's finally time to run testing.jar wich is provided by the coursesite. To read both integers and strings

test1.txt

Alfa Bravo Charlie Delta Echo Foxtrot Golf Hotel India Juliett Kilo Lima Mike November Oscar Papa Qubec Romeo Sierra Tango Uniform Victor X-Ray Zulu Yankee

test2.txt

-30 -12 -9 -4 -3 -2 0 2 4 6 7 8 9 22 27 34 39 42 48 55 77 89 92 96 100