

# 1 Assignment 1

Submit source code and running instructions to EAS<sup>1</sup>. Submit the textual component as a block comment at the top of your code. Do it in Java. Do not use java's search methods! Place textual responses for 2 and 3 in block comments in your code.

**Posted:** Tuesday, May 9<sup>th</sup>

**Due:** Tuesday, May 16<sup>th</sup>

**Grade:** 5%

1. You have the following array 1, 5, 17, 22, 33, 37, known to be sorted. Write a program that demonstrates a  $\Theta(\log(n))$  time or better (in the average case) algorithm to determine if the value 5 is in that array. **A reminder, the  $\Theta(\log(n))$  restriction applies only to finding the value, not setting up values from stdin.**
  - (a) Make sure your program allows as input on the command-line a comma-separated (free of spaces) list of integers (the above being just an example).
    - i. The list should be known to be sorted
    - ii. The file name should be bsort.java
    - iii. e.g.: java bsort 2,4,6,7,8,9,12,17,22,28 7
  - (b) As output to stdout, each step along the way, on a single line, indicate what value you checked, followed by the symbol <, > or =. e.g. The last line for this example would be "5=" (without the quotes)
  - (c) If the searched for value is not found, the last line should simply be a "!" (without the quotes)
2. In clear, natural language, give the name of your algorithm and explain in a generalized step-wise manner how it can be applied to an arbitrary sorted array when searching for an arbitrary value.
  - (a) This textual response should be no more than 5 lines / 50 words.
3. In clear, natural language, describe how you would change your algorithm to search over sorted Strings instead of integers.
  - (a) This textual response should be no more than 4 lines / 40 words.

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<sup>1</sup><https://fis.encs.concordia.ca/eas/>