Content Objective: Students will explore sorting algorithms and searching strategies in Java.

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| **Chapter 12 of The Information (10pts.)**  **Detail a response with 5 or more text citations to the following chapter 12 question:** | |
| 500 or more words on the human tendency to find patterns and thoughts on striving for a perfect algorithm for entropy. |  |
| Notes: |  |

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| **Tech Terms and History (20pts.)**  **vocabulary from BJ p.629-669 (definition/commentary/significance in your words)** | |
| Describe the strategy for the “Selection Sort” | Goes through each array element and swaps with the element that needs to be in its place. |
| What does it mean to profile a sort? | Profiling is timing the duration that it takes a function to run. |
| Describe the Big O notation. | Big Oh notation is a shorthand version of the number of visits on a function |
| Big O expression for logarithmic and factorial. | Logarithmic- O(log(n))  Factorial- O(n!) |
| Describe the strategy for the Insertion Sort | The algorithm disregards the first element of the array, “assuming” it to be already sorted. It proceeds to the second element and organizes from there. |
| Describe the strategy for the Selection Sort | Starts with the first element of the array and finds the element that needs to be in its place and swaps with it, then moves on to the next element. |
| Describe the strategy for the Merge Sort | Continuously finds the smallest element of both arrays and adds it into the new array, taking it out from the old array |
| Describe the strategy for the Quicksort Algorithm | Partitions the array into two parts and sorts them separately and recombines them. |
| Describe the strategy for a Sequential Search | Look through all of the elements of an array or list until you find a match for what you’re looking for |
| Describe the strategy for the Binary Search | Searches a sorted array to find if the value is greater or less than the halfway point, then proceeds to do that for each additional half of the array |
| The Binary Search uses which algorithm? | The logarithmic O algorithm, O(log(n)) |
| What algorithm does Java employ in the array class for the sort method? | Arrays.sort(array); |
| Syntax to use the binary search in the arrays class. | Arrays.binarySearch(array, number you’re searching for); |
| Who are Bentley and Mechmann and what was their contribution to sorting? | <http://www.skidmore.edu/~meckmann/2009Spring/cs206/papers/spe862jb.pdf> |

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| **Code Snippets (30pts.)**  **only submit snippets or classes no full programs required (test and run in IDE, then copy/paste applicable code frag)** | |
| Self Check 7 |  |
| Self Check 8 |  |
| E14.1-3 |  |
| E14.4 | // You may use the textbook example of random array generator or create your own…  import java.util.Random;  /\*\*  This class contains utility methods for array manipulation.  \*/  public class ArrayUtil  {  private static Random generator = new Random();  /\*\*  Creates an array filled with random values.  @param length the length of the array  @param n the number of characters in each random value  @return an array filled with length strings of numChars characters  \*/  public static String[] randomStringArray(int length, int numChars)  {  String[] a = new String[length];  for (int i = 0; i < a.length; i++)  {  a[i] = randomString(numChars);  }  return a;  }  /\*\*  Creates a random string.  @param numChars number of characters in the string  @return random string with numChars  \*/  private static String randomString(int numChars)  {  String s = "";  for (int i = 0; i < numChars; i++)  {  s += (char) ('a' + generator.nextInt(26));  }  return s;  }  } |
| E14.7 |  |
| E14.11 |  |
| E14.12  (starter on Wed.) |  |
| E14.14 |  |

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| **Code Challenge (30pts.)**  **This code challenge will be facilitated as an in-class project on Friday.** | |
| Responses will be posted to GitHub. (P14.6 will be used if you are absent.) or any of the challenges P14.1-P14.5. | |
| Notes: |  |

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| **Badge Progress (10pts.)**  **building your coding profile: Java coding training site to earn badges (recommended site** [**http://coderbyte.com**](http://coderbyte.com) **)** | |
| Screenshot/URL: |  |
| Notes/Issues: |  |

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| **Notes**  **your notes** | |
| Notes: |  |