**Weekly Project 12: Searching and Sorting Lab Report**

**Name(s):**

***Part I. Collecting Data:* Complete each table**

**Linear Search**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Data Points** | **Number of times through the algorithm** | **Total Time** | **Average Time** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Binary Search**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Data Points** | **Number of times through the algorithm** | **Total Time** | **Average Time** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Selection Sort**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Data Points** | **Number of times through the algorithm** | **Total Time** | **Average Time** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Bubble Sort**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Data Points** | **Number of times through the algorithm** | **Total Time** | **Average Time** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Insertion Sort**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Data Points** | **Number of times through the algorithm** | **Total Time** | **Average Time** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Merge Sort**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Data Points** | **Number of times through the algorithm** | **Total Time** | **Average Time** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

***Part II. Graphing the data***

a) Use Excel or some other graphing program to create a single graph showing number of points and average time for the two searches. Insert your graph below. Be sure to label your axes.

b) Use Excel or some other graphing program to create a single graph showing number of points and average time for the four sorts. Insert your graph below. Be sure to label your axes.

***Part III. How Long Will One Trillion Take?***

Fill in the following chart. Include sample calculations or methods you used to come up with your estimates.

|  |  |  |
| --- | --- | --- |
| **Algorithm** | **Time (in seconds) for One Trillion Entries** | **Time (in days) for One Trillion Entries** |
| Linear Search |  |  |
| Binary Search |  |  |
| Selection Sort |  |  |
| Bubble Sort |  |  |
| Insertion Sort |  |  |
| Merge Sort |  |  |

***Part IV. Conclusions***

a) Discuss how the two search algorithms compare to one another.

b) Discuss how the four sorts compare to one another.

c) What have you learned from this lab?