**LAB 08**

**SUBMISSION INSTRUCTIONS**

Type/write your answers on the document and submit it as a pdf file with the name JaneDoe.pdf (replace JaneDoe with your first and last name respectively).

**QUESTIONS**

1. What is the best and the 2 worst-case scenarios of using a linear search?

The best-case scenario for linear search is when the item you’re looking for is at index 0 of the array. The worst cases are , for when the item is at the end of the array and if the item is not in the array.

1. Using a tracing table, show how 6 would be obtained using a binary search.

**2 4 5 6 8 11 15**

|  |  |  |  |
| --- | --- | --- | --- |
| **Low index** | **Mid index** | **High index** | **Element[mid]** |
| **0** | **3** | **6** | **6** |

We found 6 on our first iteration of binary search.

1. Using a tracing table, show how 2 would be obtained using a binary search.

**2 4 5 6 8 11 15**

|  |  |  |  |
| --- | --- | --- | --- |
| **Low index** | **Mid index** | **High index** | **Element[mid]** |
| **0** | **3** | **6** | **6** |
| **0** | **1** | **2** | **4** |
| **0** | **0** | **0** | **2** |

We found 2 on our third iteration of binary search.

1. Using a tracing table, show how 15 would be obtained using a binary search.

**2 4 5 6 8 11 15**

|  |  |  |  |
| --- | --- | --- | --- |
| **Low index** | **Mid index** | **High index** | **Element[mid]** |
| **0** | **3** | **6** | **6** |
| **4** | **5** | **6** | **11** |
| **6** | **6** | **6** | **15** |

We found 15 on our third iteration of binary search.

1. Sort the collection below in ascending order using the bubble sort.

**2 9 5 4 8 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2** | **5** | **4** | **8** | **1** | **9** |
| **2** | **4** | **5** | **1** | **8** | **9** |
| **2** | **4** | **1** | **5** | **8** | **9** |
| **2** | **1** | **4** | **5** | **8** | **9** |
| **1** | **2** | **4** | **5** | **8** | **9** |

1. Sort the collection below in descending order using the bubble sort.

**2 9 5 4 8 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **9** | **5** | **4** | **8** | **2** | **1** |
| **9** | **5** | **8** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |

1. Sort the collection below in ascending order using the selection sort.

**2 9 5 4 8 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2** | **9** | **5** | **4** | **8** | **1** |
| **1** | **9** | **5** | **4** | **8** | **2** |
| **1** | **2** | **5** | **4** | **8** | **9** |
| **1** | **2** | **4** | **5** | **8** | **9** |
| **1** | **2** | **4** | **5** | **8** | **9** |
| **1** | **2** | **4** | **5** | **8** | **9** |

1. Sort the collection below in descending order using the selection sort.

**2 9 5 4 8 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2** | **9** | **5** | **4** | **8** | **1** |
| **9** | **2** | **5** | **4** | **8** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |

1. Sort the collection below in ascending order using the insertion sort.

**2 9 5 4 8 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2** | **9** | **5** | **4** | **8** | **1** |
| **2** | **9** | **5** | **4** | **8** | **1** |
| **2** | **5** | **9** | **4** | **8** | **1** |
| **2** | **4** | **5** | **9** | **8** | **1** |
| **2** | **4** | **5** | **8** | **9** | **1** |
| **1** | **2** | **4** | **5** | **8** | **9** |

1. Sort the collection below in descending order using the insertion sort.

**2 9 5 4 8 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2** | **9** | **5** | **4** | **8** | **1** |
| **2** | **9** | **5** | **4** | **8** | **1** |
| **9** | **5** | **2** | **4** | **8** | **1** |
| **9** | **5** | **4** | **2** | **8** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |
| **9** | **8** | **5** | **4** | **2** | **1** |