

Day 8 Theory

1. With queues items can only be inserted into the back and can only be removed from the back. This means that the first value inserted is the first value removed, the second value inserted is the second value removed ... etc. Because of this, queues are known as first in first out data structures.
2. Items in a stack can only be inserted and removed from the top. This means that the first value in is the last value out since it will be at the bottom of the stack. Because of this, stacks are known as first in last out data structures.
- 3.A. The asymptotic complexity of the append operation for an array list is constant since the append will only insert values at the end of the list which will not affect any of the other elements in the list.
- 3.B. The asymptotic complexity of the remove operation is linear for array lists since the operation must shift the index of n number of elements following the index of removal.
- 3.C. The asymptotic complexity of the fetch at index operation is constant for array lists since array lists are indexed and all values can be directly indexed.
- 4.A. The asymptotic complexity of the append operation is constant for double linked lists since the operation only creates a link and changes the pointers for the previous link.
- 4.B. The asymptotic complexity of the remove operation is constant for double linked lists since the operation only changes the pointers for the next and previous links.
- 4.C. The asymptotic complexity of the fetch at index operation is linear for double linked lists since specific indexes cannot be accessed directly. The fetch command must sort through n number of links to find the specified link to fetch.
- 5.A. Because the array list is indexed and the value has a corresponding index it will have constant time.
- 5.B. It is different for the link list because the linked list must search for the list by going link to link. This means the time complexity is linear.
- 5.C. The maximum time complexity is linear since it is not indexed and the search algorithm must search through the tree in a similar fashion as a linked list. The minimum time complexity is logarithmic. . .
- 5.D. No, since the search algorithm will still cycle through at most n times to find the value.
6. Yes, since the upper bound of a search tree is linear and the lower bound for retrieval is logarithmic you would expect at least the same if not better performance.