|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **ResizeableArrayBag** | | | **LinkedBag** | | |
|  | **Union** | **Intersection** | **Difference** | **Union** | **Intersection** | **Difference** |
| **Time Complexity in the Best Case** | O(1), The union method would only add 1 item from each array for the best case, which would be a constant amount of time since the loop only runs once | O(1), The method would make one comparison in the for loop and add it into the new bag for a constant amount of time. | O(n), The method has a toArray method which is O(n) | O(1) because if only one element needs to be added then it will count as one step. | O(1), The method’s loop would only run once for a constant time | O(n), This method uses toArray which is O(n) and if only one element was asked to remove and that happens to be the first element found |
| **Time Complexity in the Worst Case** | O(n), The method could have multiple data entries, which makes the loop dependent on n | O(n), The method has n number of array elements and has more comparisons/loops to perform. | O(n), the method is dependent on multiple array entries and comparisons | O(n), the method uses toArray | O(n), the method’s loop would run multiple times if there are multiple items in the bag | O(n2)The method for a loop inside a while loop. |

Muhammed Zahid Kamil , Nick Karle , Kevin Hoang

[**https://github.com/ZahidKamil/CS2400Project1**](https://github.com/ZahidKamil/CS2400Project1)