There were three notable obstacles I ran into when writing the code for this project. The first was the function findFirstSequence. I had trouble figuring out how to set begin, and then keep begin the same while changing end. I also had trouble making sure that every case would be handled correctly, especially if the sequence was of length 1. Even though my code works now, via a series of conditionals, I do not believe it is the best way to solve the problem. The second notable obstacle was when writing the removeDups function without using another array. I was not sure how to end the loop after removing all the duplicates and replacing them, but that was solved by adding another counter. Then in testing the code, I found that my code did not handle the case where the final entry of the original array was “”, which I was able to fix using a simple if-else statement to check if adjustment was necessary. Through further testing, I found that this fix actually caused another problem if the final entry was “” but there were no duplicates, which was fixed by slightly altering the if-else statement. The final obstacle I ran into was sorting in the function mingle. I figured out how to get the right entry in the last position and figured out how many times I had to repeat that process over different ranges by tracing through the loops with pen and paper.

Test Data:

**tally:**

No occurrence, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "tyrion")

1 occurrence, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "daenerys")

Multiple occurrences, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "petyr")

Size of 0, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 0, "jaime")

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1, "jon")

**findFirst:**

No occurrence, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "tyrion")

1 occurrence, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "daenerys")

Multiple occurrences, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "petyr")

Size of 0, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 0, "jaime")

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1, "jon")

**findFirstSequence:**

No occurrence, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "tyrion", b, e)

Sequence of 1 at the start, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "jaime", b, e)

Sequence of 1 at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "tyrion"}, 9, "tyrion", b, e)

Sequence of 1 in the middle, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "daenerys", b, e)

Sequence greater than 1 at the start, Sequence of 1 at the start, ({"jaime", "jaime", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "jaime", b, e)

Sequence greater than 1 at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "tyrion", "tyrion"}, 9, "tyrion", b, e)

Sequence greater than 1 in the middle, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "jon", b, e)

More than 1 sequence, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, "petyr", b, e)

Size of 0, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 0, "jaime", b, e)

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1, "jon", b, e)

**positionOfMin:**

Min at the start, ({"a", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9)

Min at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "a"}, 0)

Min in the middle, ({"jaime", "a", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9)

Min has multiple positions, ({"a", "daenerys", "petyr", "a", "jon", "jon", "jon", "petyr", "a"}, 9)

Size of 1, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 1)

Size of 0, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 0)

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1)

**moveToEnd:**

Size greater than 1, position not at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, 5)

Position already at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, 8)

Size of 1, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 1, 0)

Invalid position (negative), ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, -1)

Invalid position (greater than or equal to size), ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, 10)

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1, 0)

**moveToBeginning:**

Size greater than 1, position not at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, 5)

Position already at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, 0)

Size of 1, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 1, 0)

Invalid position (negative), ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, -1)

Invalid position (greater than or equal to size), ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9, 10)

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1, 0)

**disagree:**

First array has invalid size, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, -1, {"petyr", "jaime", "theon", "tyrion"}, 4)

Second array has invalid size, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, 5, {"petyr", "jaime", "theon", "tyrion"}, -1)

Both arrays have invalid sizes, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, -1, {"petyr", "jaime", "theon", "tyrion"}, -1)

Identical arrays, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, 2, {"petyr", "jaime", "theon", "tyrion"}, 2)

First array smaller with no disagreements, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, 1, {"petyr", "jaime", "theon", "tyrion"}, 2)

Second array smaller with no disagreements, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, 2, {"petyr", "jaime", "theon", "tyrion"}, 1)

First array smaller with disagreement, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, 3, {"petyr", "jaime", "theon", "tyrion"}, 4)

Second array smaller with disagreement, ({"petyr", "jaime", "jon", "daenerys", "tyrion"}, 5, {"petyr", "jaime", "theon", "tyrion"}, 4)

**removeDups:**

Invalid size, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, -1)

No duplicates, not ending with "", ({"jaime", "daenerys", "a", "petyr", "b", "c", "jon", "d", "petyr"}, 9)

No duplicates, ending with "", ({"jaime", "daenerys", "a", "petyr", "b", "c", "jon", "d", ""}, 9)

One set of duplicates, not ending with "", ({"jaime", "daenerys", "a", "petyr", "jon", "jon", "jon", "b", "petyr"}, 9)

One set of duplicates, ending with "", ({"jaime", "daenerys", "a", "petyr", "jon", "jon", "jon", "b", ""}, 9)

Multiple sets of duplicates, not ending with "", ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "a", "petyr"}, 9)

Multiple sets of duplicates, ending with "", ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "a", ""}, 9)

Similar sets of duplicates not ending with "", ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "petyr", "petyr"}, 9)

Similar sets of duplicates ending with "", ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "petyr", "petyr", ""}, 9)

Set of "" at the end, ({"jaime", "daenerys", "petyr", "petyr", "jon", "jon", "jon", "", ""}, 9)

**subsequence:**

Size of second array is larger than size of first, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 1, {"jaime", "daenerys", "tyrion"}, 3)

First array has invalid size, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, -1, {"jaime", "daenerys", "tyrion"}, 3)

Second array has invalid size, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 6, {"jaime", "daenerys", "tyrion"}, -3)

Both arrays have invalid sizes, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, -1, {"jaime", "daenerys", "tyrion"}, -3)

Second array has size of 0, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 6, {"jaime", "daenerys", "tyrion"}, 0)

Second array can be found in first array, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 6, {"jaime", "daenerys", "tyrion"}, 3)

Second array can be found in first array, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 6, {"jaime", "jon", "jon"}, 3)

Second array cannot be found in first array, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 6, {"jon ", "jaime"}, 2)

Second array cannot be found in first array, ({"petyr", "jaime", "jon", "daenerys", "tyrion", "jon"}, 6, {"jaime", "jaime", "jon"}, 3)

**mingle:**

First array not in nondecreasing order, ({"cersei", "jaime", "jon", "petyr", "a"}, 5, {"daenerys", "jaime", "jaime", "tyrion"}, 4, z, 20)

Second array not in nondecreasing order, ({"cersei", "jaime", "jon", "petyr", "theon"}, 5, {"daenerys", "jaime", "jaime", "a"}, 4, z, 20)

First array has invalid size, ({"cersei", "jaime", "jon", "petyr", "theon"}, -5, {"daenerys", "jaime", "jaime", "tyrion"}, 4, z, 20)

Second array has invalid size, ({"cersei", "jaime", "jon", "petyr", "theon"}, 5, {"daenerys", "jaime", "jaime", "tyrion"}, -4, z, 20)

Both arrays have invalid sizes, ({"cersei", "jaime", "jon", "petyr", "theon"}, -1, {"daenerys", "jaime", "jaime", "tyrion"}, -1, z, 20)

Result would have more than max elements, ({"cersei", "jaime", "jon", "petyr", "theon"}, 5, {"daenerys", "jaime", "jaime", "tyrion"}, 4, z, 8)

Proper arguments, ({"cersei", "jaime", "jon", "petyr", "theon"}, 5, {"daenerys", "jaime", "jaime", "tyrion"}, 4, z, 20)

**divide:**

Invalid size, ({"petyr", "jon", "tyrion", "jaime"}, -1, "jon")

Size of 0, ({"petyr", "jon", "tyrion", "jaime"}, 0, "jon")

divider in array, ({"petyr", "jon", "tyrion", "jaime"}, 4, "jon")

divider not in array, ({"cersei", "jon", "theon", "daenerys", "tyrion", "jaime"}, 6, "petyr")