

Time Complexity Analysis:

In the code I wrote;

- For the addPatient method, the time complexity is **$O(n)$** . This is because I used a while loop to iterate through the whole list to find the end and add the new patient.
- The removePatient method is also **$O(n)$** . To remove a patient, I have to check the list using while and if conditions to find the correct ID.
- Finally, the findPatient method has a time complexity of **$O(n)$** as well. My algorithm checks all the patients one by one using a loop until it finds the match.

Compare the performance of Linked List vs. ArrayList:

If I used an ArrayList, accessing data would be faster ($O(1)$), but LinkedList is better here because adding or deleting patients doesn't require shifting all the elements in the memory. In an ArrayList, when an element is removed, all remaining elements must be shifted one by one. This is a very time-consuming process.