Metropolitan University of Tirana
Data Structures
Lists in Java

4.1 LinkedLists Save the Inbox: How to Filter Emails like a Boss

Write a method that takes in a `LinkedList` of emails (`Strings`) and a `String` parameter representing a domain name. The method should return a new `LinkedList` containing only the emails that belong to the given domain. This method can be useful for email filtering and sorting.

Write a method that takes in a `LinkedList` of emails (`Strings`) and returns the number of emails that contain attachments. An email is considered to have an attachment if its subject or body contains any of the following keywords: `attachment`, `attached`, or `enclosed`. This method can be useful for email classification and sorting.

4.2 LinkedList vs ArrayList: Battle of the Lists for Data-Intensive Applications

Write a program that creates a LinkedList and an ArrayList of the same size, say 100,000. The program should then add 100,000 Strings to both lists, where each String is a random 10-character sequence.

After populating the lists, the program should measure the time it takes to search for a specific String in each list. To make the comparison fair, the program should perform the search operation 100 times and calculate the average time taken for each list.

The search operation can be implemented by choosing a random index in the list and then comparing the String at that index with the target String. If the String at the index is the target String, the search is successful; otherwise, the program moves to the next index and repeats the process until the end of the list is reached.

Finally, the program should output the average time taken for each list and compare the results. This exercise can help demonstrate the performance differences between LinkedList and ArrayList, especially in terms of searching and indexing.

What to submit:

All the code that we develop will be pushed to a GitHub repository. For that reason, make sure that you have (created) a GitHub account. Use `UMT_data_structures` for the repository name.