Computer Science 3A

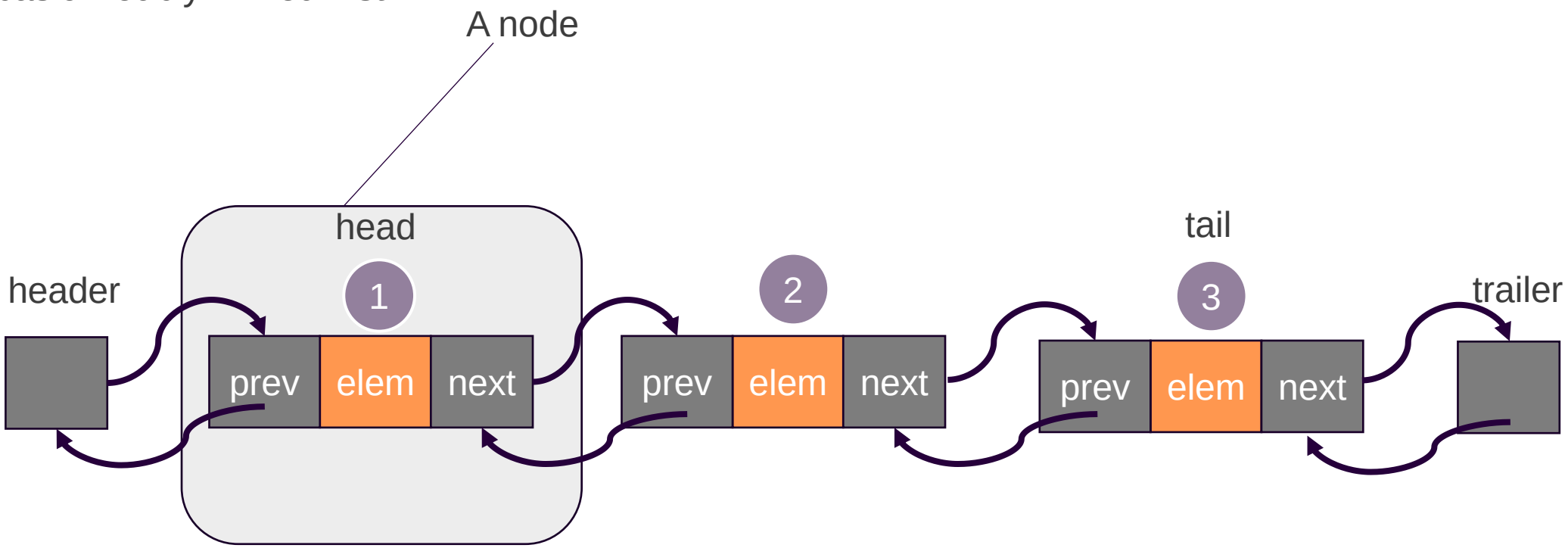
Practical 3

02 March 2023

UNIVERSITY OF JOHANNESBURG

Doubly Linked Lists:

The basic Doubly Linked List:



Size = 3

For Practical 3: Overview

1. Complete the Node Class

2. Complete the DList class methods

For Practical 3: Overview

1. Complete the Node Class
    - Accessor methods
    - Mutator methods
    - toString method

For Practical 3: Overview

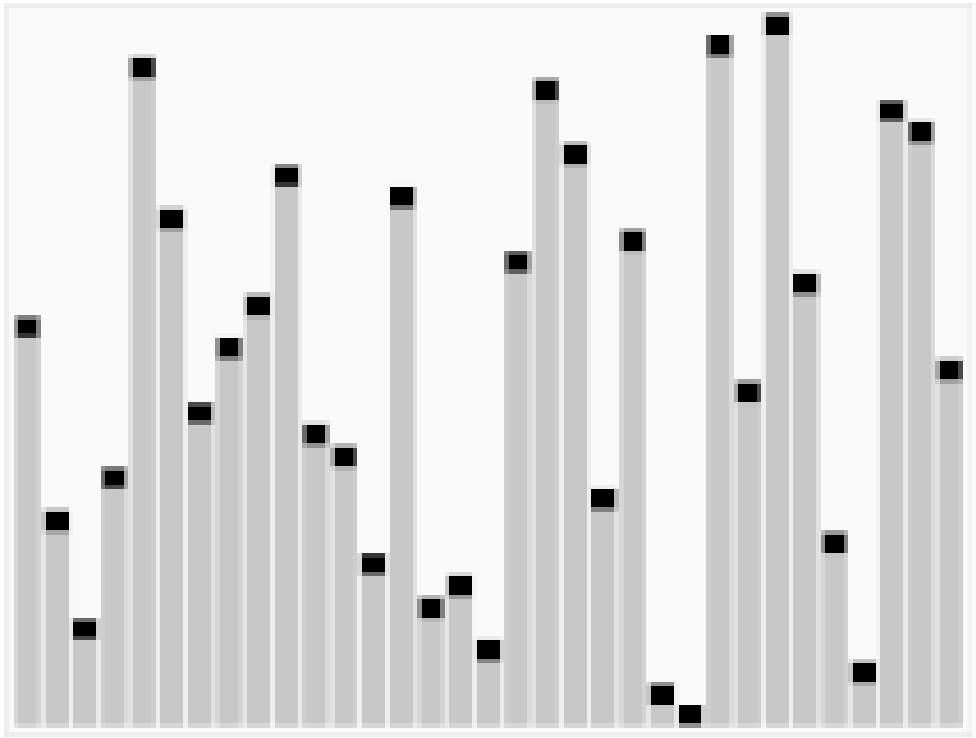
2. Complete the DList class methods

- fromArray() – construct a list from an array ; toArray() – convert a list to an array
- clone() – construct a copy of the linked list
- addAfter() – adds an element after a given node in the list ; addBefore() – adds an element before a given node in the list
- remove() – remove a specified node from the list ; search() – returns the node which contains the specified element
- tail() – returns the list that contains everything except the first element
- toString() – returns a string representation of the linked list
- Quicksort methods

NOTE: pay attention to the signature and return type of a method/function

For Practical 3:

Quicksort



https://en.wikipedia.org/wiki/Quicksort

For Practical 3: Quicksort

- An efficient method of sorting a list of items
- Algorithm:
    1. Choose a "pivot" element (we'll use the first element in the list)
    2. Split the list into three smaller lists
        a. One list that only contains items that are smaller than the pivot element (splitLess() method)
        b. One list that only contains items that are greater than the pivot element (splitGreater() method)
        c. One list that only contains items that are equal to the pivot element (splitEqual() method)
    3. Call quicksort on the list of smaller elements
    4. Call quicksort on the list of greater elements
    5. Merge the smaller list, the equal lists, and the greater lists together (merge method)

Questions?