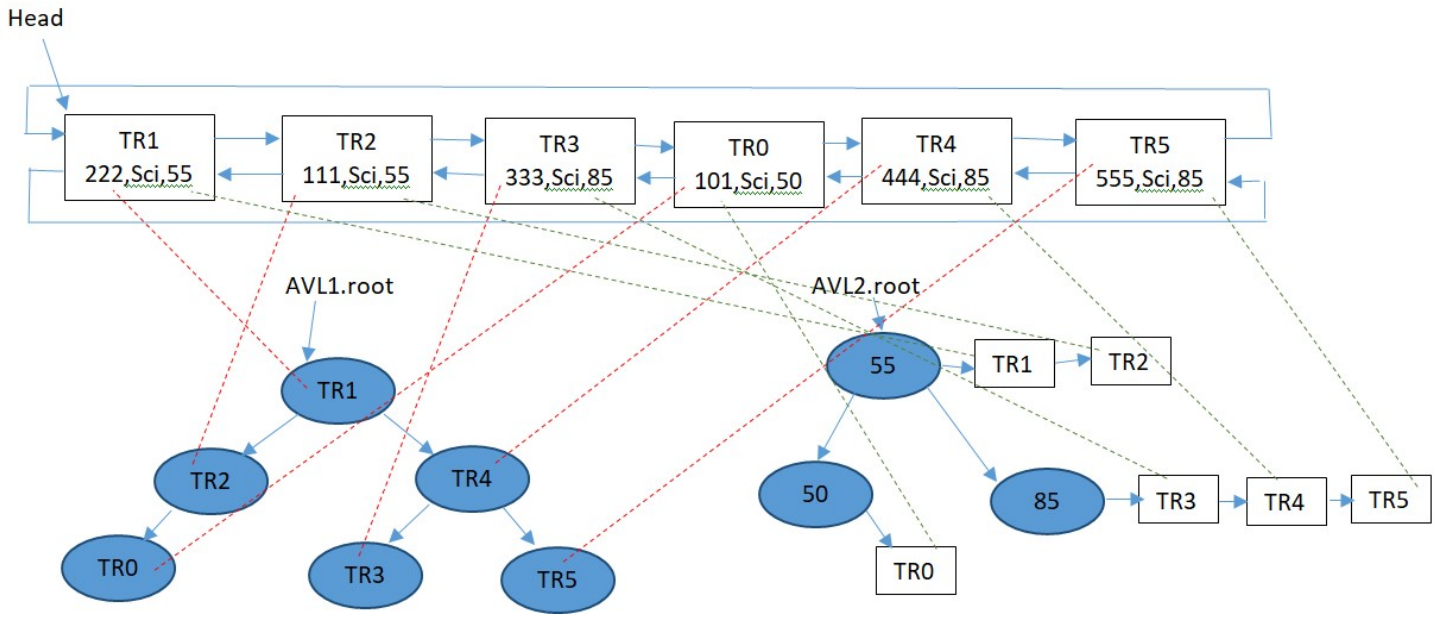
BIRZEIT UNIVERSITY

COMP242-Project III

In this project, we are going to create a student Tawjihi records database. As what we have in the first project, a Tawjihi record has (**seat number, branch,** and**average**) separated by comma.The records will be read from one file and stored in a **circular doubly linked list**unsorted. To access the information fast we will use 2 AVL trees. The first AVL will sort the data according to student's seat number. The second AVL will sort that data by average. In the second AVL tree, there will be grade duplicates. To handle the duplicate we will maintain a single linked list within the secondAVL node (see below).

Important: the AVL trees will not contain any of the student information directly. Instead, they will contain a pointer to the students' information in the doubly linked list.

All the mentioned data structures should be part of a single data structure (class) let us call it **TawjihiDS**. The following figure shows the internal structure of TawjihiDS:



The **TawjihiDS** should have the following operations:

- **Insert**: insert a new student record to the doubly linked list as well as pointers into the two AVL trees. Duplicate students' seat numbers are not allowed.
- **Update** a student information given the seat number.
- **Delete** a student record given the seat number.
- **Find** a student record given a seat number.
- **Get all** students for a given grade.

Driver:

You will implement a javaFX GUI as follow:

- At first, the user has to use a file chooser to load a Tawjihi file according to a selected Tawjihi branch (i.e. *Scientific* or *Literary*).
- Read the file and fill the **TawjihiDS** (i.e. doubly linked list and 2 AVLs).
- Show options to insert/update/delete Tawjihi records
- Show an option to find a Tawjihi record using a seat number, with options to show the previous/next records.
- Show an option to print out doubly linked list, 1st AVL(level-traversal), or 2nd AVL(level-traversal).
- Show an option to print out the AVL's height.

Good Luck!