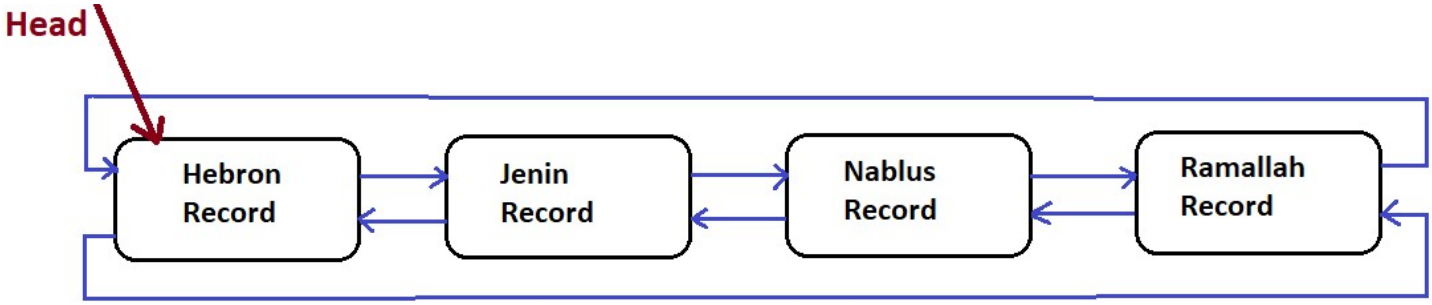
BIRZEIT UNIVERSITY

COMP242-Project III

Due Date: 25/6/2023

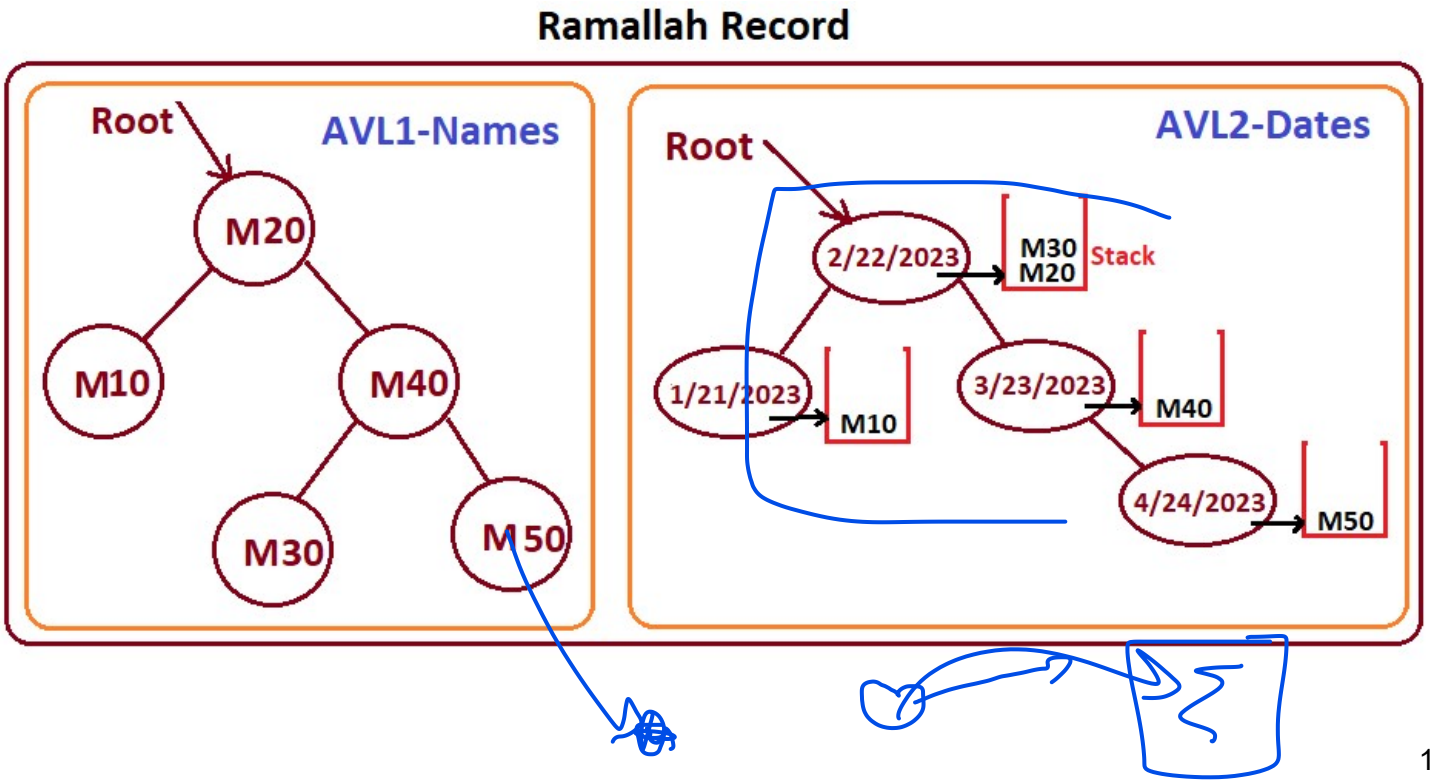
2nd Semester 2023

In this project, you will implement a martyrs data structure using **sorted doubly circular linked list**, **AVL Trees**, **Queues** and **Stacks**. The following figures shows the overall data structure:



The sorted double circular linked list contains location records sorted by location.
The location record contains 2 AVL tress:

- 1st AVL tree: Stores Martyr records sorted by Martyr's name.
- 2nd AVL tree: Stores **DateStack** objects sorted by date. **DateStack** object contains a date and a Stack of martyrs' pointers.



The data input for this project will be a martyrs csv file (**btselem.csv** attached).
For a good user experience, you will need to implement a graphical user interface (GUI) using javaFX.

At the beginng, the user has to load the martyrs file using a file chooser and fill the data structures. Then the user will get a list of functions to choose from:

Location Screen [tab1]:

1. An option to insert new **location** record.
2. An option to update (update or delete) an existing **location** record.
3. An option to search for a **location** record and load the martyrs' records in that location. (Martyrs Screen [**tab2**])

Martyrs Screen [tab2]: after searching/selecting a ***location***, the user can:

1. Insert a new **martyr** record (i.e., create **one** **Martyr** record and add its pointer to AVL1 and AVL2).
2. Update/delete a **martyr** record.
3. Search for martyrs by part of name.

Statistics Screen [tab3]: for the selected location from location screen [**tab1**], do

1. Generate a summary report that includes:
    a. The numbers of martyrs in the selected location.
    b. Traverse the 1st AVL **level-by-level** and print the Martyr's full information
    c. The height of the 1st AVL tree.
    d. Traverse the 2nd AVL backward (i.e., start from the latest date back to the earliest) and print the Martyr's full information
    e. Report the date that had the maximum number of martyrs.
    f. The height of the 2nd AVL tree
2. Two buttons to navigate through locations. A **next** button will generate a summary report of next location. A **previous** button will generate a summary report of previous location.

Save Screen [tab4]: in this screen, you will save the updated data structures back to a file in the same format (**Name, Age, Event location – District, Date of death, Gender**) separated by comma (**,**)
Use a file chooser to select the folder to save the file in.

You have to write efficient code, study the time complexity of each function very well, and be ready to explain it during the discussion.

Good Luck!!!