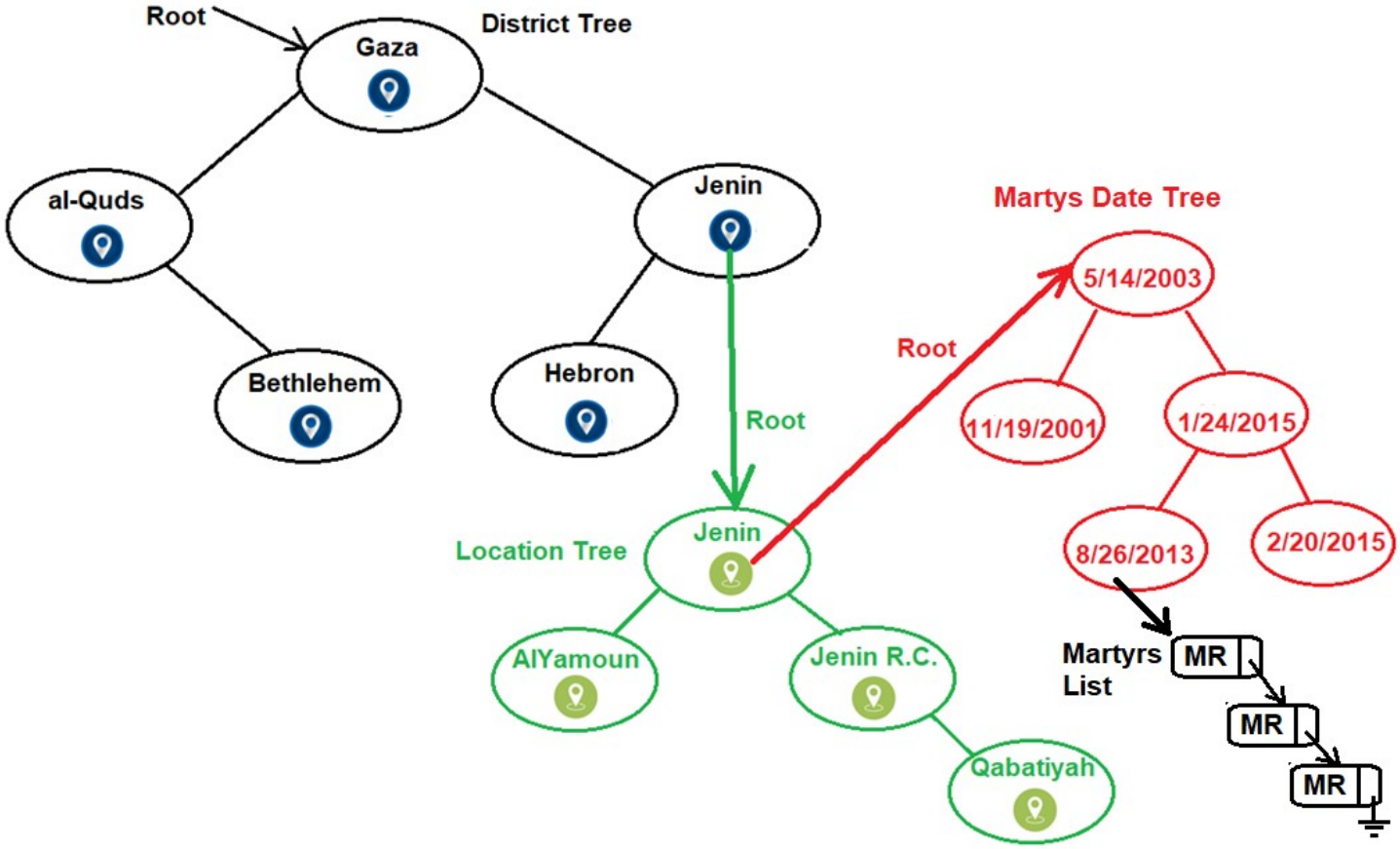
COMP242 Project II

In this project, you will implement a new martyrs' data structure using Binary trees, stacks, and queues. The following figure shows the overall **districts-locations-dates-martyrs** data structure:



Note the following in this data structure:

- **Main District Tree**: this tree holds unique district records and sorted alphabetically ignoring the case. Each data record in this tree contains a **district name** and a **Location Tree**. This is the main entry of our data structure.
- **Location Tree**: this tree holds unique location records and sorted alphabetically ignoring the case. Each data record in this tree contains a **location name** and a **Martyr Date tree**.
- **Martyr Date tree**: this tree holds unique martyrs dates and sorted by **date**. Each data record in this tree is a date and a **linked list of martyrs** who died in that date.
- Martyrs Linked list: this linked list holds remaining martyr record info (**Name**, **Age**, and **Gender**) and sorted by **age** and **gender**.

The data input for this project will be a martyrs csv file (**data.csv** attached)

For a good user experience, you will need to implement a graphical user interface (GUI) using javaFX.

When running your project, at first, the user has to load the martyrs file using a **file chooser**. Your program has to read the file line-by-line and fill the **districts-locations-dates-martyrs** data structure appropriately.
Then the user will get a list of district functions to choose from as follow:

District Screen: in this screen we need the following:

1. An option to insert new district to the district tree.
2. An option to update a district record.[1]
3. An option to delete a district record.[1]
4. Navigate throw districts in an **in-order traversal navigation** (i.e. start with the smallest district name to the largest) (e.g. From the above district tree chart, start from al-Quds, Bethlehem, Gaza, Hebron, to Jenin). The navigation has to have an option to go **next** district and go **previous** district). (Hint: you might need to use **stacks** and/or **queues**). While navigate throw districts show the following:
    a. Total number of martyrs (in all locations that belongs to this district)
    b. An option to load the current district's location into location screen.

Location Screen: in this screen we need the following:

1. An option to insert new location record to the location tree.
2. An option to update a location record.[1]
3. An option to delete a location record.[1]
4. Navigate throw district's locations **level-by-level and from left to right** manner. The navigation has to have an option to go **next** location and go **previous** location). (Hint: you might need to use **stacks** and/or **queues**). While navigate throw locations show the following:
    a. The earliest date that has martyrs.
    b. The latest dates that has martyrs.
    c. The date that has the maximum number of martyrs.
    d. An option to load the current location's martyrs into Martyr screen.

Martyr Screen: in this screen we need the following:

1. Navigate throw dates in an **in-order traversal navigation**. The navigation has to have an option to go **next** date and go **previous** date). While navigate throw dates show the following:
    a. Average martyrs ages in that date.
    b. The youngest and oldest martyrs in that date.
    c. Show list of martyrs info sorted by name. (Bonus: show martyrs list in a tableview)
2. An option to insert a new martyr record to the martyrs linked list.
3. An option to update/delete a martyr record.[1]
4. An option to search for martyrs record by part of their names. (Bonus: show martyrs list in a tableview)

Important:

- To enter dates, use DatePicker.
- To enter District or Location, choose from a combo box.
- All the operations should consider the data from the created **districts-locations-dates-martyrs** data structure.
- Add an option to save the updated data structure it to a new file in the same format of the input file.

Good Luck!

[1] Show a warning and a confirmation dialog before performing this action.