Assignment 02: Data Structure

As our “rolling” project we will build a chat application. That application will be incrementally build based on the subjects that recently learned in the classroom.

This assignment is based on the 01 assignment, so you’ll need to provide users and groups management before proceeding further.

Requirements:

- Create module that will represent n-child tree data structure. This data structure will support search, add, remove and all other methods that you find relevant.
- Groups management will support nested groups with n-level hierarchy. So this layout will be possible:
  --Group1 (3)
  ----Group2 (3)
  ------Group44 (2)
  --------user1
  --------user2
  ------Group55 (1)
  --------user4
  ----Group3 (0)

- Only one type of entities is allowed in every group, so if a group contains another groups, it won’t contain users. Vise versa - if a group contains users, it won’t able to contain more nested groups. Example based on the layout above - users can be nested under Group44, Group55 and Group3, but not in Group1 or Group2
- The app will allow to search by user and get all groups that the user associated with.
- Allow search for groups and show the full path to the results
- Print full tree of group and users. Each group sums up the users count in that group or all groups beneath it.
- The app will provide convenient way to create group inside a group that contains users, like
  --Group11 (2)
  ----user1
  ----user2
  Create new group in group11 =>
  --Group11 (2)
  ----new group (0)
  ----others (2)

- The app will support flattening as well:
  --Group11 (2)
  ----Group22 (2)
  ------user1
  ------user2

  After flattening group22 =>
  --Group11 (2)
  ----user1
  ----user2