



Department of Computer Science
COMP2421 (Fall Semester 2024/2025)
Project#3 Due date: 3 January 2025 (before 23:59)

In this project, you will build a system to maintain the information of districts and cities. Your program should read a set of districts and their relevant information from a file named `district.txt`

The format of the input data is as follows:

`district:town:population:elevation:HasMunicipality`

Example

`AlQuds:Hezma:5000:550:yes`

`Nablus:Asira:8000:350:yes`

`AlQuds:Qatanna:3000:300:No`

`Jenin:Yabad:12000:200:yes`

You are required to implement a program to help maintaining the information of districts and their towns using an AVL Tree:

- Read `districts.txt` file and create the tree.
- Insert a new town from the user with all its associated information.
- Find a town and give the user the option to update its information (if found).
Update the population, elevation, and if it has a municipality or not.
- List the towns in the tree in alphabetical order with their associated information.
- List all towns that have population greater than an input number.
- List all towns that have municipalities or not.
- Delete a town from the tree.
- Save all information to a file called `towns.txt`.

Then create a Hash Table using the data from `towns.txt`. Use the name of towns as the keys and implement the following functions on the hash table:

- Print hashed table (i.e., print the entire table to the screen including empty spots).
- Print the size of hash table and the load factor.
- Insert a new record into the hash table.
- Search for a specific town and print the number of collisions to reach the town (if there are any collisions).
- Delete a specific record.
- Save the data back to the file `towns.txt`

Please note that you should use any open addressing hashing technique and you should use only the first 5 characters of the name of town as the key.

Instructions and Notes on submission:

1. **This is individual work.** It should represent your own individual efforts. You can discuss your ideas with your colleagues, but you are not allowed to copy/paste the work of others or give your work to anyone else. You are not allowed to post/copy from other websites and/or social media and this will be considered as cheating.
2. **Document format.** Please submit only the code file (c file) containing the code of your project. Please rename it as follows:
“**P3_YourStudentID_FirstNameLastName_SectionNo.c**”.
E.g., P3_1200000_MohammedKhader_2.c → given this student in section 2.
3. **Input/output file name.** Make sure that the input/output file names are the same as in the specifications.
4. Include your full name, student ID, and section number in the beginning of your file.
5. Please do not compress the file, only the C-file is needed.
6. Files not following the convention in point 2 will not be marked.

Good Luck!