Department of Computer Science
COMP2421 - Data Structures and Algorithms
Fall 2022/2023
Project No. 2 – Trees & Hashing
Deadline: 24 January 2023

In this project, you will build a system to maintain the information of medicines for a pharmacy system. Your program should read a set of words and their relevant information from a file named Meds.txt. The user should be then able to enter name of medicines with their relevant information.

The format of the input data is as follows:

```
name:active ingredient:category:indication:expiry date:count:company
```

Example
```
Azimex
500:Azithromycin:Antibiotic:pneumonia,tonsillitis,skin
allergy:3/2025:7:birzeit pharmaceutical company
Azicare  500:Azithromycin:Antibiotic:pain,tonsillitis,skin
allergy:3/2025:11:Pharmacare PLC
Paramol:Paracetamol:Pain   killer:fever,pain:3/2026:9:Beit
Jala Pharmaceutical
```

1. You are required to implement a program to help maintaining the information of medicines and inventory using a Binary Search Tree:
   - Read Meds.txt file and create the tree.
   - Insert a new medicine from the user with all its associated information.
   - Find a medicine and give the user the option to update its information (if found).
     Update the quantity of a given medicine.
   - List the medicines in the tree in alphabetical order with their associated information.

- List all medicines of same category (i.e., anti-inflammatory) and specify if available or not.
- List all medicines that treat a specific disease and specify if available or not.
- Delete a medicine from the tree.
- Delete all medicines from a specific company.
- Save all information to a file called Pharmacy.txt.

2. Then create a Hash Table using the data from Pharmacy.txt. Use the name of medicines 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.
   - Print the used hash function.
   - Insert a new record into the hash table.
   - Search for a specific medicine and print the number of collisions to reach the medicine (if there are any collisions).
   - Delete a specific record.
   - Save the data back to the file Pharmacy.txt

Please note that you should use any open addressing hashing technique and you should use only the first 3 characters of the name of medicine 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: "**P2_YourStudentID_FirstNameLastName_SectionNo.c**". E.g., P2_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, <u>only the C-file is needed</u>.
6. Files not following the convention in point 2 will not be marked.