Department of Computer Science
COMP2321: Data Structures
Fall 2020/2021; Project No. 3 – Trees & Hashing
Deadline: TBA

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

The format of the input data is as follows:

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Word: meaning1, meaning2, ... , meaningN / a synonym  * an antonym. N ≥ 1.
```

Example

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old: advanced in age, aged, antique / ancient * new
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To keep track of the dictionary, a computer program based on an AVL tree data structure should be implemented.

1. You are required to implement a program to help creating the dictionary by including the following operations of an AVL tree:
    - Read Words.txt file and create the dictionary (i.e., AVL Tree).
    - Insert a new word from user with all its associated data (up to three meanings).
    - Find a word and give the user the option to update the information of the word if found.
    - List words in the dictionary in lexicographic order with their associated meanings, synonyms, and antonyms.
    - List all synonym and antonyms of a given word.
    - List all words that start with the same first letter in lexicographic order.
    - Delete a word from the dictionary.

- Delete all words that start with a specific letter.
- Save all words in file Dictionary.data.

2. Then create a Hash Table using the dictionary data of the previous step (use words as 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 out table size.
    - Print out the used hash function.
    - Insert a new record into the hash table.
    - Search for a specific word.
    - Delete a specific record.
    - Save hash table back to file.