# CMPUT 291 - Fall 2023 - Mini Project 1

## Overview

Near the top of the Python file, there is a line "database = None", and the user is expected to type the name of their database. The database is expected to already have the relevant tables and valid entries.

Login Screen:
1. Login: Typing "1" allows the user to attempt to log in.
2. Register: Typing "2" allows the user to create a new account.
3. Exit: Typing "3" exits the program.

Interaction Screen:
1. Display Tweets: Typing "d" displays tweets (newest to oldest) from the followees of the user. The tweets are displayed 5 at a time.
   a. Typing the displayed tweet number shows some statistics about that tweet.
   b. Typing "n" displays the next 5 tweets.
   c. Typing "b" sends the user back to the main interaction screen.
2. Search for Tweets: Typing "s" allows the user to enter some keywords to search for tweets. Keywords with a "#" as a prefix will search for tweets that mention that hashtag.
   a. Typing the number of a tweet shows some statistics about that tweet.
   b. Typing "n" displays the next 5 tweets.
   c. Typing "b" sends the user back to the main interaction screen.
3. Search for Users: Typing "u" allows the user to enter a keyword to search for other users. Users with matching names or cities will be displayed 5 at a time.
   a. Typing the number of a user shows some statistics about that user.
      i. Typing "follow" will make the user follow the selected user.
      ii. Typing "reply" allows the user to reply to one of the other user's tweets.
      iii. Typing "retweet" allows the user to retweet one of the other user's tweets
      iv. Typing "tweets" displays more of the other user's tweets.
      v. Typing "back" sends the user back to the main interaction screen.
   b. Typing "next" displays the next 5 users.
   c. Typing "back" sends the user back to the main interaction screen.
4. Compose a Tweet: Typing "c" allows the user to compose a tweet. The user will be prompted to type the text of the tweet and it will be posted.
5. List Followers: Typing "l" displays all other users that follow them.
   a. Typing the number of a user shows some statistics about that user.
   b. Typing "back" sends the user back to the main interaction screen.
6. Logout: Typing "q" sends the user back to the login screen.

# Design

The detailed design of the software can be explained in 2 major components:

1. Database Operations :
   - login()
     - Validates the user credentials and retrieves the current user record from the database.
   - register()
     - Inserts a new user in the database
   - search_tweets(usr)
     - The user inputs one or more keyword, separated by space if more than one, and the function returns any tweets that either contains the input in the text of the tweet, or the keyword has the prefix # and it is mentioned by the tweet as a hashtag in the mentions table. Returns extra information when selecting a displayed tweet (extra info being display_tweet_statistics)
   - search_users(user_id=None)
     - The user inputs one or more keywords, separated by space if more than one, and the function returns any users that have parts of their names and cities that match the keyword. Returns extra information when selecting a displayed user (extra info being display_user_details)
     - Allows to search for other users and provides the specified details and their recent tweets.
   - follow_user(target_user_id)
     - Enables current user to follow a targeted user
   - compose_tweet(usr)
     - Allows users to compose tweets and handle hashtags.
   - list_followers(usr)
     - Retrieves the list of all users who follow the current logged in user
     - Displays details about followers and enables interactions such as following, replying and retweeting.
   - retweet(tweet_id, user_id)
     - Enables the current user to retweet a tweet by adding a new entry to the retweet table.

2. Display and interaction functions:
   - display_tweets_for_user(user_id, page=0)
     - Fetches tweets from followees and displays them in the required pagination format
     - Allows users to select tweets for further interactions, if need be.

- display_tweet_statistics(tweet_id)
  - Retrieves and displays statistics about a specific tweet such as retweets and replies.
- interact_with_tweet(tweet_id, user_id)
  - Provides functionality to the logged in user to a specific tweet, like replying or retweeting.
- compose_reply(tweet_id,user_id)
  - Allows the user to compose a tweet that is replying to another tweet.
- user_interface(user_id)
  - Acts as the primary loop for the system functionalities of a user who has successfully logged in. It handles the user's input and calls the necessary functions depending on that input.
- display_user_details(user_id)
  - Lists the specified user's recent tweets and allows various interactions.

# Testing

Testing fell under 2 main categories.
1. Testing edge cases in the database by creating potentially conflicting data.
   a. Creating tweets that have hashtags mentioned but do not appear in the text and querying for those tweets in the Tweet Search functionality.
   b. Testing if duplicate tweets and retweets are returned by the query.
2. Testing the user interaction loop by fully exploring the functionality as a user and intentionally inputting conflicting information.
   a. Attempting SQL injections to get a password displayed for a user without access to that password.
   b. Trying to log in as a user with an incorrect password or a user without a matching username.
   c. Typing strings as input that are not listed as commands to see if the program is not able to handle such inputs.
   d. Attempting to follow a user where a follow relationship already exists.
   e. Searching for users that have the given string in their city but not their name.

Some of the bugs found are:
1. Bug: Sometimes backing out to the login screen takes a few attempts to work and will display prompts from previous functionalities.
   a. Solution: not sure what is causing this to happen.