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How to run:

1. Unzip the contents of file “proj4p1bonus”.
2. Open file: proj4p1bonus_test.exs
3. Set the following parameters:
   a. userNum = <some value>
      example: userNum = 1000
      This is the **number of users**
   b. tcount = <some value>

      example: tcount = 2
      This is the **number of tweets per user**
   c. zipf_factor = <come value>
      example: zipf_factor = 0.5
      This is the value of **zipf factor**
4. Save the file
5. Navigate to the folder in CMD
6. Run the following command –

   ```
   mix test
   ```

Twitter implementation:

- The Twitter file is used as a simulator that runs the registration, tweet functions etc. upon being called from the test file.
- Engine is the Twitter server which maintains all the information about the number of users, their respective followers, their respective tweets, all the hashtags and the tweets those hashtags were used in, all the people that were mentioned in any tweet and the tweets that they were mentioned in.
- User is the user file and maintains information like the user name, that is userNum in our case, user tweets, user followers and user tags.

Zipf factor implementation:

- Zipf factor value is set in proj4p1bonus_test.exs file
- On the basis of zipf factor, there is two category of users that have been created: regularUsers and specialUsers
- regularUsers are zipf percentage of the total number of users and the remaining users are specialUsers.
- regularUsers have been number of followers equal to the number of tweets

- The specialUsers have been assigned number of followers one more than the number of followers for regularUsers
- regularUsers will make number of tweets equal to the value specified in the test file.
- specialUsers will make number of tweets equal to one more than the number of tweets made by resularUers.

<u>Test case implementation:</u>

- To verify registered users: checking if the size of users table in Twitter engine is the same as number of users or not
    - File: Twitter
    - line number: 8 to 16

- To verify all tweets:
    - checking the number of users who have tweeted: Since our code is tweeting for all users, hence checking if the size of allTweets table in Twitter engine is the same as number of users or not
        - File: Twitter
        - Line number: 32 to 42
    - checking the number of tweets per user: will traverse the alltweets table to get length of tweets by all users and it should be equal to the number of tweets specified in the zipf implementation above

- To verify subscriptions:
    - To check the number of users who have atleast one follower: checking if the size of followers table in Twitter engine is the same as number of users or not.
    - checking the number of followers per user: will traverse the followers table to get length of tweets by all users and it should be equal to the number of followers as specified in zipf implementation above
        - File: Twitter
        - Line number: 18 to 30

- To verify the number of retweets: Our code is making exactly half (every alternate follower) the number of followers per user to retweet. but the followers have been assigned randomly, so there is no way to verify retweets. However, we will see if any retweet has been made or not by checking if the size of retweet table is atleast 1 or not.
    - File: Twitter
    - Line number: 44 to 48

- To verify hashtags: All user are tweeting using hashtag value ‘#COP5615isgreat’.

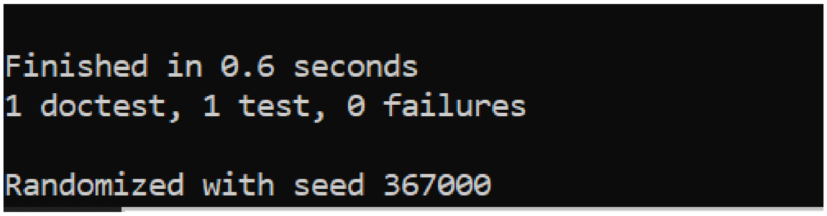
So the size of hashtags table should be equal to 1 and the size of the tweets list corresponding to this hashtag should be equal to (number of regularUsers * number of tweets) for regularUsers and (number of specialUsers * (number of tweets + 1))
(Note, all retweets are stored in retweets table)

  - File: Twitter
  - Line number: 56 to 59

- To verify all the tagged users: all the tagged users are in mentions table along with the tweets that they have been tagged in. There is no way to verify this using size. However, we will see if any retweet has been made or not by checking if the size of retweet table is atleast 1 or not.
  - File: twitter
  - Line number: 50 to 54

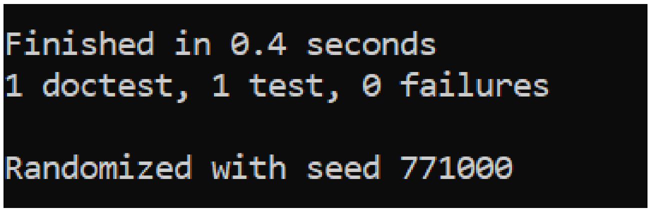
Performance analysis:

- The program runs in 0.6 seconds for 10,000 users and 2 tweets.
- It takes less than 2 seconds for 1000 users and 2 tweets.



```
Finished in 0.6 seconds
1 doctest, 1 test, 0 failures

Randomized with seed 367000
```



```
Finished in 0.4 seconds
1 doctest, 1 test, 0 failures

Randomized with seed 771000
```