Assignment 3

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Part One: The social media features

From the ER-diagram, there is the entity Subscriber with the primary keys username and number. Thus, we will have a table named Subscriber and we will make (username, number) to be the primary key pair. There are also attributes email, hash and salt in the entity Subscriber. We will use large strings CLOB for username. For number, INT is used for the domain of attribute. Since both username and number are used as primary keys, two different subscribers can either have the same username or the same number but not both (exclusive or). We would use VARCHAR(320) to store email. Since hash and salt values require 64-byte each, we would use BINARY(64) for each of them. Since all the above attributes are required to create a subscriber, all of them need to be not null (except for number since it is already automatically incremented). The relational schema for Subscriber table is

$$\textbf{Subscriber}(\underline{username}:\ \text{CLOB},$$
$$\underline{number}:\ \text{INT},$$
$$\text{email: VARCHAR(320)},$$
$$\text{hash: BINARY(64)},$$
$$\text{salt: BINARY(64))}.$$

The ER-diagram has a many-to-many relationship Friend_Of between Subscriber and Subscriber. Thus, we will have a table name Friend_Of. The primary keys of the Subscriber will be the primary keys of the Friend_Of. Since there are two subscribers, we will have a 4-tuple primary key (funame, funum, tuname, tunum). funame is short for from username, which is the username of the subscriber who is following and funum is short for from user number, which is the number of the subscriber who is following. Similarly, tuname and tunum is the username and the user number of the subscriber who is being followed, respectively. Thus, funame and tuname would reference username (column) of the Subscriber table while funum and tunum would reference number (column) of the Subscriber table. Since the domain of the attribute username in the Subscriber table is CLOB, we need to use CLOB to be the domain of the attributes (keys) funame and tuname. Similarly, we need to use INT for funum and tunum. All of the attributes would be not null as well. We also need to

check that a subscriber is not following themselves, that is, we need to check either <u>funame</u> <> <u>tuname</u> or <u>funum</u> <> <u>tunum</u> or both are different (inclusive or). The relational schema for the Friend_Of table is

$$\textbf{Friend\_Of}(\underline{funame}: \text{CLOB},$$
$$\underline{funum}: \text{INT},$$
$$\underline{tuname}: \text{CLOB},$$
$$\underline{tunum}: \text{INT}).$$

We also have the entity Reaction, which will be the table Reaction in the relational schema. Since Reaction has a one-to-many relationship with Subscriber, we can add the primary keys of the table Subscriber to be the attributes of the table Reaction to represent this relationship. We name these attributes to be uname and unum correspond to the <u>username</u> and <u>number</u> in the table Subscriber with the domain of CLOB and INT, respectively.