

## Final Report

### 1. Problem statement

The goal of HW1 is to create a database modeling for an online forum that facilitates the exchange and use of ideas. The interaction between user/admin and thread/tag/reply/announcement/like is implemented in an entity relational database model.

### 2. Tables and diagrams

Table 1: Entity, attribute and key of an online forum

ENTITY	ATTRIBUTES	PRIMARY KEY	FOREIGN KEY
USER	USER_ID, USER_NAME, USER_GENDER, USER_PIC, USER_DOB	USER_ID	
ADMIN	SUBTYPE<USER>, ADMIN_DOP	USER_ID	USER_ID
THREAD	THR_ID, THR_TEXT, USER_ID	THR_ID	USER_ID
THRPIC	THRPIC_ADD, THR_ID	THRPIC_ADD	THR_ID
THRTAG	TAG_NAME, THR_ID	TAG_NAME, THR_ID	TAG_NAME, THR_ID
LIKETHR	LIKETHR_ISSUPER, THR_ID, USER_ID	THR_ID, USER_ID	THR_ID, USER_ID
REPLY	REP_ID, REP_TEXT, USER_ID, THR_ID	REP_ID	USER_ID, THR_ID
REPPIC	REPPIC_ADD, REP_ID	REPPIC_ADD	REP_ID
REPTAG	TAG_NAME, REP_ID	REP_ID, REPTAG_NAME	REP_ID, REPTAG_NAME
LIKEREPLY	LIKEREPLY_ISSUPER, REP_ID, USER_ID	REP_ID, USER_ID	REP_ID, USER_ID
ANNOUNCEMENT	SUBTYPE<THREAD>	ANN_ID	USER_ID
ANNPIC	ANNPIC_ADD, ANN_ID	ANNPIC_ADD	ANN_ID
ANNVID	ANNVID_ADD, ANN_ID	ANNVID_ADD	ANN_ID
ANNTAG	TAG_NAME, ANN_ID	ANN_ID, TAG_NAME	ANN_ID, TAG_NAME
LIKEANN	LIKEANN_ISSUPER, ANN_ID, USER_ID	ANN_ID, USER_ID	ANN_ID, USER_ID
TAG	TAG_NAME	TAG_NAME	

Table 2: Entity, relationship, connectivity and bridge table of an online forum (if needed)

ENTITY	RELATIONSHIP	CONNECTIVITY	ENTITY2	BRIDGE TABLE
USER	IS PROMOTED TO	1:01	ADMIN	
USER	POSTS	1:0N	THREAD	
USER	POSTS	1:0N	REPLY	
USER	LIKES	0M:0N	THREAD	LIKETHR
USER	LIKES	0M:0N	REPLY	LIKEREPLY
USER	LIKES	0M:0N	ANNOUNCEMENT	LIKEANN
ADMIN	POSTS	1:0N	ANNOUNCEMENT	
THREAD	HAS	1:0N	PICTURE	
THREAD	HAS	1N:0N	TAG	THRTAG
REPLY	ASSOCIATED WITH	0N:1	THREAD	
REPLY	ASSOCIATED WITH	0N:1	ANNOUNCEMENT	
REPLY	HAS	1:01	PICTURE	
REPLY	HAS	1N:0N	TAG	REPTAG
ANNOUNCEMENT	HAS	1:01	VIDEO	
ANNOUNCEMENT	HAS	1:0N	PICTURE	
ANNOUNCEMENT	HAS	1N:0N	TAG	ANNTAG

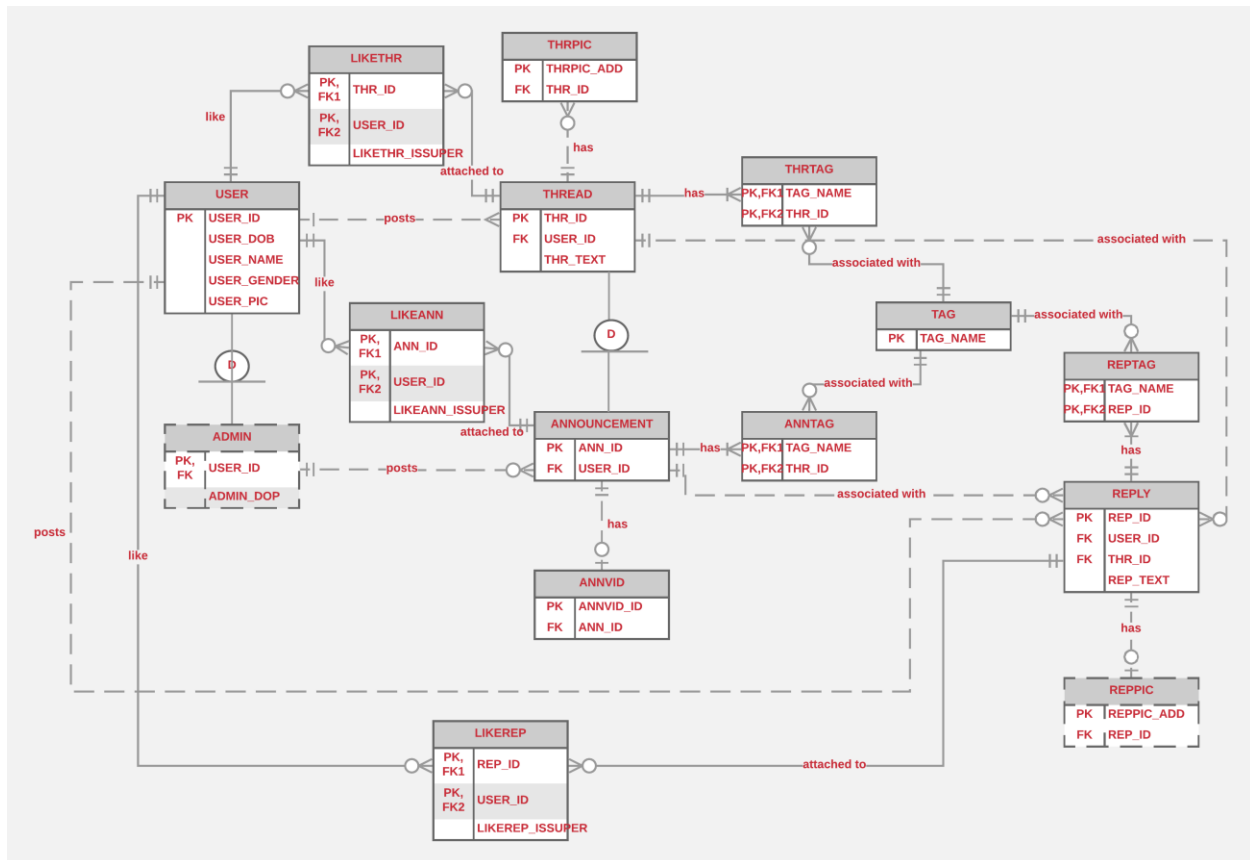


Figure 1: ER Diagram for an online forum (created by LucidChart)

### 3. Model justification

There are two subtypes in the ER diagram:

- An administrator (admin) is a subtype of a USER. Any admin is a user while a user can either be an admin or not, thus the 1:01 relationship. An admin has an extra attribute, which is DOP (date of promotion). A user can also have a Boolean attribute named USER\_ISADMIN to easily pick out the users who are admins. This hierarchy does not need disjoint/overlapping definition because only one subtype exists under USER. An admin is a partial subtype of user because not all USERS are ADMIN.
- An announcement is a subtype of a thread, with an extra attribute of a possible video (thus the 1:01 relationship between ANNOUNCEMENT and ANNVID). An announcement is a partial subtype of a thread because not all threads are announcement. Because only one subtype of thread exists, the hierarchy relationship does not have to be defined as disjoint or overlapping.

A user can do all the following:

- Post multiple threads or replies. Each thread or reply can only be posted by one user. Thus, these are 1:0N relationship because a user can post no thread/reply whatsoever.
- Like multiple announcements, threads or replies. On the other hand, each announcement, thread or reply can be liked by multiple users. Each M:N relationship needs a bridge table (see LIKEANN, LIKETHR, LIKEREPLY). Note that a superlike is inserted as an extra attribute of all LIKE-related entities such as LIKETHREAD.

An admin can perform all of the following tasks:

- Because each admin is also a user, he can perform all the tasks that a user can.
- Post multiple announcements but each announcement can only be associated with 1 admin, thus the 1:0N relationship.

Another situation arises that requires the use of a bridge table:

- Each announcement, reply or thread can have multiple tags while each tag can be associated with multiple announcements, replies or threads. Thus there is a need for a bridge table for each of these relationships (see ANNTAG, REPTAG, THR TAG)

Each reply can have at most one pic, thus a 1:01 relationship is needed between REPLY and REPPIC.

There are no optional or multi-valued attributes in this design.

All the relationships are weak relationships except in the bridge table (ANNTAG, REPTAG, THR TAG, LIKEANN, LIKETHR, LIKERE). These bridge tables require strong relationships to connect to associated entities because they transform M:N relationship to 2 1:N relationships.