

Documentation for Interactive Learning Management System

CS 377 Course Project

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1 Introduction

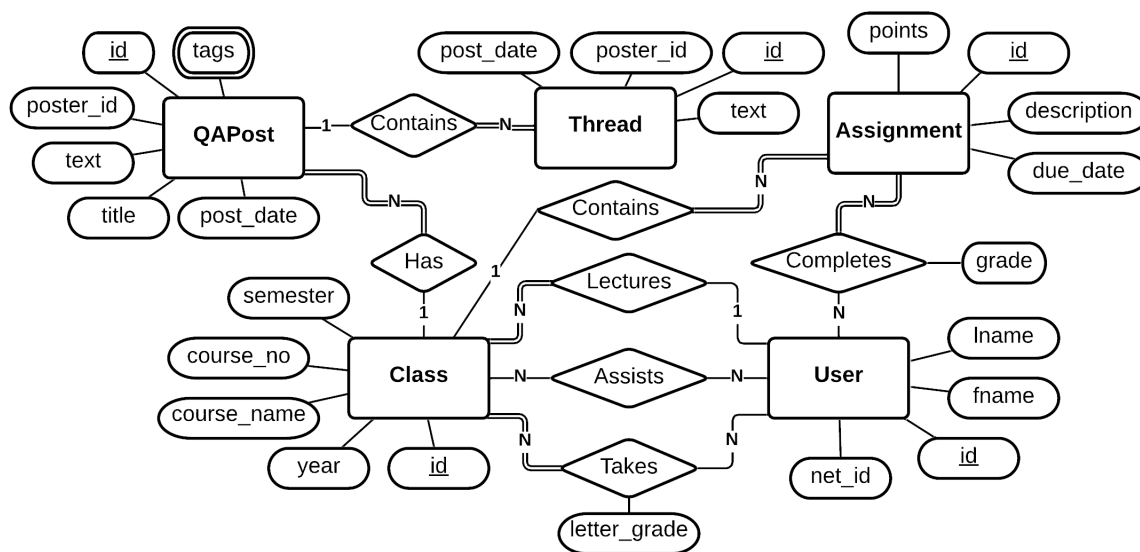
Amazing, introductory ideas that provide unique insight into your field of interest and “wows” your professor—formatted based on Kate L. Turabian’s *A Manual for Writers of Research Papers, Theses, and Dissertations* (9th edition).

2 ER Design

The following assumptions are made:

- A class must contain at least one student.
- A class can only be taught by one professor.
- A thread does not contain “reply-to-posts”, i.e., threads will organized only by chronological order

The entity-relation design diagram is as follows:



3 Relational Model Creation

The initial relational model consists of the following relations:

- User(id, net_id, fname, lname)
- Class(id, course_no, course_name, semester, year, lecturer_id→User.id)
- Assignment(id, description, due_date, points, class_id→Class.id)
- QAPost(id, title, text, poster_id→User.id, post_date, class_id→Class.id)
- Thread(id, text, poster_id→User.id, post_date, parent_id→QAPost.id)
- Tags(post_id→QAPost.id, tag)
- Takes(user_id→User.id, class_id→Class.id, letter_grade)
- Completes(user_id→User.id, assignment_id→Assignment.id, grade)
- Assists(user_id→User.id, class_id→Class.id)

4 Database Normalization

To ensure that the database conforms to 3NF, start by ensuring that the relation schema is in 1NF, which states that

- Every attribute in the relational model has atomic values.

By this rule, the relation schema is already in 1NF. 2NF states that

- 1NF is satisfied, and
- Non-candidate-key attributes are not partially dependent on any key of the relation, i.e., every non-key attribute is fully functionally dependent on the primary key.

Since the relation schema is already in 1NF, I argue the second point of the 2NF constraints: none of the non-key attributes are partially dependent on their respective relation's primary key. This can be seen readily where the primary key is a single element, and for those relations that contain a key with size greater than 1, there are only one or no non-key attribute.

Now, to convert to 3NF, its constraints must include that

- 2NF is satisfied, and
- Every non-key attribute is non-transitively dependent on all the keys.

I argue that the relational model proposed above satisfies the 3NF conditions, as no non-key attribute in any of the relations is dependent on another non-key attribute in that same relation.

With the satisfaction of 3NF conditions, the normalization of the database is considered complete.

5 Data Description

All of the .csv files are generated using the `extract.py` script on the data source files `canvas.csv` and `qa.csv`.

6 PHP File Directory

7 Conclusion