**CSCI 6315 Applied Database Systems**

**Assignment #1 Entity-Relationship Modeling**

Instructor: Dr. Xiang Lian

Due Date: See the course Web page

**You must use software (such as Visio or Word) to draw your ER diagram.**

Hand-written submissions will not be accepted.

Design an ER diagram that models research projects at a university. The following information describes the university research enterprise:

* Professors have a name, date of birth, rank, and research specialty. The university assigns each professor a unique identification number.
* Graduate students have a name, date of birth, and a degree program (such as M.S. or Ph.D.). The university assigns each graduate student a unique identification number.
* Projects have a sponsor name (such as NSF), a starting date, and ending date, and a budget. The university assigns each project a unique identification number.
* Each project is managed by exactly one professor (known as the principal investigator).
* Each project is worked on by one or more professors (known as the project’s co-investigators).
* Professors can manage and/or work on multiple projects.
* Each project has one or more graduate students working on it.
* When a graduate student works on a project, a professor must supervise that student’s work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each project.
* Departments have a name and a main office number. The university assigns each department a unique identification number.
* Each department is run by exactly one professor, who is known as the chairperson of the department.
* Professors work in one or more departments. For each department a professor works in, a time percentage is associated with their work in that department.
* Graduate students have exactly one major department in which they are working on their degree.
* Each graduate student has another, more senior, graduate student (known as a peer advisor) who advises him or her on the graduate school process.

**Tips for completing the assignment**

* Begin by identifying the entities.
* Next, identify the relationships between pairs of entities. Draw a different ER diagram for each relationship.
* Then, specify attributes related to entities and relationships.
* Combine these simple ER diagrams into a single ER diagram that models the entire enterprise.

**Your diagram must include (100 points)**

* Proper UML representation of entities and relationships, including their attributes.
* Multiplicity constraints for each relationship (1..1, 0..\*, etc.).
* At least one relationship that has an attribute.
* At least one recursive relationship.
* At least one pair of entities that has two distinct relationships.

Follow the diagram format presented in Connolly and Begg Chapters 12 and 13.

**Bonus Question: Write SQL statements for the database in Figure 1 to (20 extra points):**

1) Insert row (310, ‘RAT’, ‘Relational Algebra Toolkit’, 2013) into table P.

2) Select Names of all projects.

3) Select Names of students majoring in IT.

4) Select Names of students working on project with PID = 300.

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**Figure 1:** Student Research Database

**Submission**

Submit an electronic copy of your homework solution to the [**Blackboard**](https://mycourses.utrgv.edu/).

**Grading**

The main assignment receives 100 points, and bonus question receives 20 extra points (120 total, if solved correctly).