

CS579  
Lab 1 (Project Part 1)

Due: 9/26

Project will be performed by a team of two students.

You are required to design a conceptual model of a database whose requirements specification is given below. Use the ER model that is described in our textbook. Show (*min*, *max*) constraints on all relationship types in your ER diagram. If any part of the requirements is incomplete, inconsistent, or ambiguous, make your own assumption and design a model based on this assumption. You need to clearly state your assumptions in your report and your assumptions should not contradict the given requirements.

### **Requirements**

The database to be designed keeps a part of home sale transaction information. In the database, we want to store the following information.

- Houses for sale: For each house, we want to keep a unique property id, the city where the house is located, the type of the house (ranch, colonial, cape cod, etc.), the living area square feet, the number of rooms, the number of bathrooms, and the allowance the seller is willing to pay for the house as a credit.
- Sellers: For each seller, we want to store a unique seller id, the name, the phone number, and whether the seller is motivated or not.
- Buyers: For each buyer, we want to store a unique buyer id, the name, the phone number, and whether the buyer has been preapproved or not. We assume that all buyers take out a mortgage loan (i.e., no cash buyers).
- Realtors: For each realtor, we want to store a unique realtor id, the name, the company the realtor works for, the seller fee (in percentage), and the buyer fee (in percentage).
- We also want to keep a history of bid. Each bid entry in the history must include the buyer, the house, the bidding date, and the price (i.e., an entry represents who submitted a bid on which house, when, and for how much).

We also assume the followings:

- A house belongs to only one seller and a seller may have more than one house for sale.
- A seller is represented by only one realtor and a buyer is represented by only one realtor.
- A realtor may represent zero or more sellers and buyers.
- A house may have multiple bids.
- A buyer may bid on the same house multiple times on different days with different prices and may bid on multiple houses. We assume that a buyer can bid on a house at most once a day.

Above requirements are itemized for the sake of description. You must make your own decision regarding whether to model a certain item/concept as an entity type, a relationship type, or an attribute.

## Deliverables

### 1. Documentation

- A cover page showing the course number, course title, assignment number (e.g., Lab 1), names of team members, due date, and date submitted.
- Show all your entity types in following format.

Entity Types (example)

Name	Description	Attribute			
		Name	Description	Multivalued	Derived
EMP	if needed	Ssn{K}	if needed	N	N
	...	Name {K}	...	N	N
		Fname	...		
		Minit			
		Lname			
DEPT	...	...			
		Dept_no{K}	...	N	N
		Dept_name {K}	...	N	N
		...		...	...
		Num_employees	...	N	Y

Note: Here, we assume Name is a composite key.

In the table, use {K} for a key. If there is a weak entity type, indicate the partial key of the weak entity type with {WK}. The component attributes of a composite attribute must be indented.

- Show all your relationship types in the following format.

Relationship Types (example)

Name	Description	Participating Entity Types		Attribute
		Name	Structural constraint	
WORKS_FOR	if needed	Emp	(1, 1)	none
	...	Dept	(1, n)	
MANAGES	...	Emp	(0, 1)	Mgr_start_date
		Dept	(1, 1)	
...	...	...	...	...

### 2. ER diagram.

- When drawing an ER diagram, you may use our textbook's notation or the UML notation shown in the lecture notes. You must not use any other ER model notations (there are too many other notations and they all have different symbols and semantics).
- You must draw a diagram using a software (i.e., you must not draw an ER diagram manually).
- You may use any software to draw an ER diagram.

Include all documents and the ER diagram in a single file (if there are multiple files, then combine them into a single archive file, such as a zip file), name it *LastName\_FirstName\_lab1.ext*, where *ext* is an appropriate file extension, such as *docx*, *pdf*, or *zip*, and upload it to Blackboard.

**Only one team member needs to submit (this applies to all lab submissions).**