Business School
UNIVERSITY OF COLORADO DENVER

Information Systems Program

Module 9
Data Modeling Problems and Design Errors

Lesson 1: Data Modeling Problems I

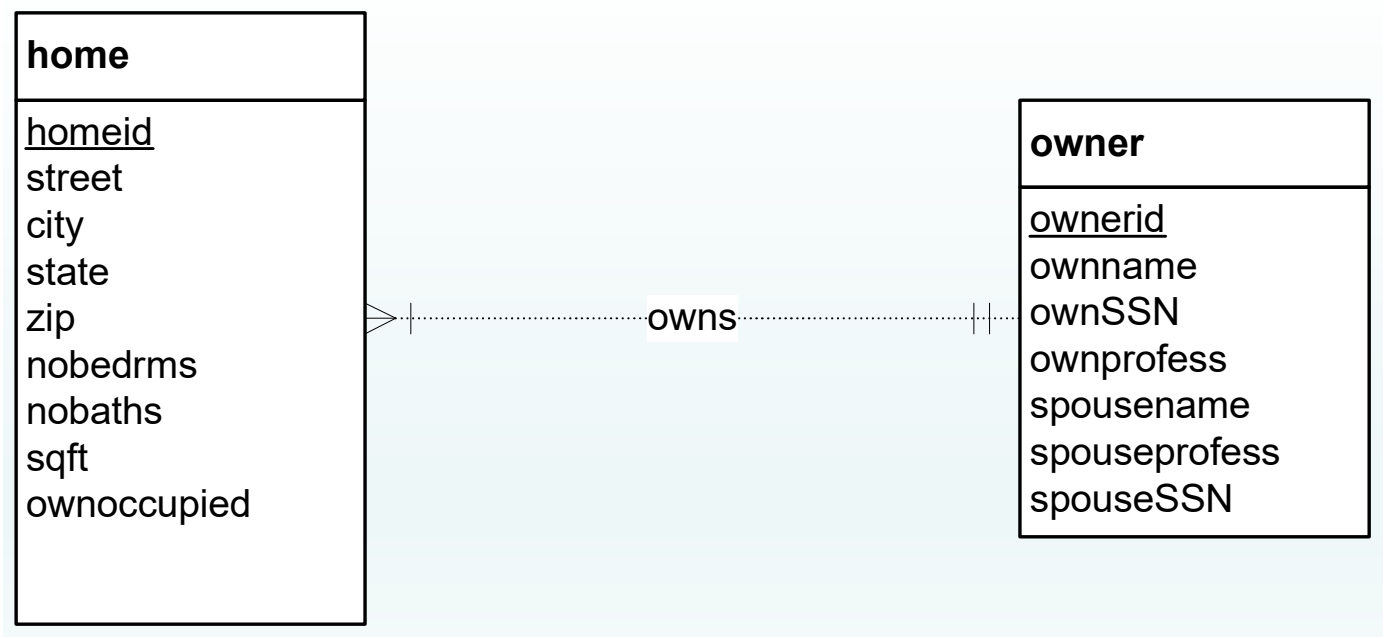
Lesson Objectives

- Practice analyzing simple narrative problem statements and applying design transformations
- Focus on consistency with narrative problem statements
- Learn from mistakes

Problem 1

- Track homes and owners
- Home has only 1 owner. Owner can possess 1 or more homes.
- Home has unique home identifier, address, characteristics (number of bedrooms, bathrooms, …), and occupied by owner, tenant, or vacant.
- Owner has unique owner number, government identifier, name, and spouse details.

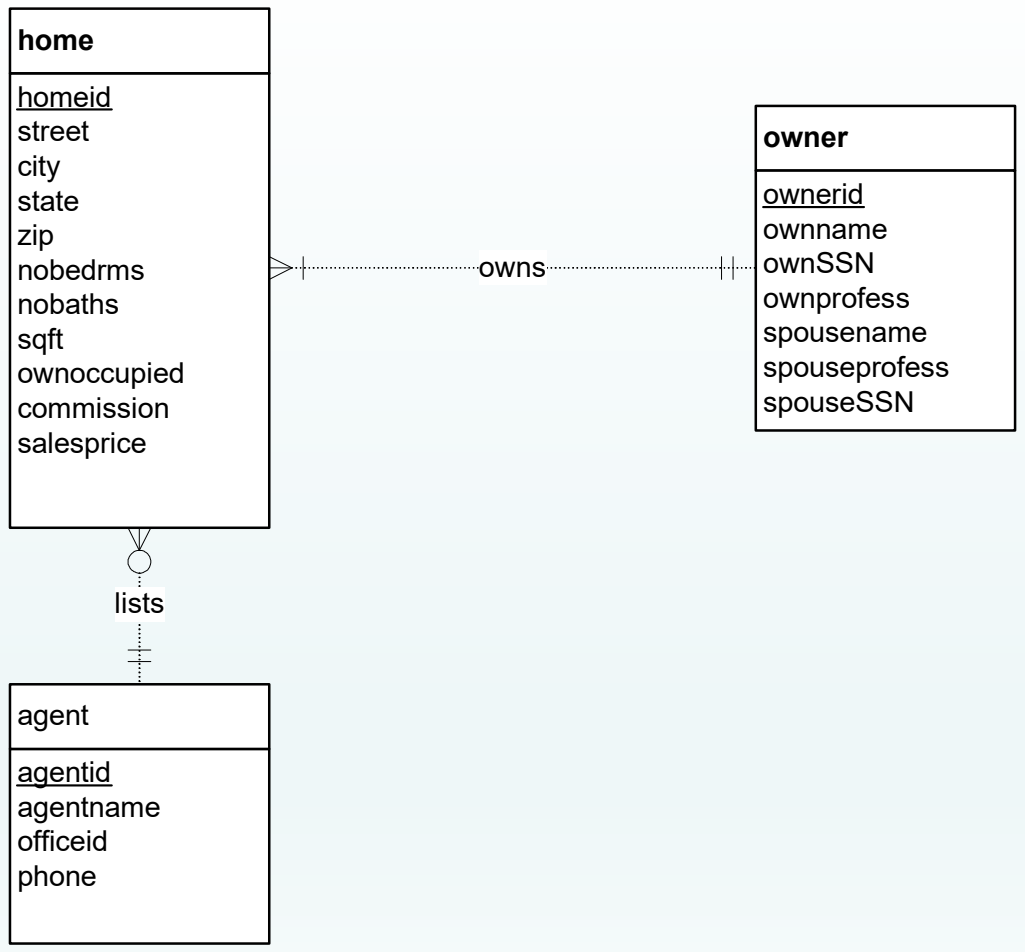
Problem 1 Solution



Problem 2

- Track agents
- Agents represent owners in home sales. An agent can list many homes, but a home is listed by a maximum of one agent.
- Agent has a unique agent identifier, name, office identifier, and phone number.
- Commission and listing price are determined when a home is listed.

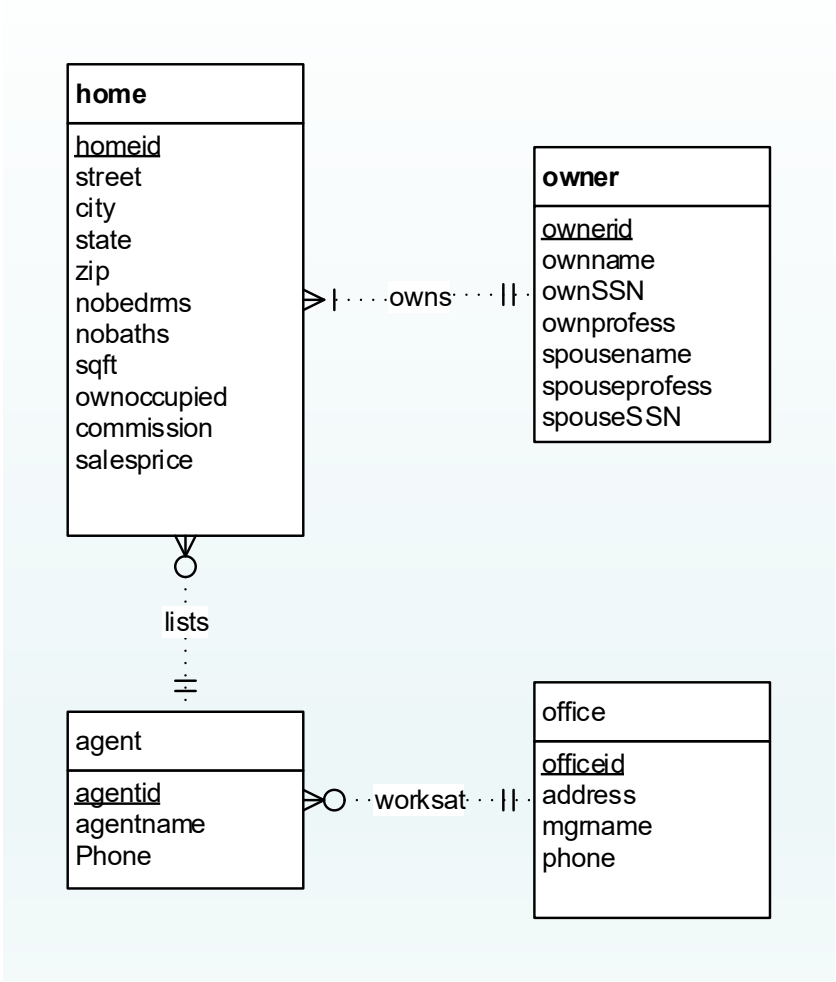
Problem 2 Solution



Problem 3

- Transform office identifier into an entity type
- Office has a phone number, manager name, and address.

Problem 3 Solution



Summary

- Work problems to gain confidence analyzing requirements
- Focus on goals of narrative problem analysis
- Use the ER Assistant or another tool for drawing ERDs
- Use notation precisely in business data modeling problems

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Lesson 2: Data Modeling Problems II

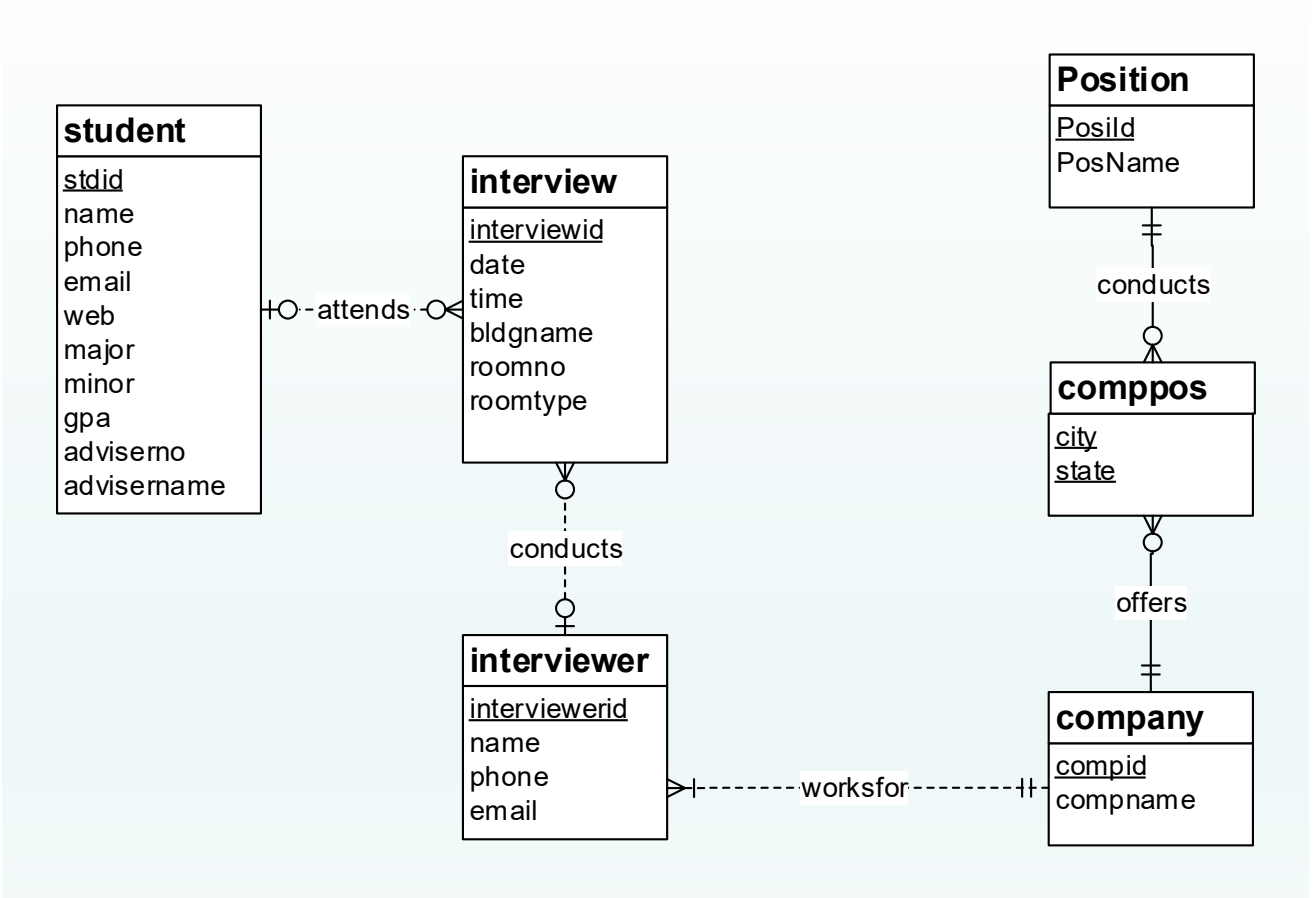
Lesson Objectives

- Practice analyzing a complex narrative problem statement
- Extend data modeling skills
- Learn from mistakes

Problem 1

- Placement office database for interview scheduling and searches
- Major nouns: student, position, company, interviewer, interview
- Connections in sentences
  - Interview includes a student and interviewer
  - List of positions and interviewers for a company
  - Company lists cities for each position.
  - Each interviewer works for a company.

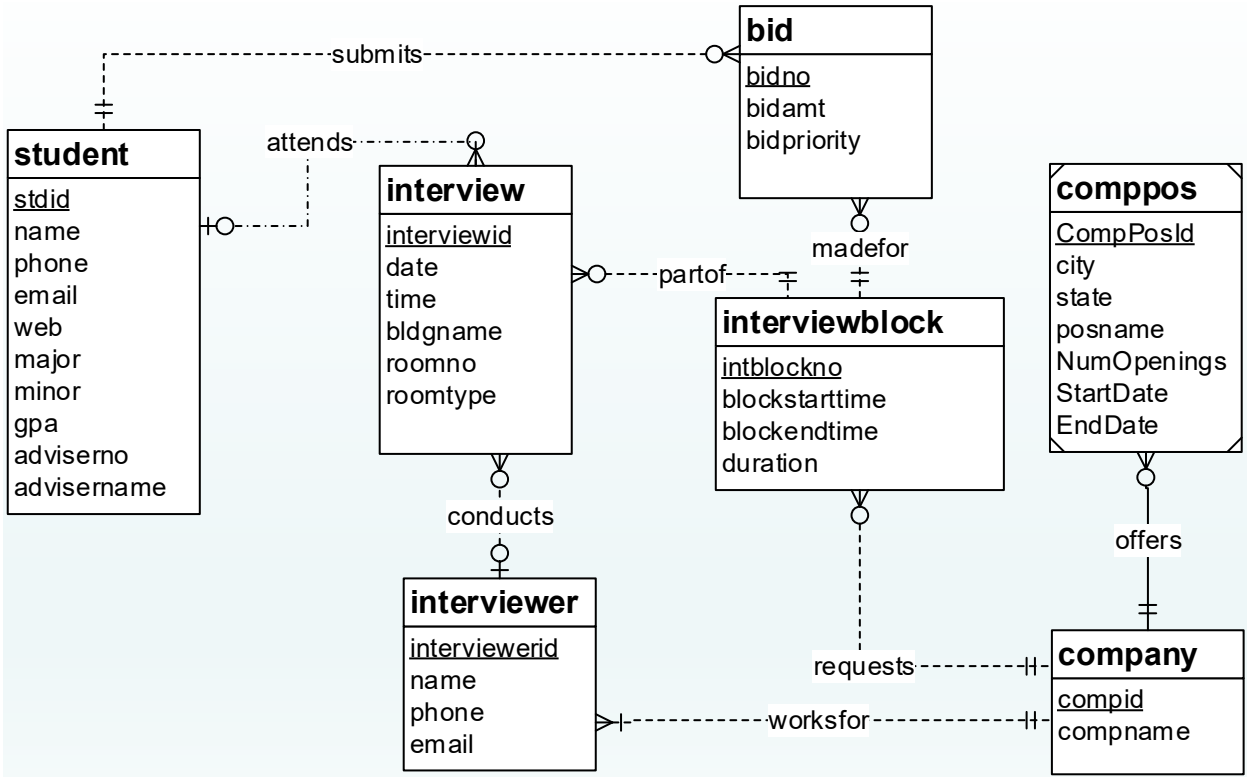
Problem 1 Initial Solution



Problem 1 Revision

- Positions
  - Local to each company
  - No standardized list of positions
- Interview blocks
  - Blocks of time for interviews
  - Companies reserve interview blocks before placement office schedules interviews.
- Bids
  - Students can submit many bids for an interview blocks.
  - Interview block can receive many bids.

Problem 1 Revised Solution



Graded Problems

- Similar to exercise problems
- Basic problems
  - Simple narratives
  - Incremental extensions
- Advanced problem
  - More complex narrative
  - Revision to narrative

Summary

- Work problems to gain confidence analyzing requirements
- Focus on goals of narrative problem analysis especially on unstructured problem statements
- Use the ER Assistant or another tool for drawing ERDs
- Use notation precisely in business data modeling problems

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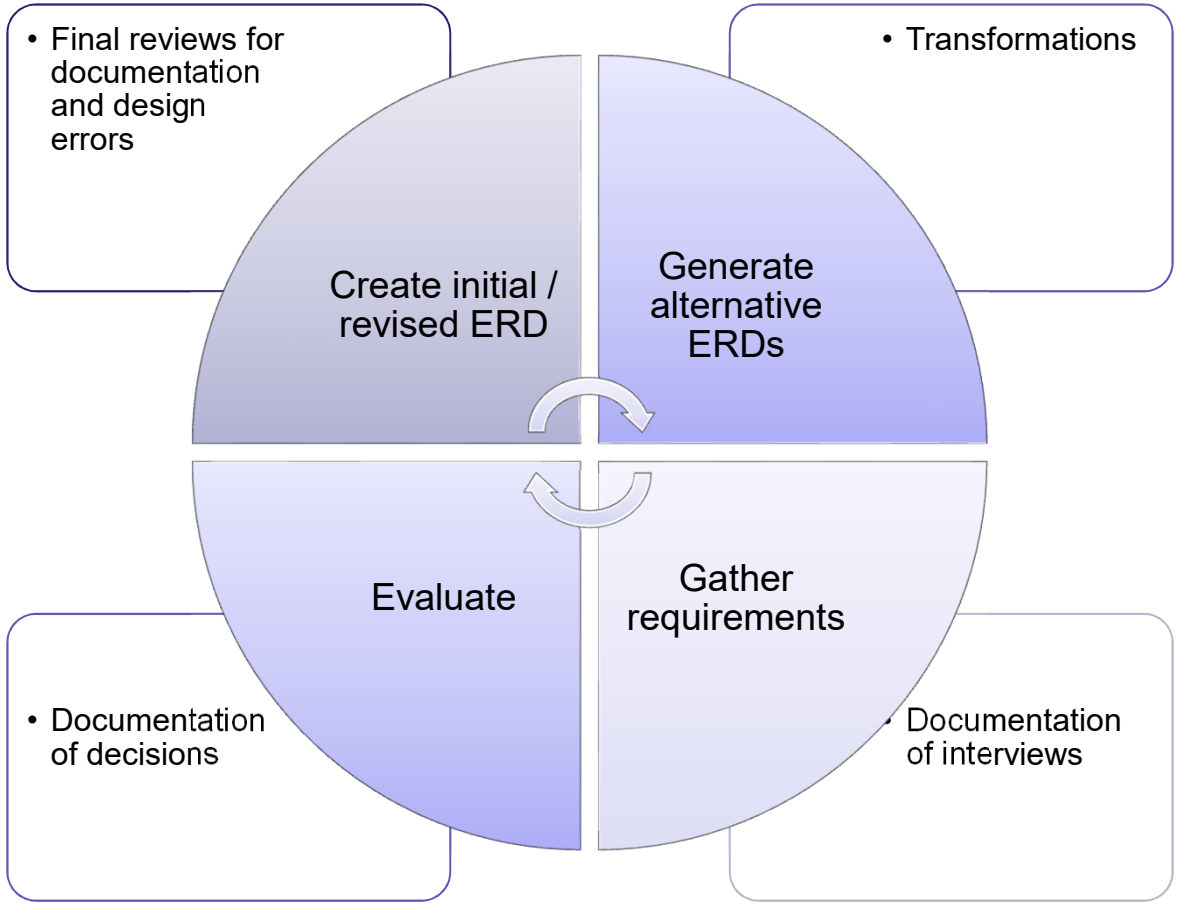
Lesson 3: Finalizing an ERD

Lesson Objectives

- Appreciate the importance of documentation
- Appreciate the difficulty of detecting and resolving diagram errors
- Gain practice with analysis of an ERD for design errors

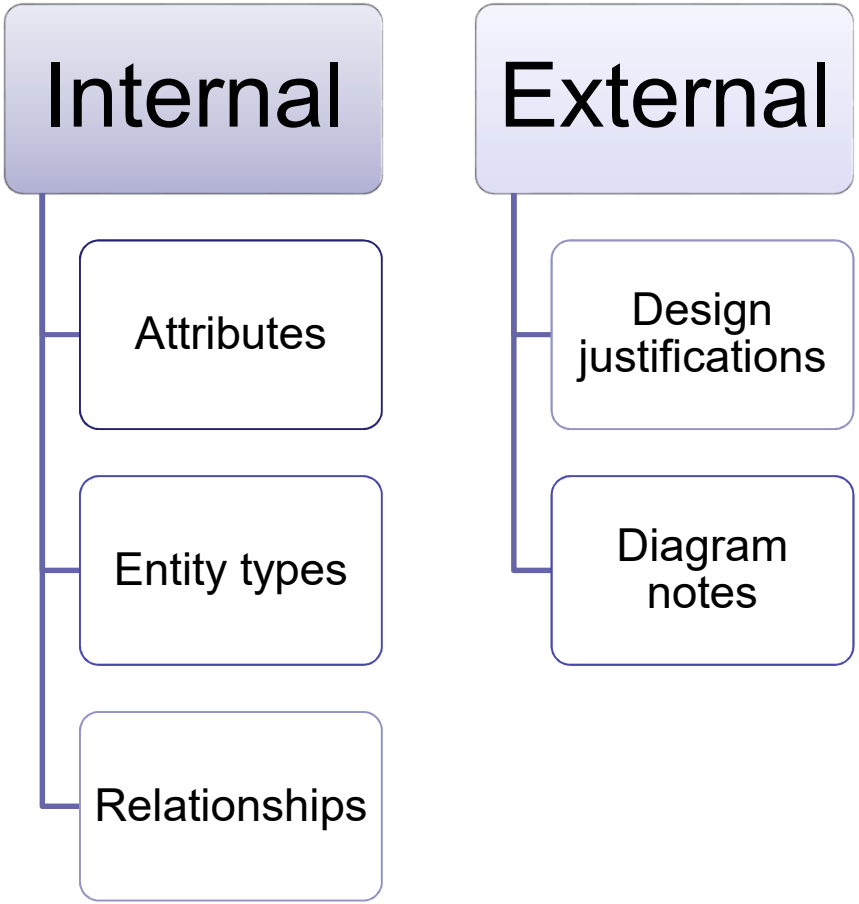
Finishing Steps



Documenting an ERD

- Important for resolving questions and communicating a design
- Identify inconsistency and incompleteness in a specification
- Identify situations when more than one feasible alternative exists
- Do not repeat the details of the ERD
- Incorporate documentation into the ERD

Documentation with the ER Assistant



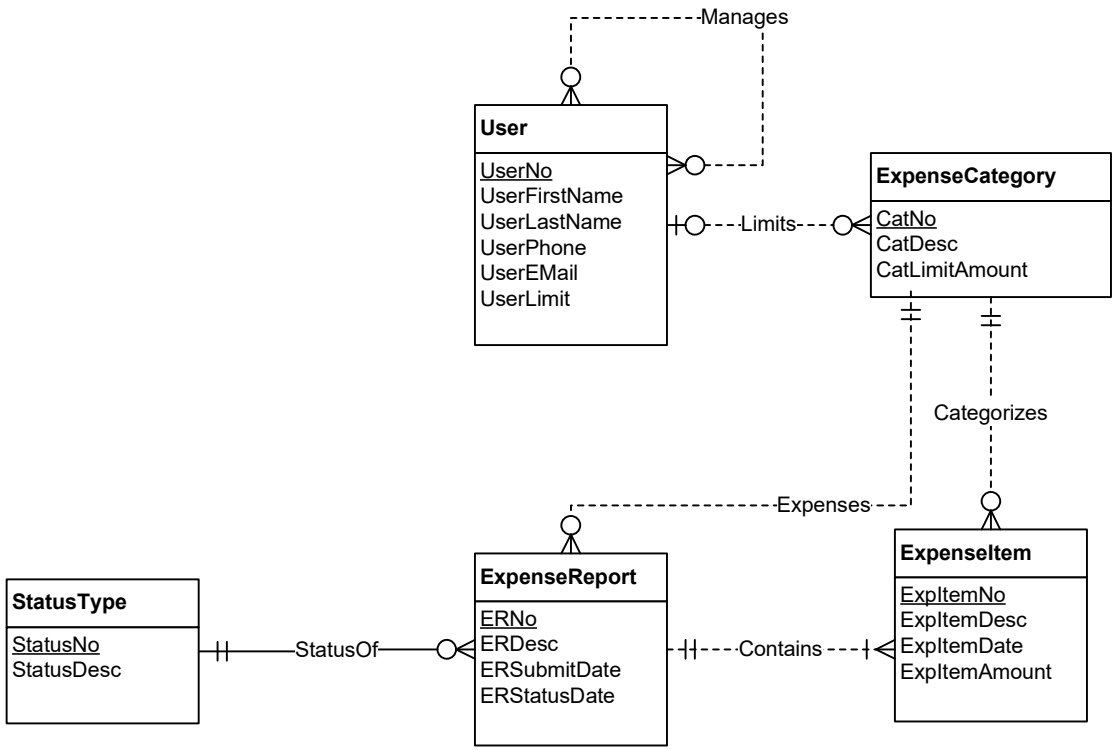
Documentation with Visual Paradigm

- Specification windows
- Show Description button
- Note icon

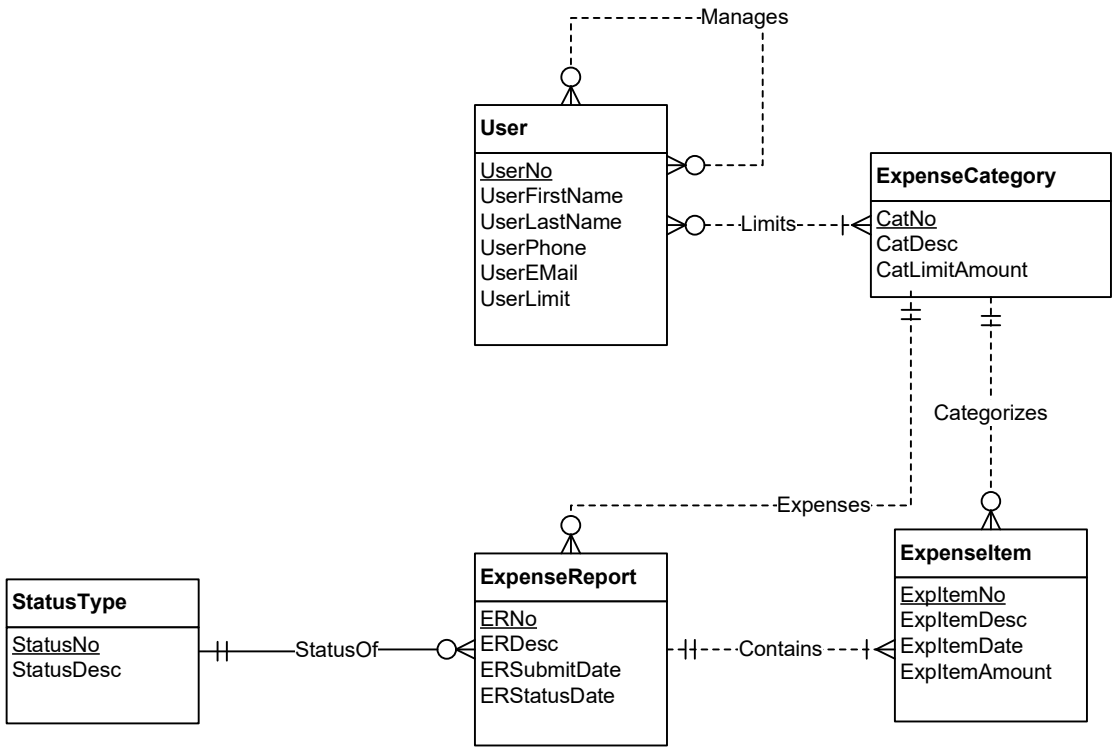
Common Design Errors

- Misplaced relationships: wrong entity types connected
- Missing relationships: entity types should be connected directly
- Incorrect cardinalities: typically using a 1-M relationship instead of a M-N relationship
- Overuse of specialized modeling constructs
  - Identification dependency
  - Self-referencing relationships
  - M-way associative entity types
- Redundant relationships: derived from other relationships

Problem 2 about Design Errors



Partial Solution for Problem 2



Summary

- Document an ERD carefully especially to justify important design decisions
- Check for design errors throughout the design process
- Conduct design reviews with peers