

# CSCE-608 Database Systems

Spring 2024

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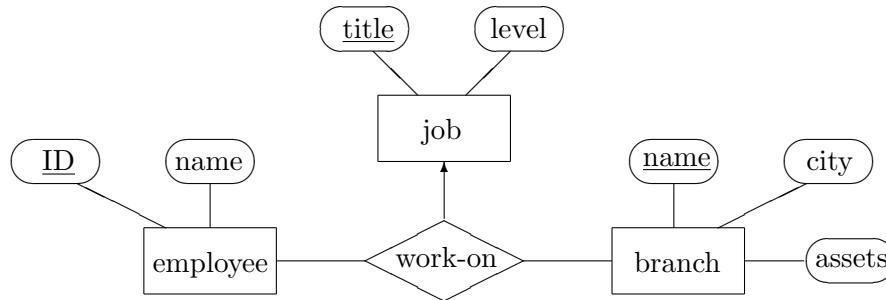
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## Assignment # 1 (Due February 16)

1. Convert the following E/R diagram into a relational database schema.



2. List all functional dependencies for the relations constructed in Question 1.
3. Consider a relation about people in the United States, including their name, Social Security number, street address, city, state, ZIP code, area code, and phone number (7 digits). What FD's would you expect to hold? What are the keys for the relation?
4. Consider a relation with schema  $R(A, B, C, D, E)$  and FD's  $AB \rightarrow C$ ,  $C \rightarrow D$ ,  $D \rightarrow B$ ,  $D \rightarrow E$ .
  - a) Indicate all the BCNF violations. Do not forget to consider FD's that are not in the given set, but follow from them. Only give violations that have a single attribute on the right side.
  - b) Decompose the relation into a collection of relations in BCNF.
5. For the relation schema and FD's given in Question 4:
  - a) Indicate all the 3NF violations.
  - b) Decompose the relation into a collection of relations in 3NF.