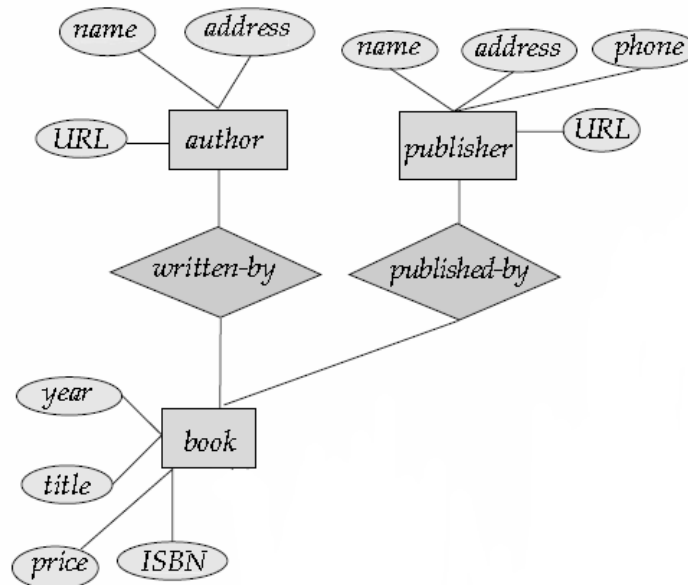


## GEOG 3140 GIS Database Design

### Week 2 Exercise: E-R Modeling

1. Consider the E-R diagram below, which models an online bookstore. List the entity sets and their primary keys.

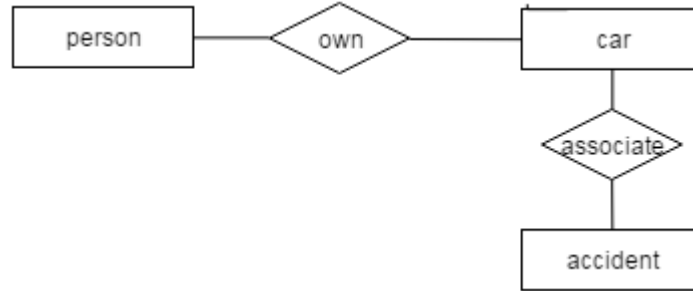


2. Create entities based on the following description. For each entity, identify its attributes and primary key. Check if any of the attributes should be modeled as complex attributes (e.g., multi-valued, composite, etc.):

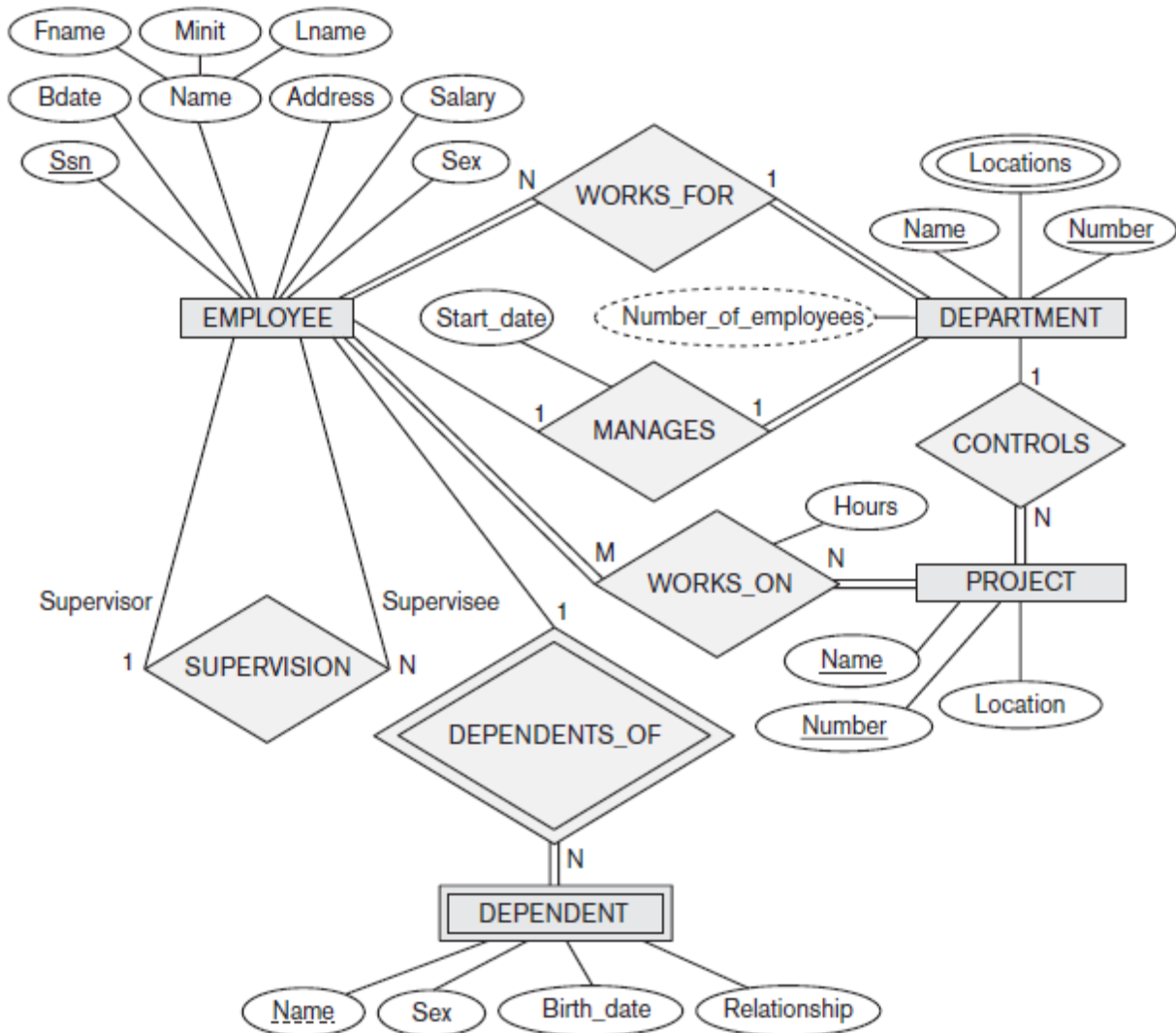
Galleries keep information about **artists**, their names (which are unique), birthplaces, age, and style of art. For each piece of **artwork**, the artist, the year it was made, its unique title, its type of art (e.g., painting, lithograph, sculpture, photograph), and its price must be stored. Pieces of artwork are also classified into **groups** of various kinds, for example, portraits, works by Picasso, or works of the 19th century; a given piece may belong to more than one group.

3. Identify cardinality

A car-insurance company whose customers **own one or more cars** each. Each car has associated with it **zero to any number** of recorded accidents.



4. Understand ER diagram



- a. Identify the entities (strong and weak) and their attributes. For each entity, what is the key attribute? Any composite attributes? Any multi-valued attributes?
- b. Identify the relationships between different entities. For each relationship, what about the cardinality? Given a relationship, which entity is the optional/required one? Do you see any relationships with attributes?
- c. Do you have any suggestions to improve the ER diagram?

Work on the application you selected from Exercise 1. Design an ER diagram for the selected application. Please refer to the following descriptions for your application to help you refine the conceptual design. You may want to write down any assumptions you may have. Constraints should be documented as well.