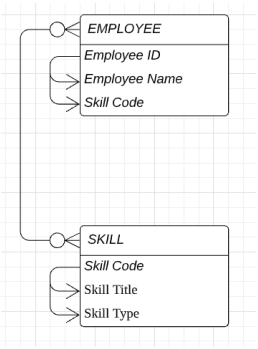
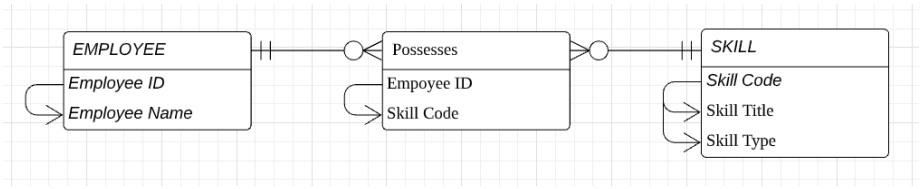
- Chapter 4 (Hoffer, Ramesh, & Topi)
    - Problems and Exercises 12,13,14

12. Transform Figure 2-15b, attribute version, to 3NF relations. Transform Figure 2-15b, relationship version, to 3NF relations. Compare these two sets of 3NF relations with those in Figure 4-10. What observations and conclusions do you reach by comparing these different sets of 3NF relations?





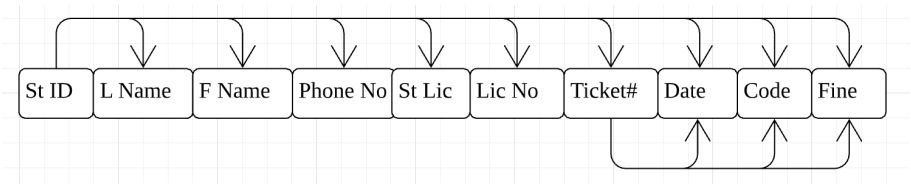
Relationship version can show more details, but also more complicated. In comparison, attribute version is more concise.

13. The Public Safety office at Millennium College maintains a list of parking tickets issued to vehicles parked illegally on the campus. Table 4-6 shows a portion of this list for the fall semester. (Attribute names are abbreviated to conserve space.)

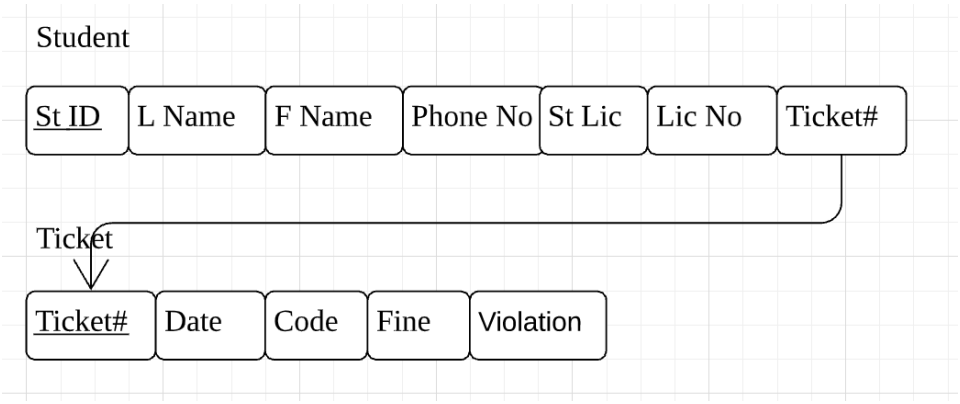
a. Convert this table to a relation in first normal form by entering appropriate data in the table. What are the **determinants** in this relation?
b. Draw a dependency diagram that shows all functional dependencies in the relation, based on the sample data shown.
c. Give an example of one or more anomalies that can result in using this relation.
d. Develop a set of relations in third normal form. Include a new column with the heading Violation in the appropriate table to explain the reason for each ticket. Values in this column are: expired parking meter (ticket code 1), no parking permit (ticket code 2), and handicap violation (ticket code 3).
e. Develop an E-R diagram with the appropriate cardinality notations.

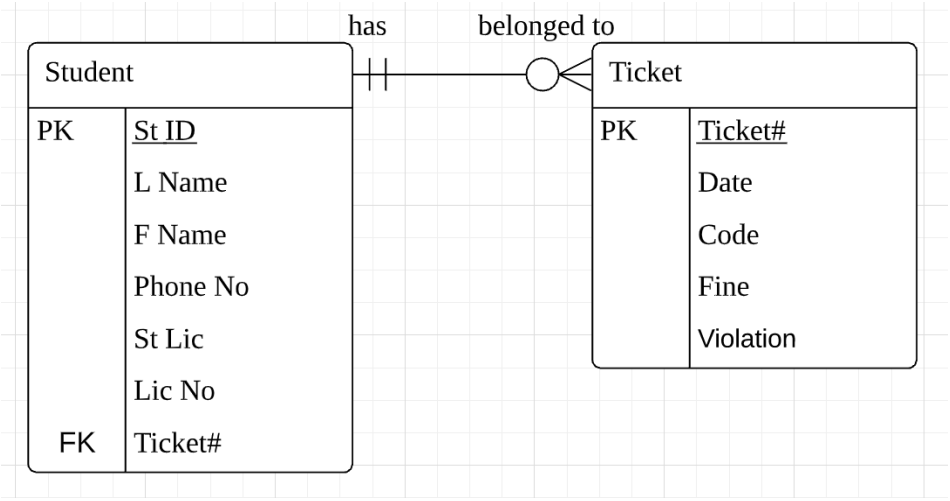
St ID	L Name	F Name	Phone No	St Lic	Lic No	Ticket#	Date	Code	Fine
38249	Brown	Thomas	111-7804	FL	BRY 123	15634	10/17/10	2	$25
38249	Brown	Thomas	111-7804	FL	BRY 123	16017	11/13/10	1	$15
82453	Green	Sally	391-1689	AL	TRE 141	14987	10/05/10	3	$100
82453	Green	Sally	391-1689	AL	TRE 141	16293	11/18/10	1	$15
82453	Green	Sally	391-1689	AL	TRE 141	17892	12/13/10	2	$25

Determinants are St ID and Ticket#.



The data for St ID, L Name, F Name, Phone No, St Lic, Lic No are the same in the first and second row, they are redundant. If the same student has another ticket, his/her information must be input again.





14. The materials manager at Pine Valley Furniture Company maintains a list of suppliers for each of the material items purchased by the company from outside vendors. Table 4-7 shows the essential data required for this application.

a. Draw a dependency diagram for this data. You may assume the following:

- Each material item has one or more suppliers. Each supplier may supply one or more items or may not supply any items.
- The unit price for a material item may vary from one vendor to another.
- The terms code for a supplier uniquely identifies the terms of the sale (e.g., code 2 means 10 percent net 30 days, etc.). The terms for a supplier are the same for all material items ordered from that supplier.

b. Decompose this diagram into a set of diagrams in 3NF.

c. Draw an E-R diagram for this situation.