Tutorial on ER Modelling

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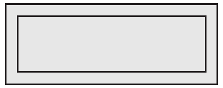
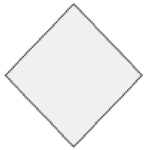
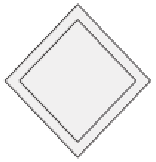
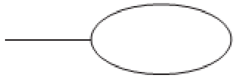
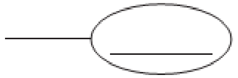
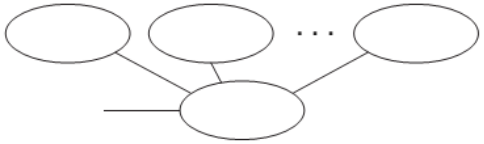
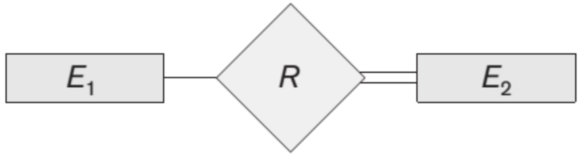
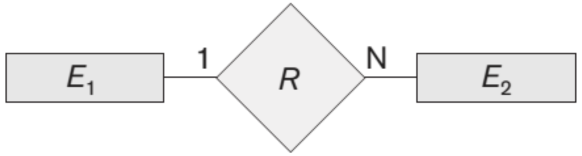
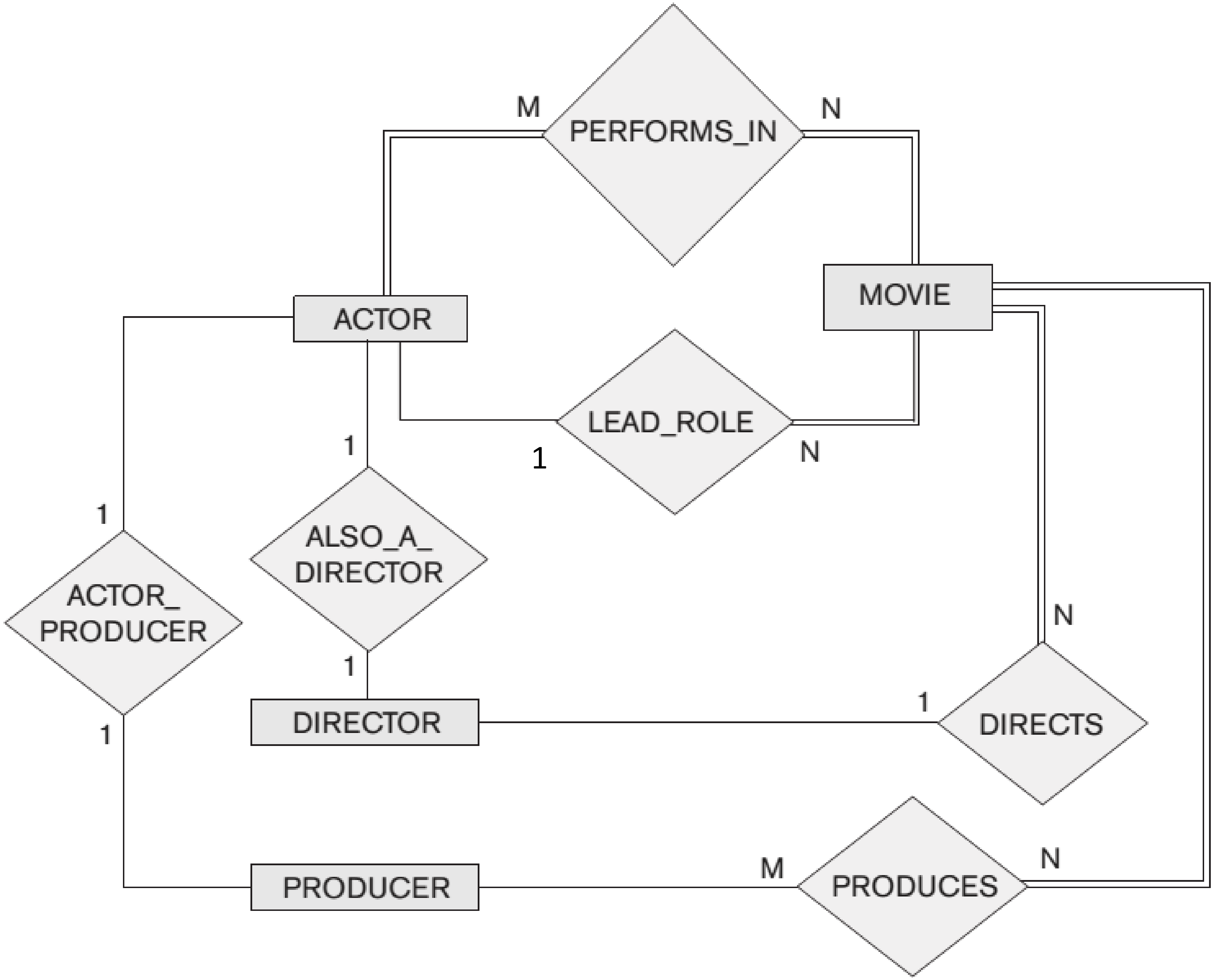
Reminder

Symbol	**Meaning**
	Entity
	Weak Entity
	Relationship
	Identifying Relationship
	Attribute
	Key Attribute
	Multivalued Attribute
	Composite Attribute
	Derived Attribute
	Total Participation of E_2 in R
	Cardinality Ratio 1: N for $E_1 : E_2$ in R

Problem 1

Construct an ER diagram for a database storing information about movies. Many actors can take part in a movie and an actor can be involved in many movies. A movie has to have only one leading actor. A movie can only be directed by one director, but it can be produced by many producers. Moreover, a movie cannot exist in the system without actors, producers and a director. A director can be an actor and vice versa; the same applies for the producers.

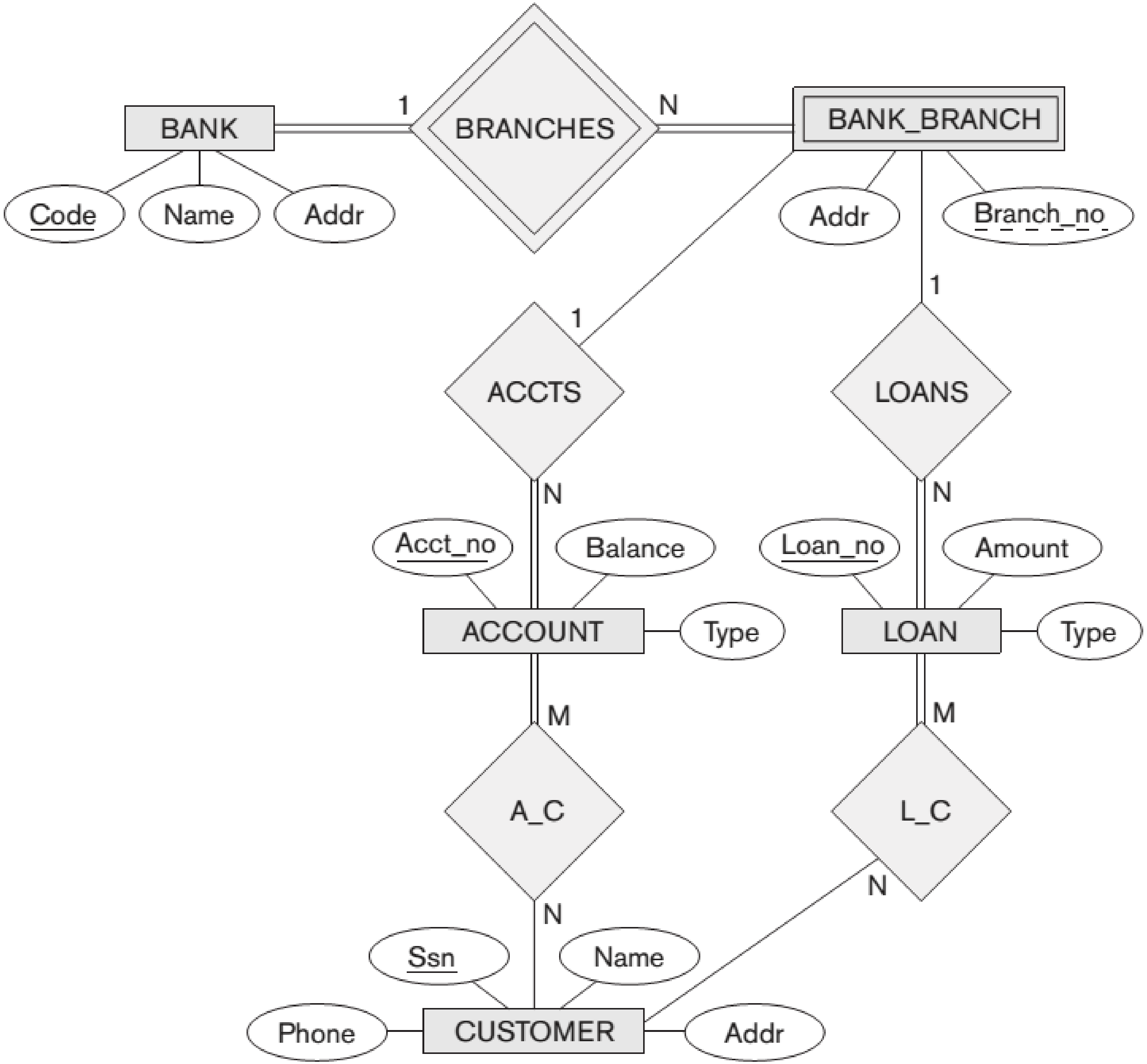
Hint: No attributes in this exercise, only relationships


M
PERFORMS_IN
N
MOVIE
ACTOR
LEAD_ROLE
1
N
1
1
ALSO_A_
DIRECTOR
ACTOR_
PRODUCER
N
1
1
DIRECTOR
1
DIRECTS
N
M
PRODUCES
PRODUCER

Problem 2

Construct an ER diagram for a database holding information for a bank, including the bank’s code, name and address. A bank is required to have multiple branches. Each branch is described by its branch number and address. Each branch holds information about the accounts & the loans made at that particular branch. A loan is described by a loan number, an amount and a type. Similarly, an account is described by an account number, a balance and a type. A customer can have many loans and many accounts. Also the database needs to hold the following information about customers: social security number, phone, name and address.

Tip: Each entity has to have a key that uniquely identifies every instance in its entity set. Choose it wisely!


BANK
1
BRANCHES
N
BANK_BRANCH
Code
Name
Addr
Addr
Branch_no
1
1
ACCTS
LOANS
N
N
Acct_no
Balance
Loan_no
Amount
ACCOUNT
Type
LOAN
Type
M
M
A_C
L_C
N
N
Ssn
Name
Phone
CUSTOMER
Addr

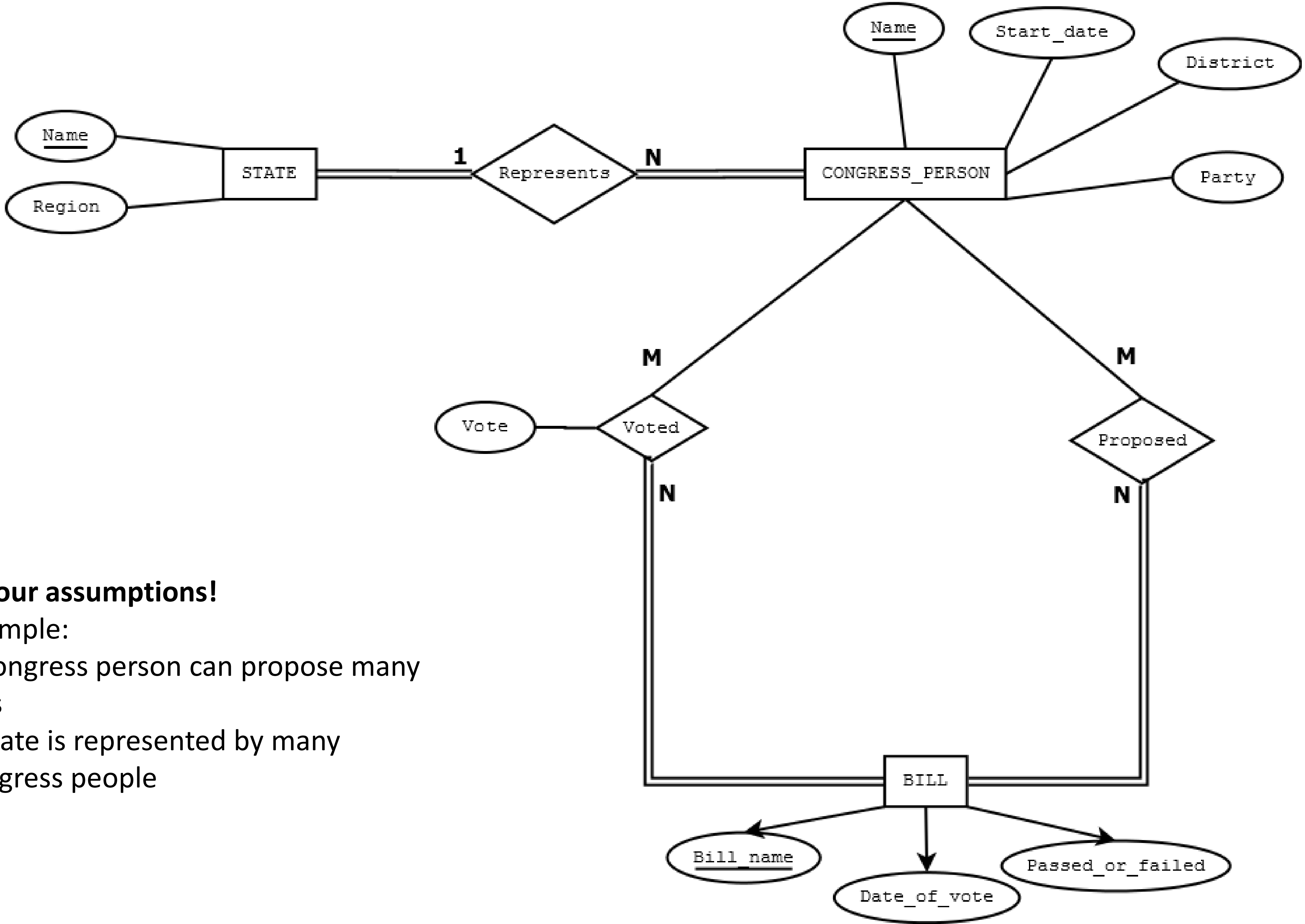
Problem 3

Design an ER schema for keeping track of information about votes taken in the U.S. House of Representatives. The database needs to keep track of each U.S. STATE’s Name (e.g., ‘Texas’, ‘New York’, ‘California’) and include the Region of the state (whose domain is {‘Northeast’, ‘Midwest’, ‘Southeast’, ‘Southwest’, ‘West’}).

Each CONGRESS_PERSON in the House of Representatives represents one state and is described by his or her Name, plus the District represented, the Start_date when the congressperson was first elected, and the political Party to which he or she belongs (whose domain is {‘Republican’, ‘Democrat’, ‘Independent’, ‘Other’}).

The database keeps track of each BILL (i.e., proposed law), including the Bill_name, the Date_of_vote on the bill, whether the bill Passed_or_failed (whose domain is {‘Yes’, ‘No’}), and the Congressperson who proposed the bill. A bill can be jointly proposed by many congress people. The database also keeps track of how each congressperson voted on each bill (domain of Vote attribute is {‘Yes’, ‘No’, ‘Abstain’, ‘Absent’}). Draw an ER schema diagram for this application.

<u>Hint:</u> Make assumptions about the keys!



State your assumptions!

For example:

1) A congress person can propose many bills
2) A state is represented by many congress people

References

- Ramez Elmasri and Shamkant Navathe. 2010. *Fundamentals of Database Systems* (6th ed.). Addison-Wesley Publishing Company, , USA.