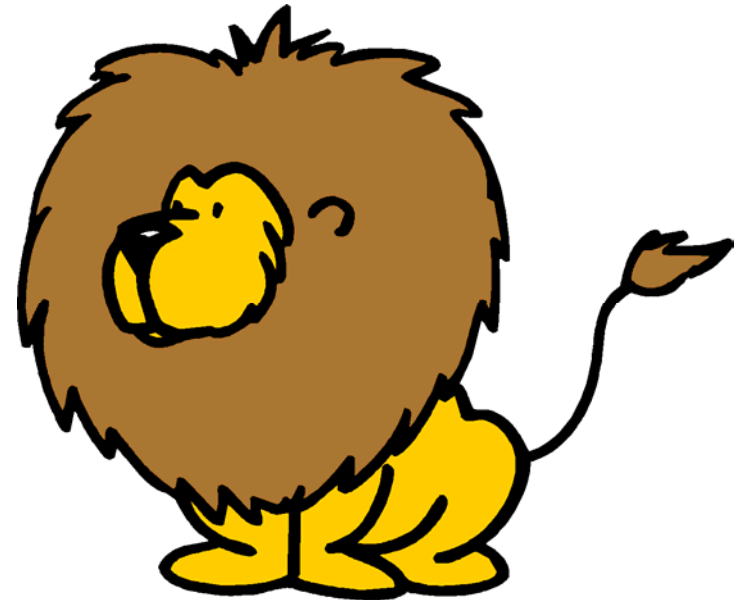


COOP-1 CARDINALITIES

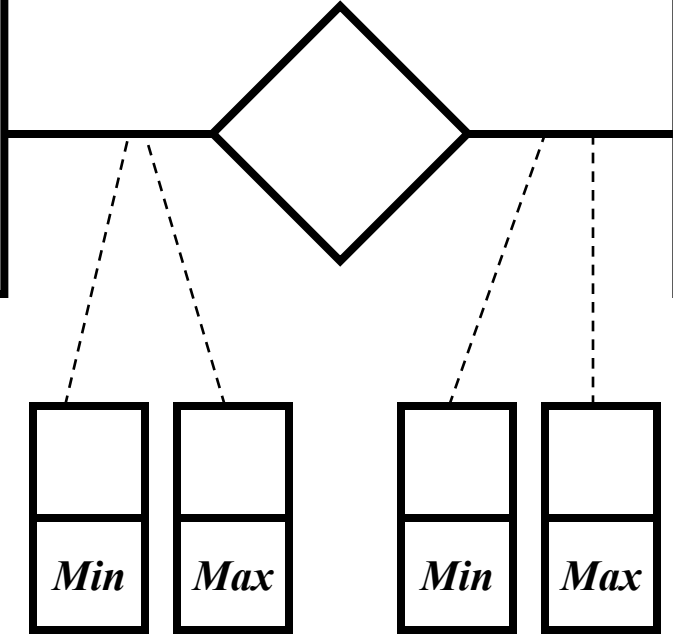
**SOLUTION
PACKAGE**



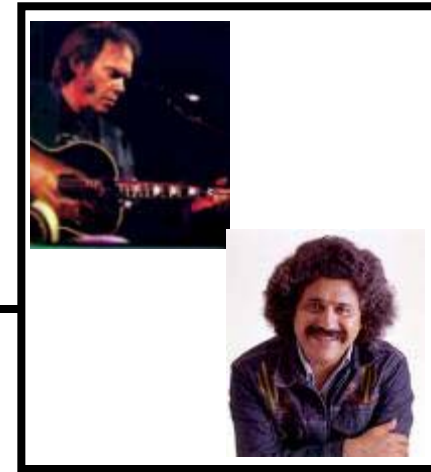
Person



has_as_favorite



Musician



→ *Jimmy (a person) doesn't care about music and does not have a favorite musician (We still need to record Jimmy in our database).*

→ *Only one favorite musician can be recorded for a person.*

→ *We have recorded more than thousand musicians in our database*

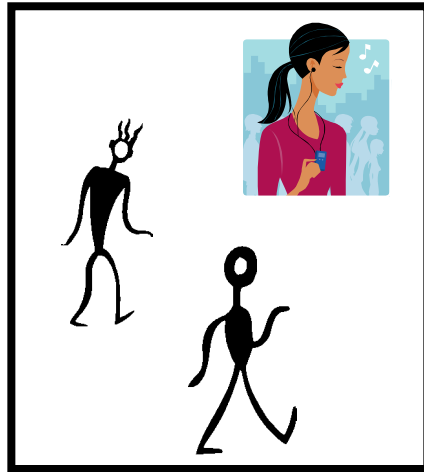
→ *Many people have Neil Young as their favorite musician*

→ *Unfortunately, no one has selected Freddy Fender (one of the musicians in our database) as their favorite musician.*

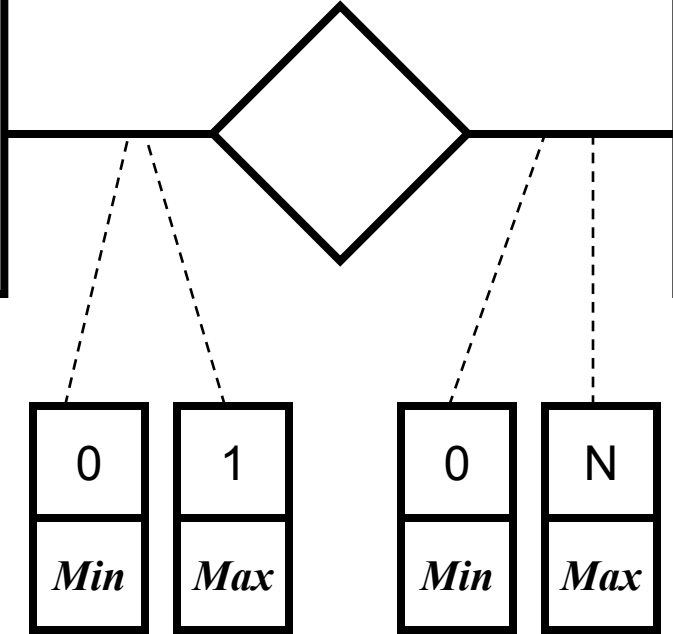
Problem #1

Group _____

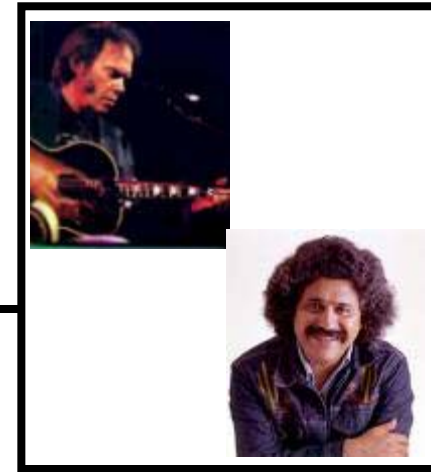
Person



has_as_favorite



Musician



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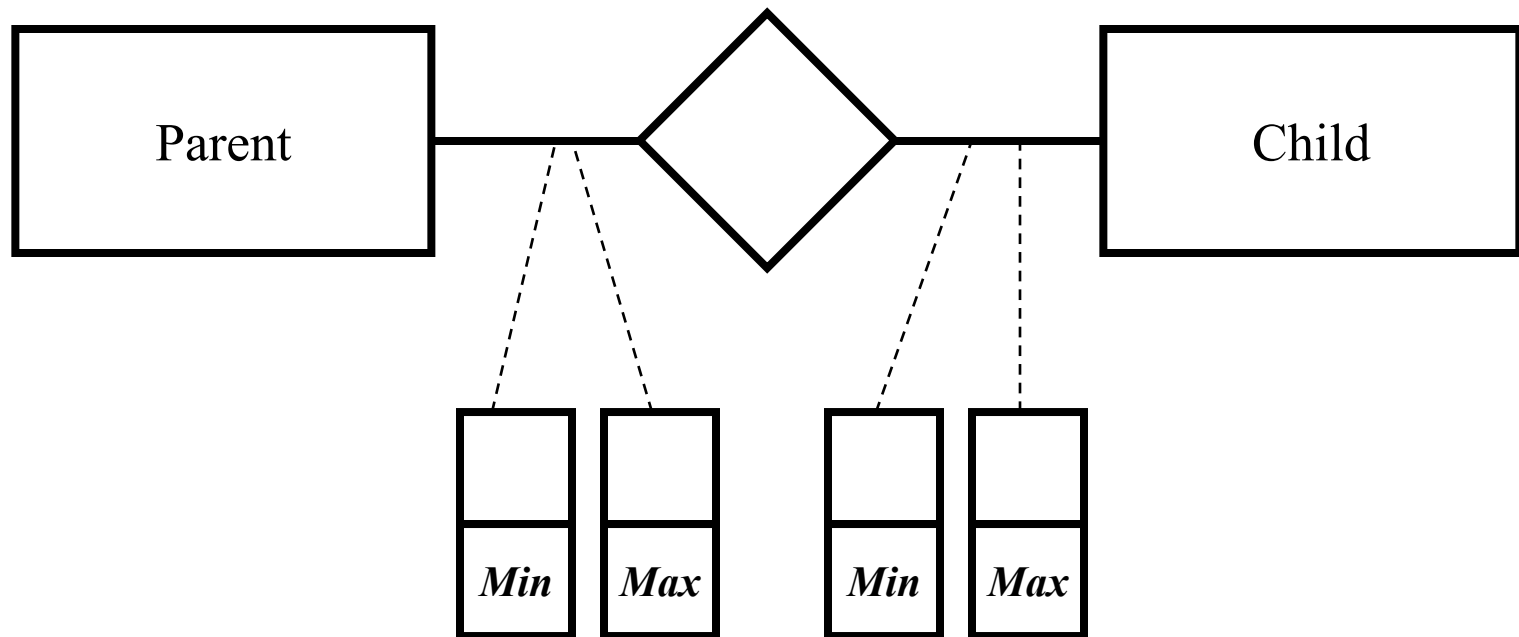
→ Only one favorite musician can be recorded for a person.

→ We have recorded more than thousand musicians in our database

→ Many people have Neil Young as their favorite musician

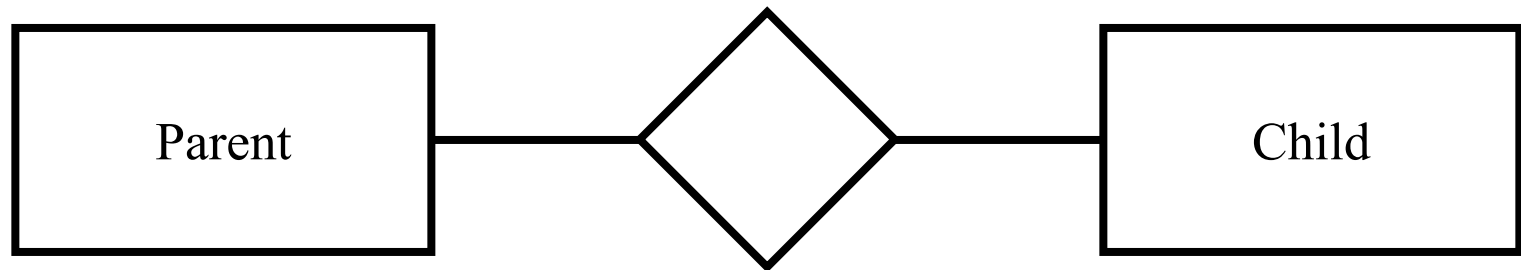
→ Unfortunately, no one has selected Freddy Fender (one of the musicians in our database) as their favorite musician.

Problem #1 -- Solution

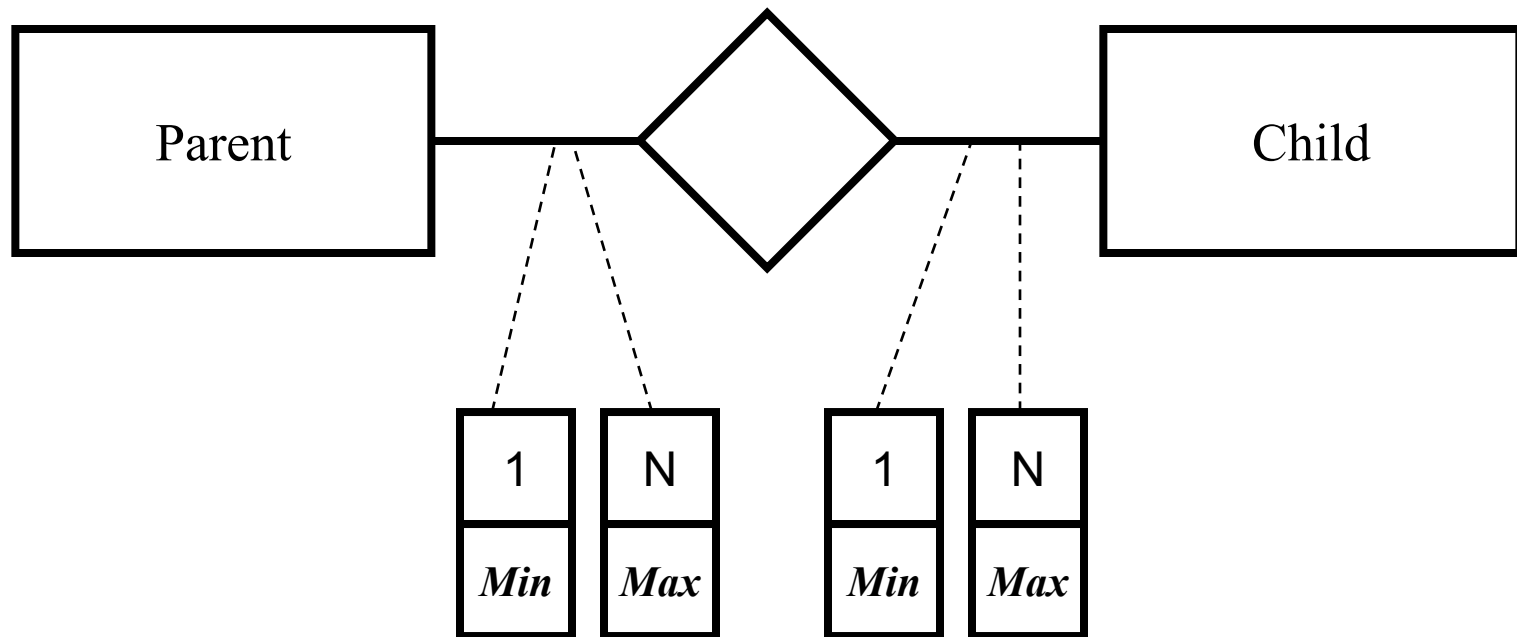




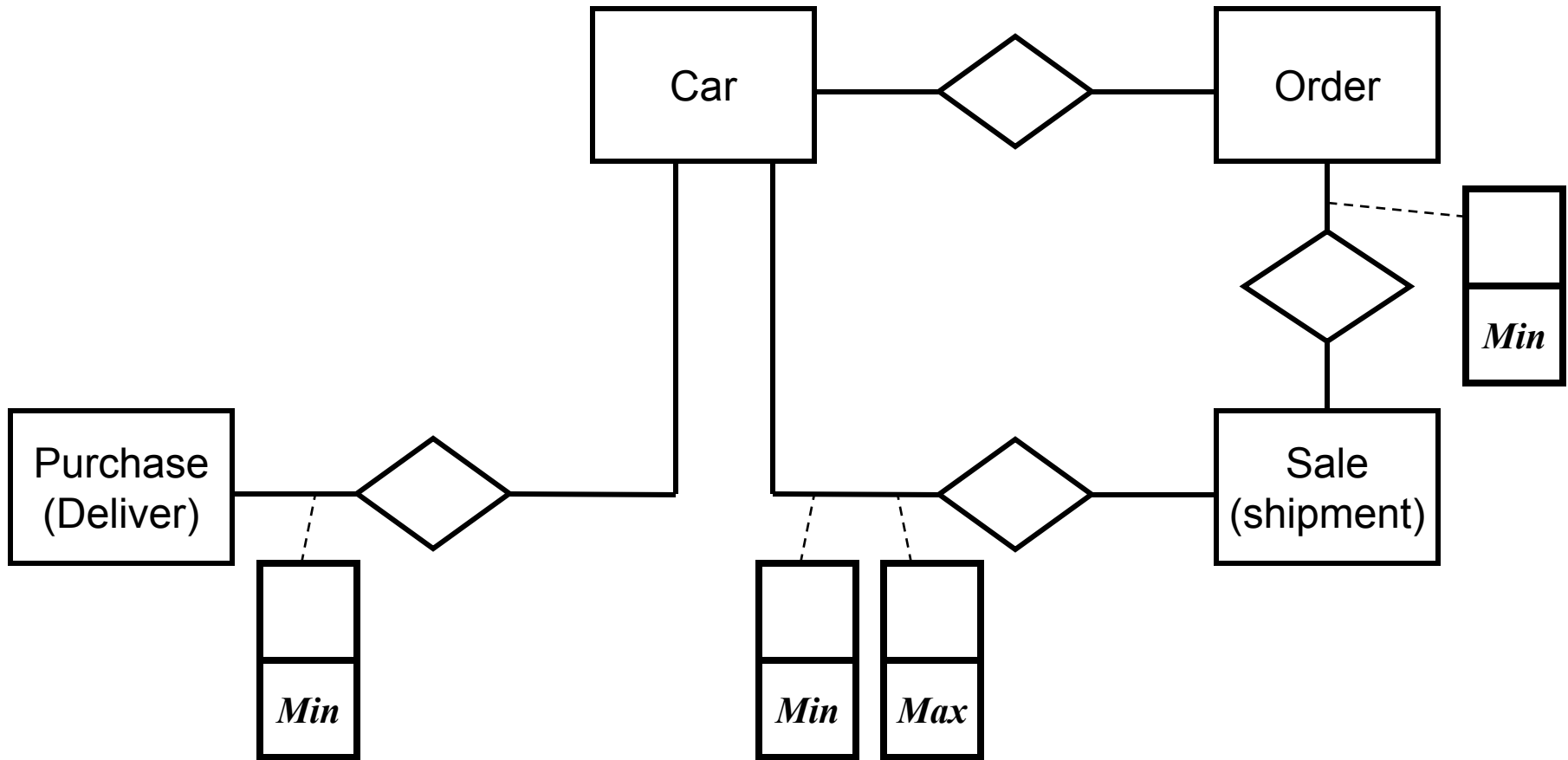
1. Being a parent implies that you have one or more children.
2. All children have 2 parents.



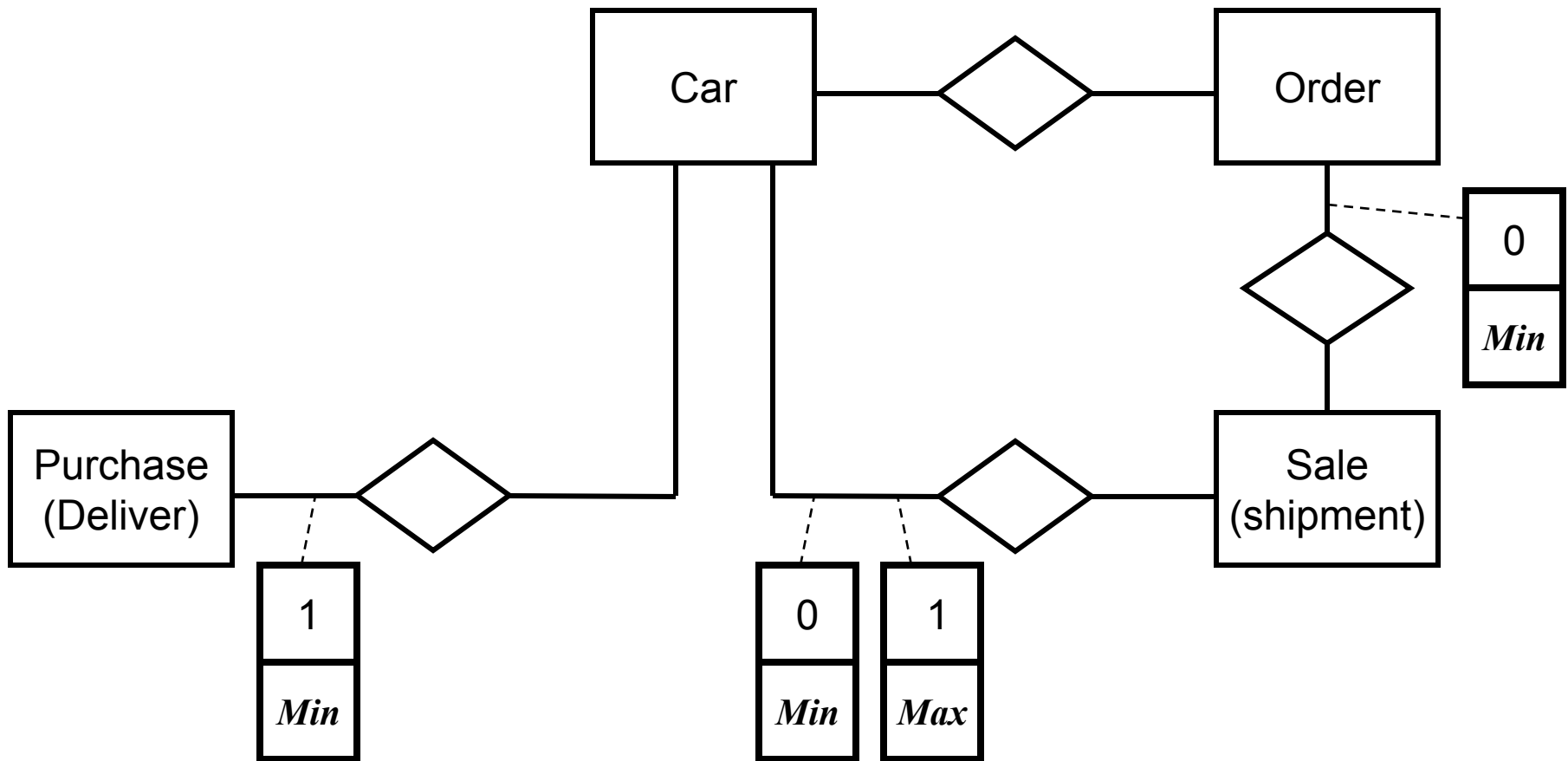
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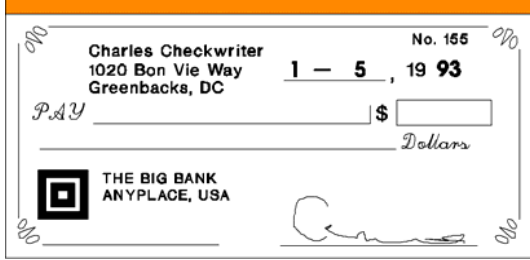
1. We always have open orders – i.e., orders that have not been fulfilled yet.
2. A car can only be sold once.
3. We have some cars in inventory – i.e., cars we have bought (purchased) but that have not been sold yet.
4. We buy cars exclusively – i.e., at least one car needs to be recorded for each purchase.



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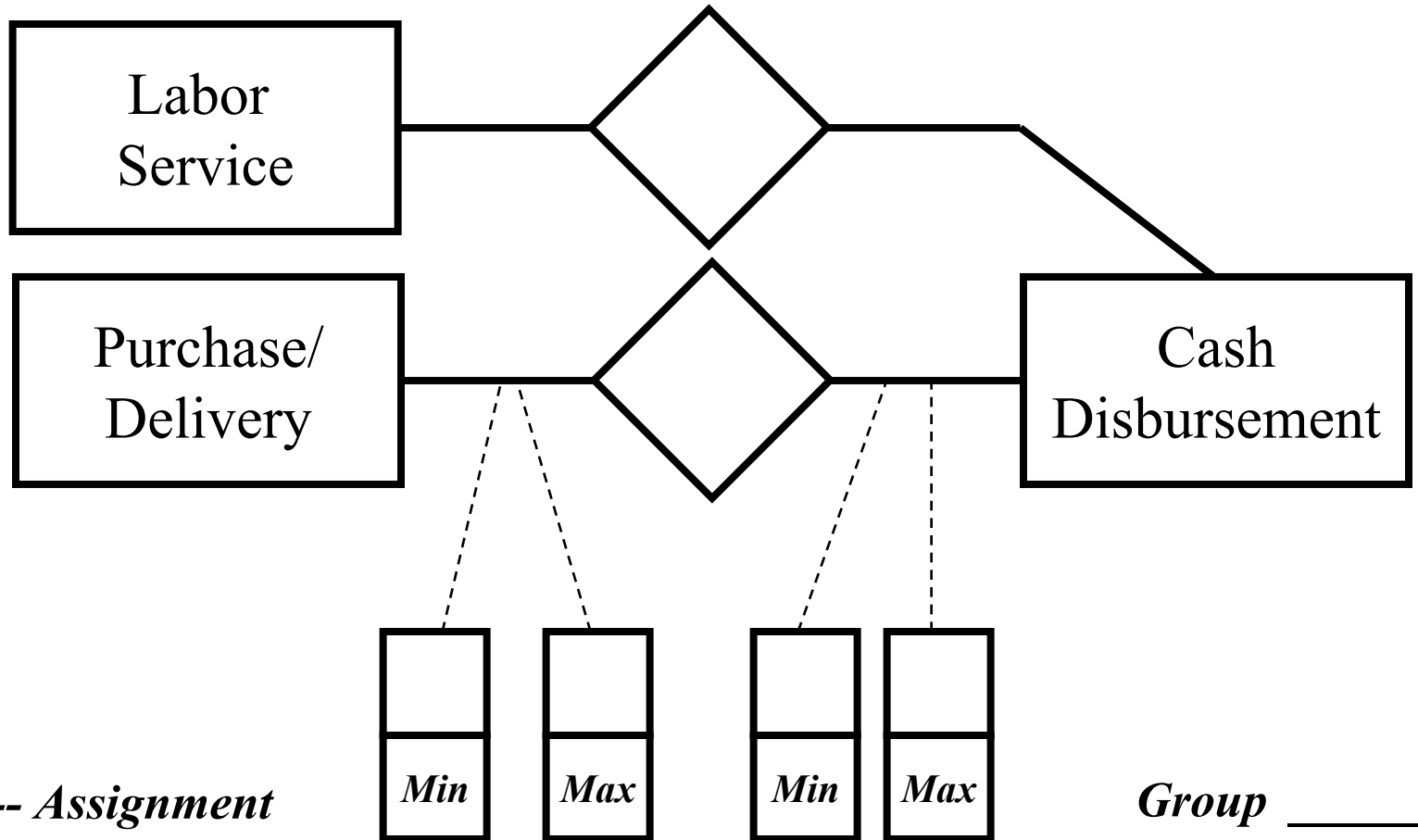


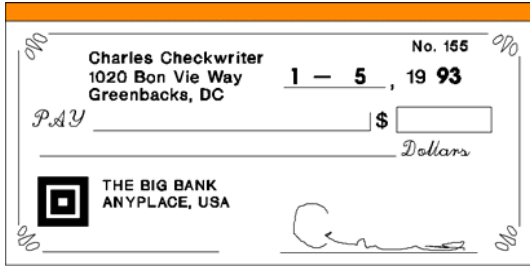
Problem #3 -- Solution



Here are our payment policies:

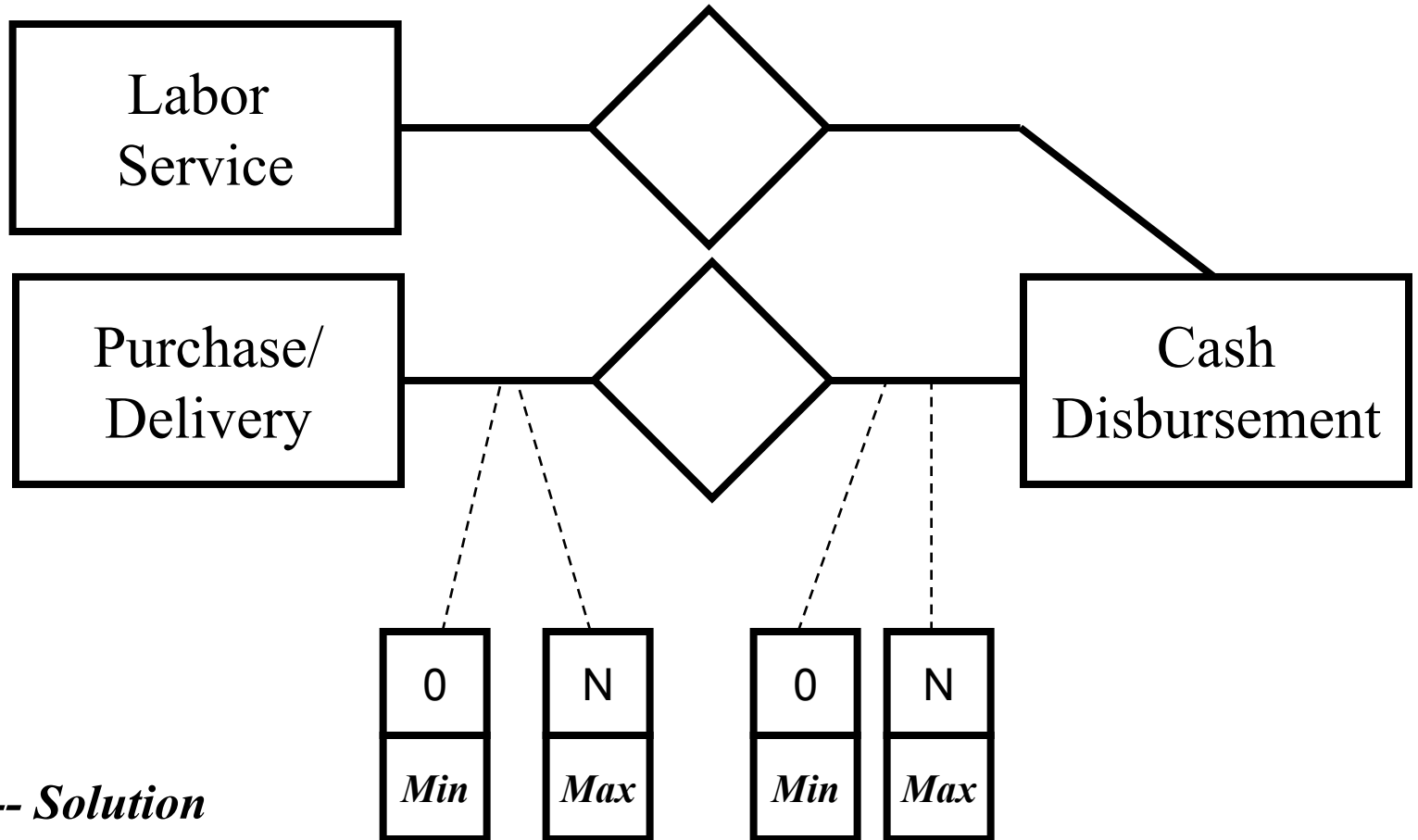
1. We usually pay our vendors no later than 60 days after delivery.
2. We often pay our vendors in installments.
3. Some of our cash disbursements (checks) pay for deliveries (by vendors). Some of our cash disbursements (checks) pay for labor services (by employees).
4. The same cash disbursement can pay for multiple deliveries.

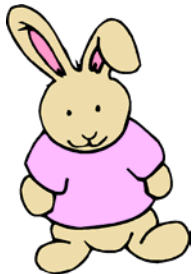




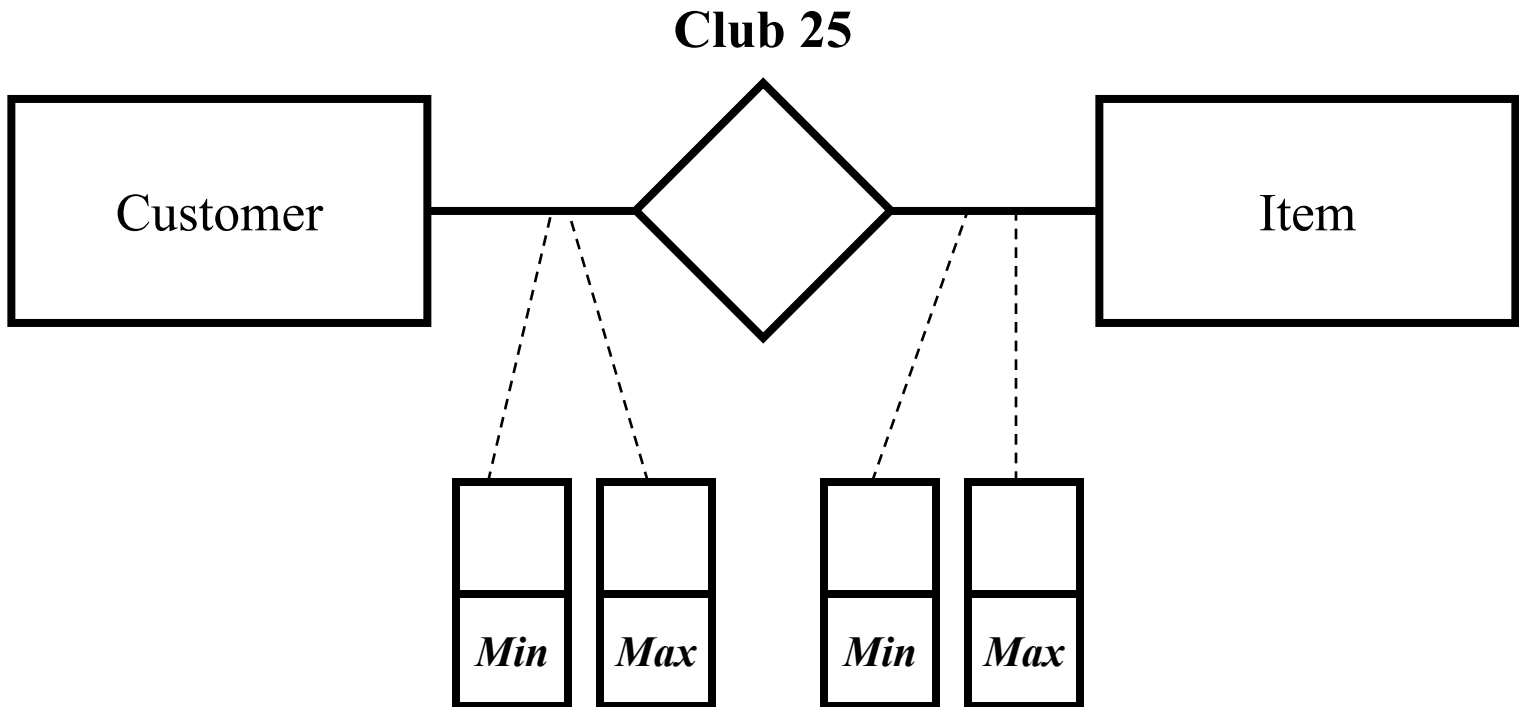
Here are our payment policies:

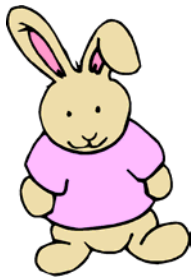
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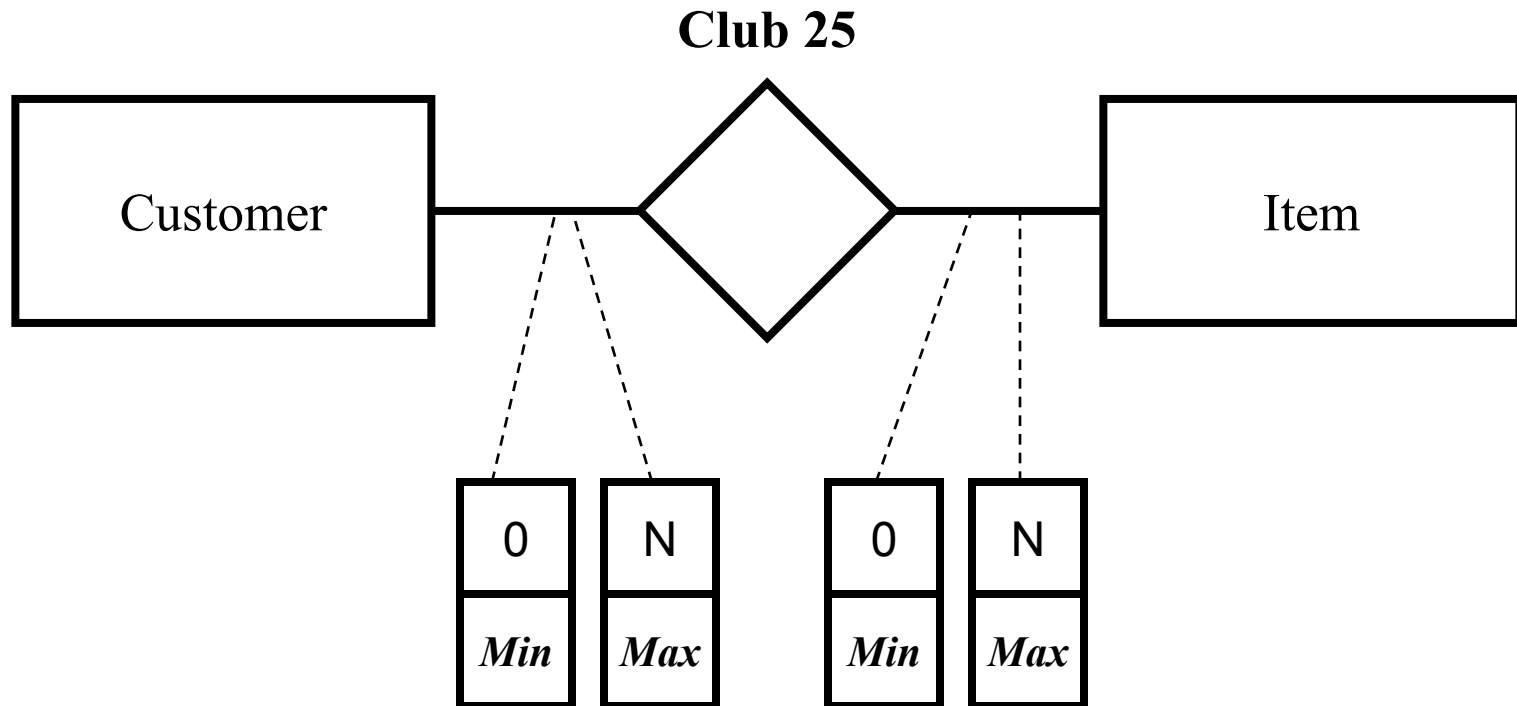


Monica owes a store that sells stuffed animals. She records all her customers and items (stuffed animals) in a database. She currently has more than 350 customers; all of them are recorded in the database. She currently sells 486 different items; all of them are recorded in the database. Further, for her 25 most important customers (“Club 25”) she keeps a list of their 5 favorite items. She uses that information to send gifts (birthday, wedding, etc.). An item can be the favorite item for more than one “Club 25” member.



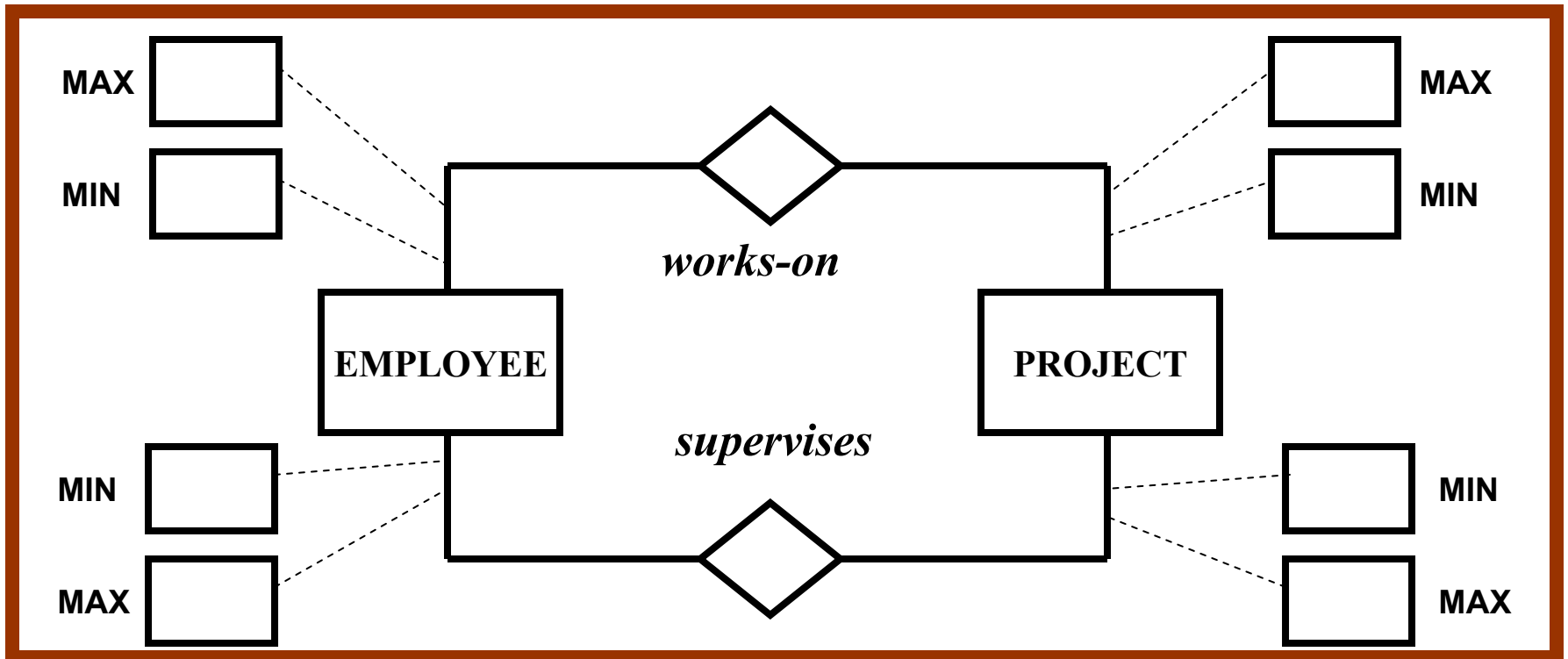


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Some employees supervise projects exclusively; i.e. they don't work on any project. Most of our employees do not supervise projects; i.e. they only work on projects. John, one of our employees, currently works on five different projects. Suzy, one of our employees, currently supervises two different projects. A project is supervised by one employee. We currently have more than twenty employees working on one of our projects. We always assign the supervisor first. So it is possible to record a project's supervisor in the database without knowing who (employees) is going to work on the project. It is impossible to record a project into our database without recording a supervisor at the same time; i.e., a project must have a supervisor.

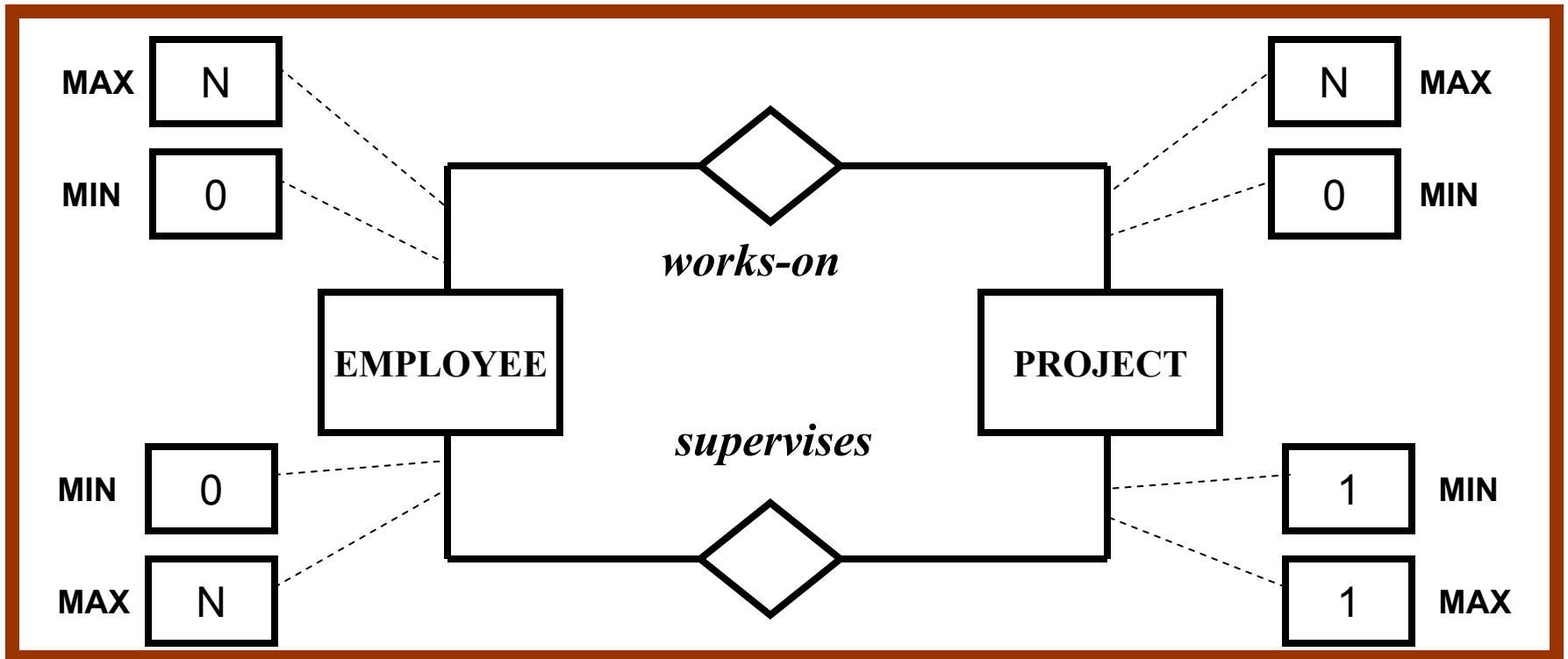


Define the cardinalities

Group _____



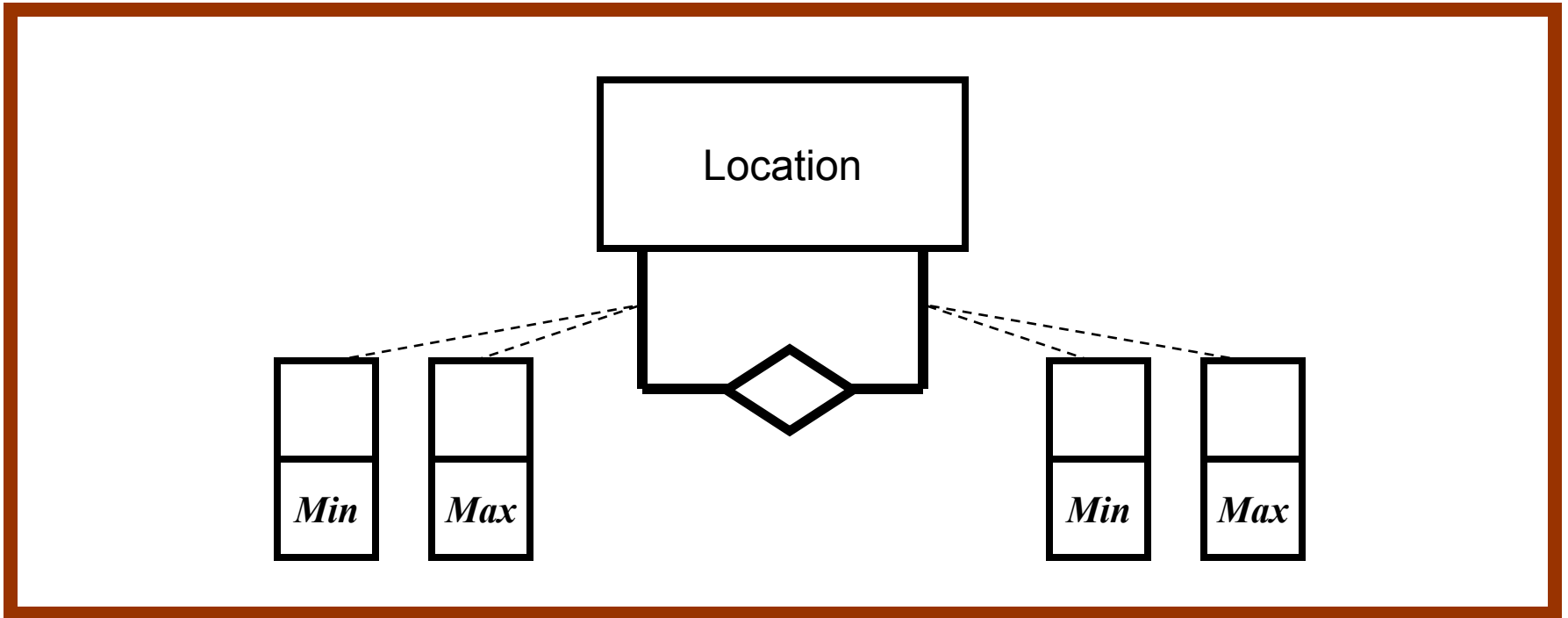
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Define the cardinalities

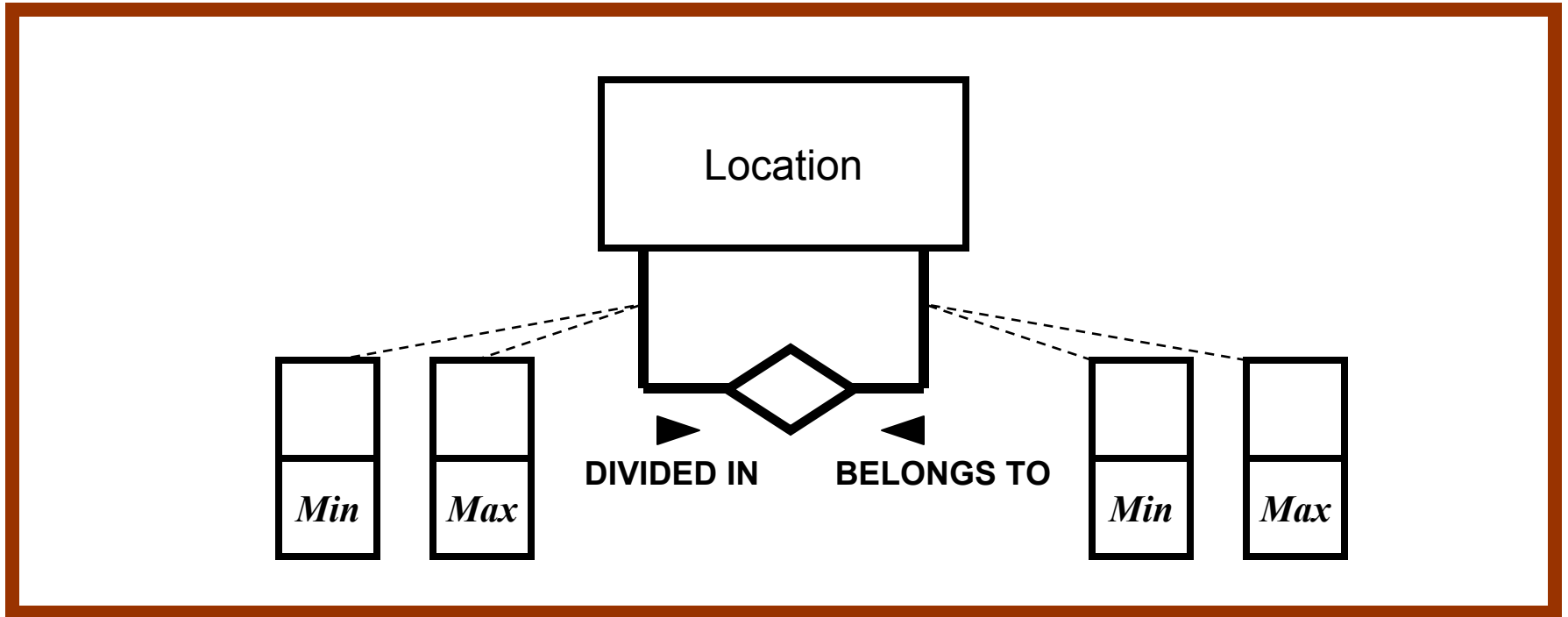


Some of our locations, such as our warehouses, are further divided. For example, a warehouse is divided in areas, and each area is then further divided into bins. One of our warehouses is divided into twenty areas. Bins are never further divided. A location belongs to at most one other location. Obviously, warehouses do not belong to any other location. Warehouse, area, and bin are all instances of location.





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