

**TECH  
VAULT**

# E-R DIAGRAMS

## RELATIONSHIPS

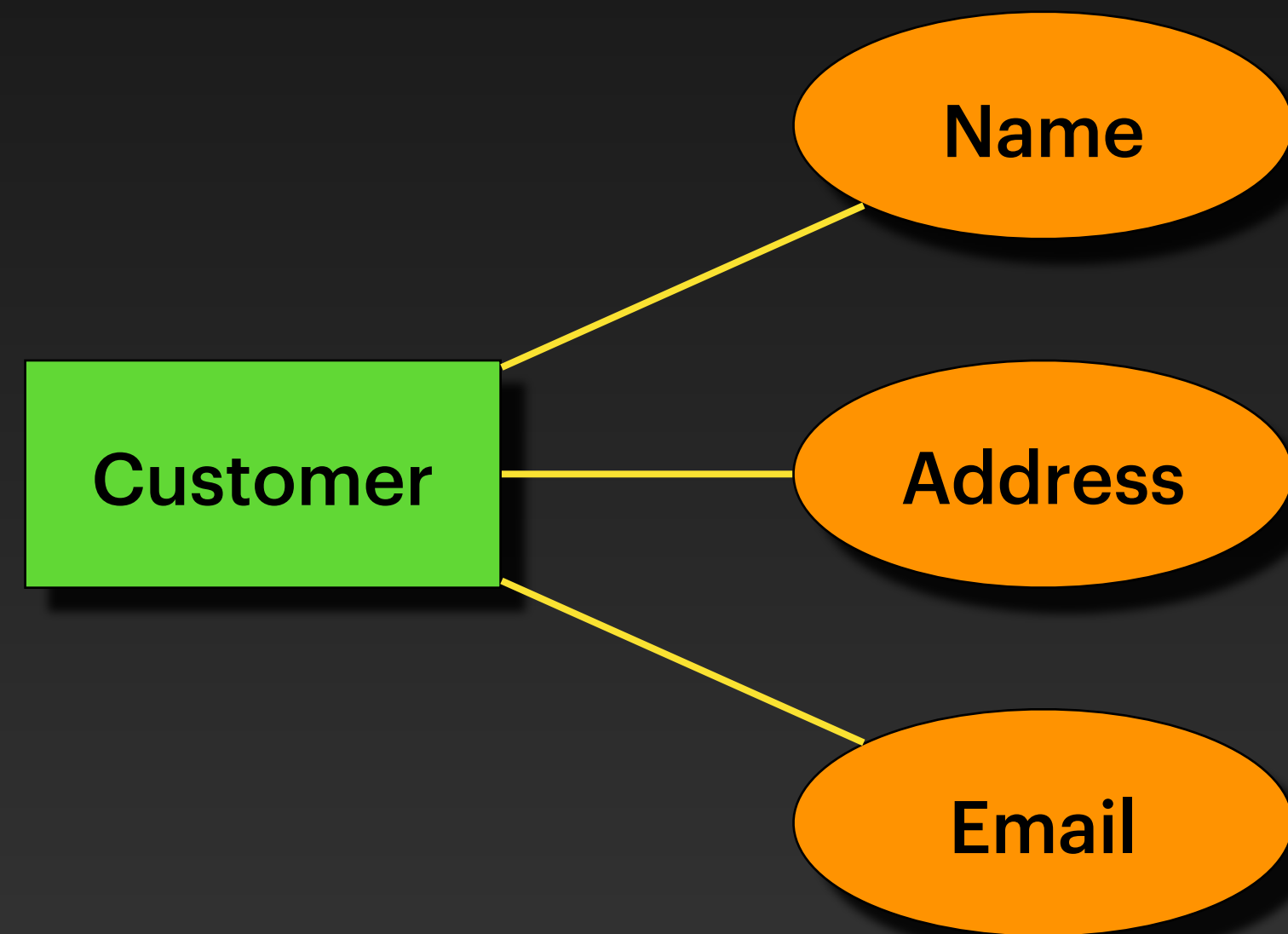
AMR ELHELW



# Entities and Attributes

Entity

Attributes

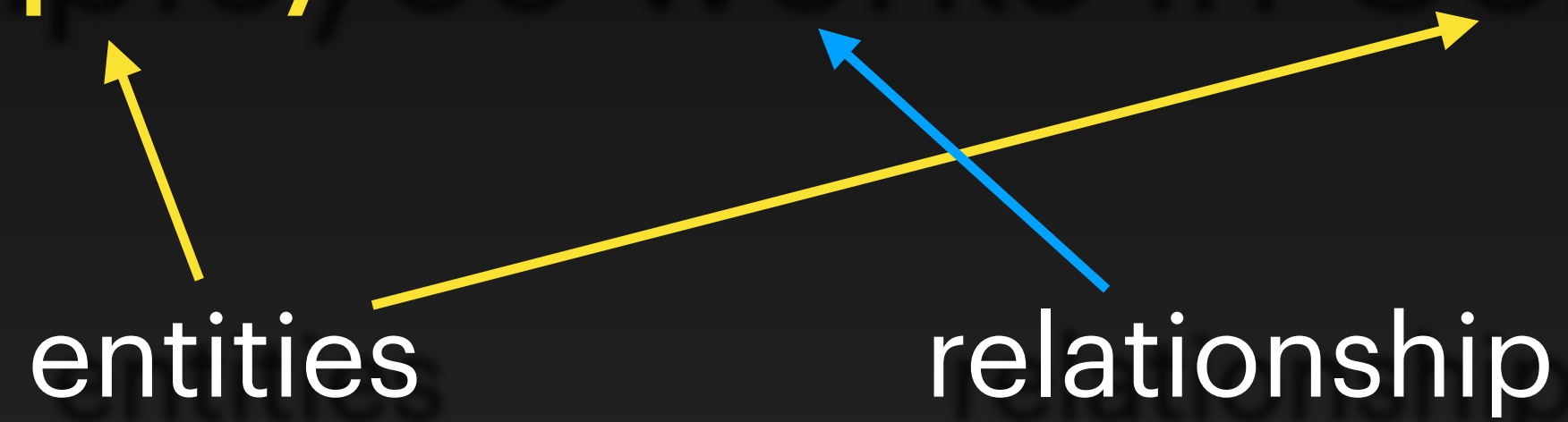




# Relationships

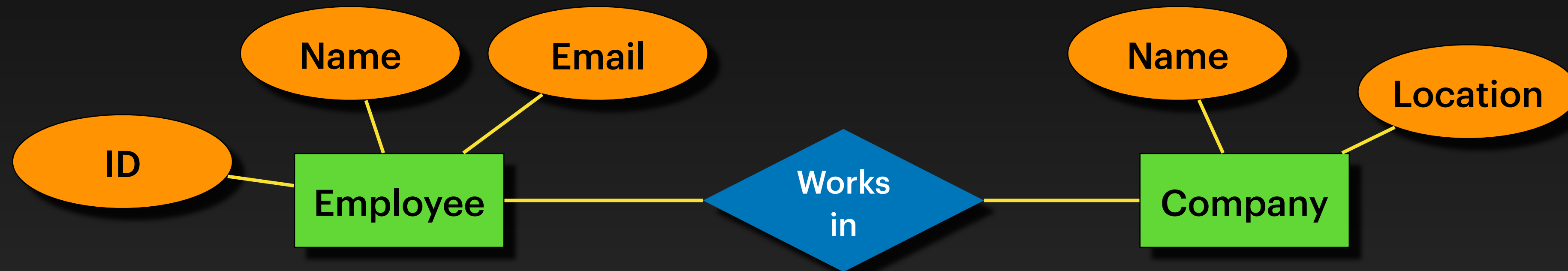
- A connection (link) between entities

- Employee works in Company

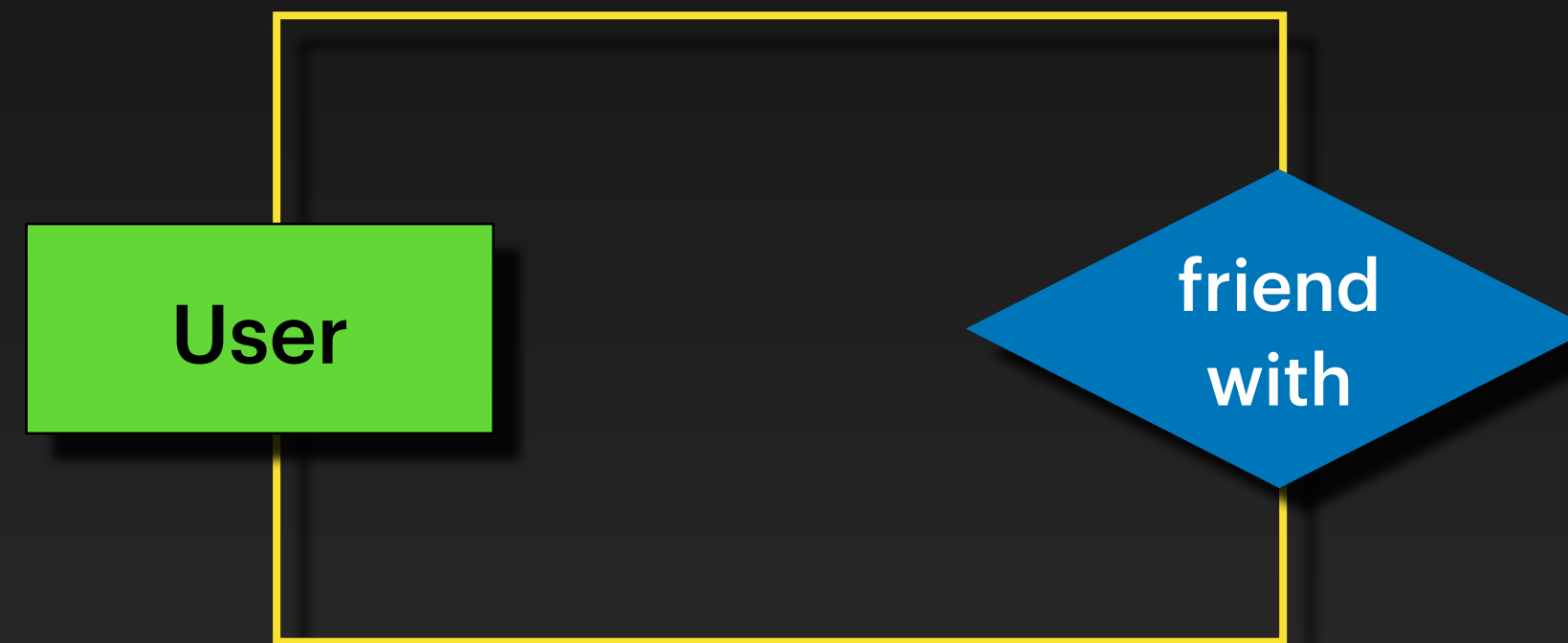


- Student studies Course

# Relationships



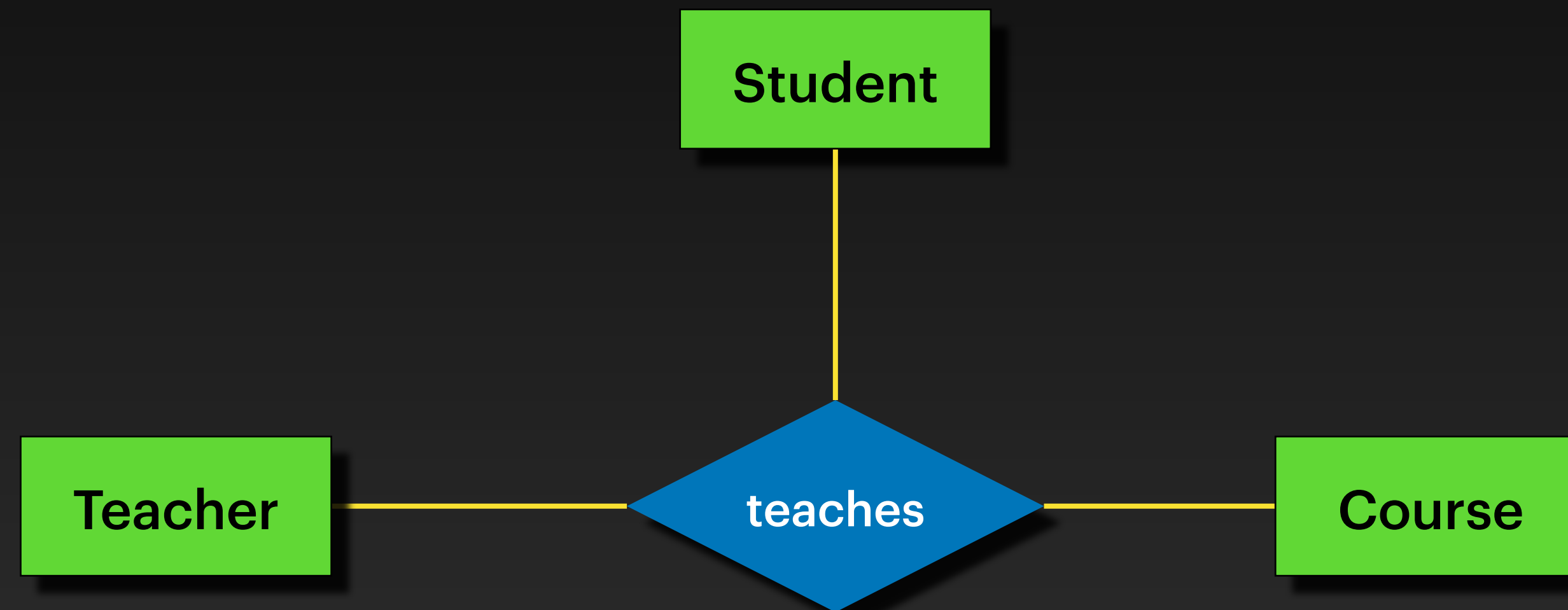
# Unary Relationship (Degree = 1)

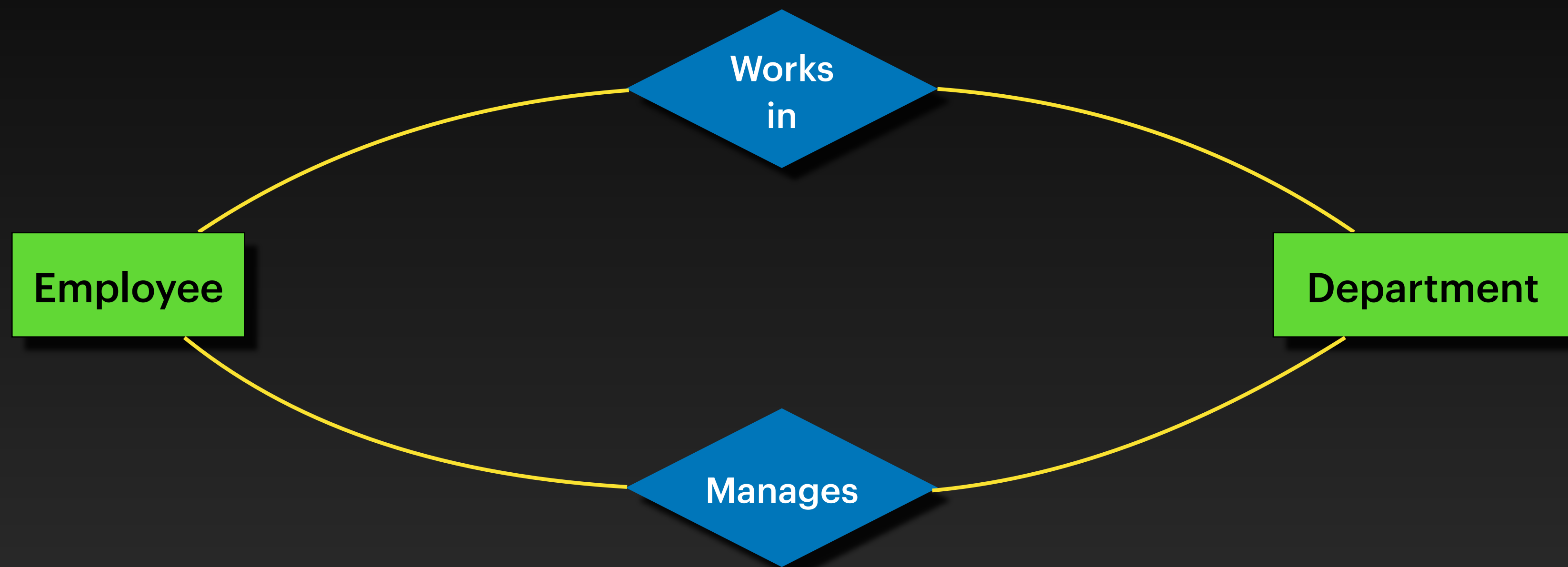


## Binary Relationship (Degree = 2)



# Ternary Relationship (Degree = 3)







# Cardinality Ratio

- Maximum no. of entity instances connected by the relationship
  - Either **one** or **many**
- Possibilities (for **binary** relationships)
  - **1:1** (one-to-one)
  - **1:N** (one-to-many)
  - **N:1** (many-to-one)
  - **M:N** (many-to-many)

# 1:1 Relationship



# N:1 Relationship



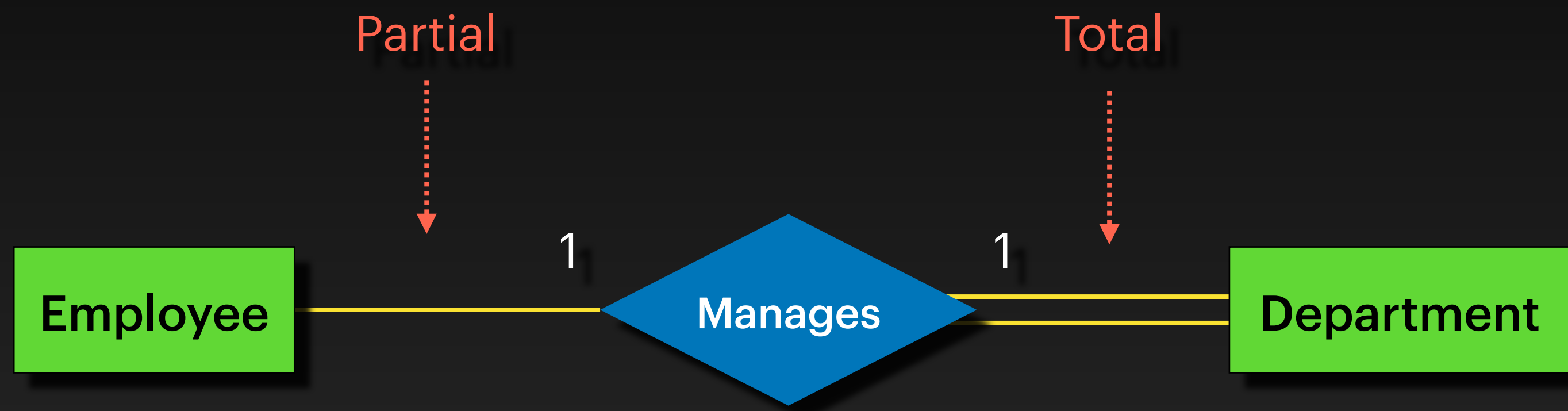
# M:N Relationship

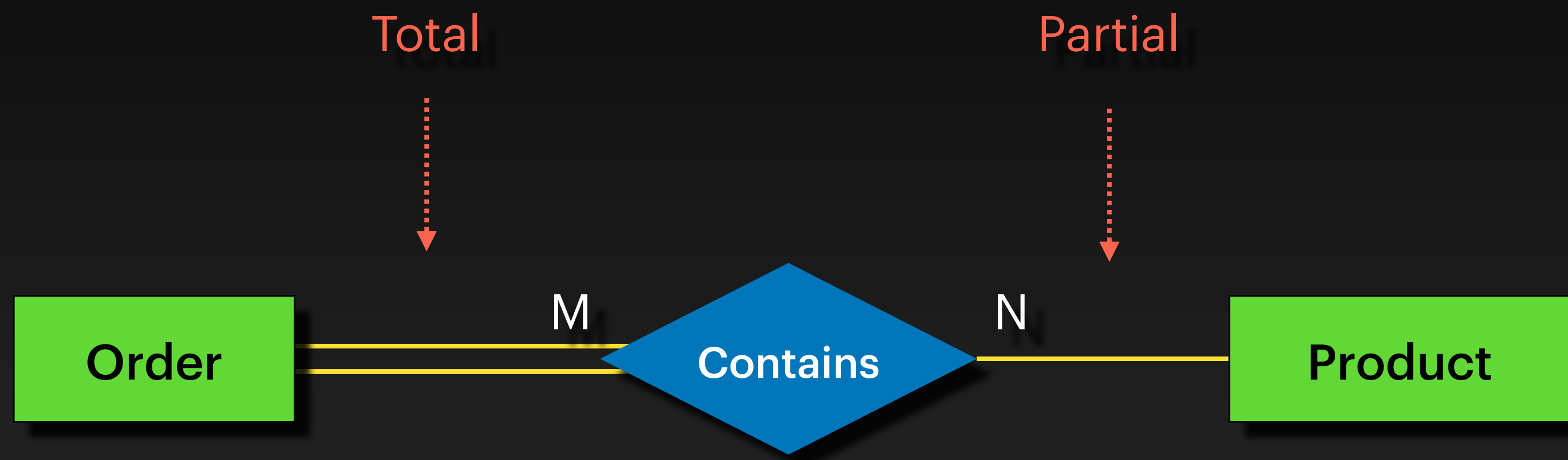


# Participation

- Describes how an entity participates in a relationship
  - **Total** or **Partial** participation
- OR: Does every entity instance have to participate?
  - **Total** Participation = **Mandatory**
  - **Partial** Participation = **Optional**







# Cardinality & Participation

- Cardinality —> Maximum (1 or many)
- Participation —> Minimum (0 or 1)

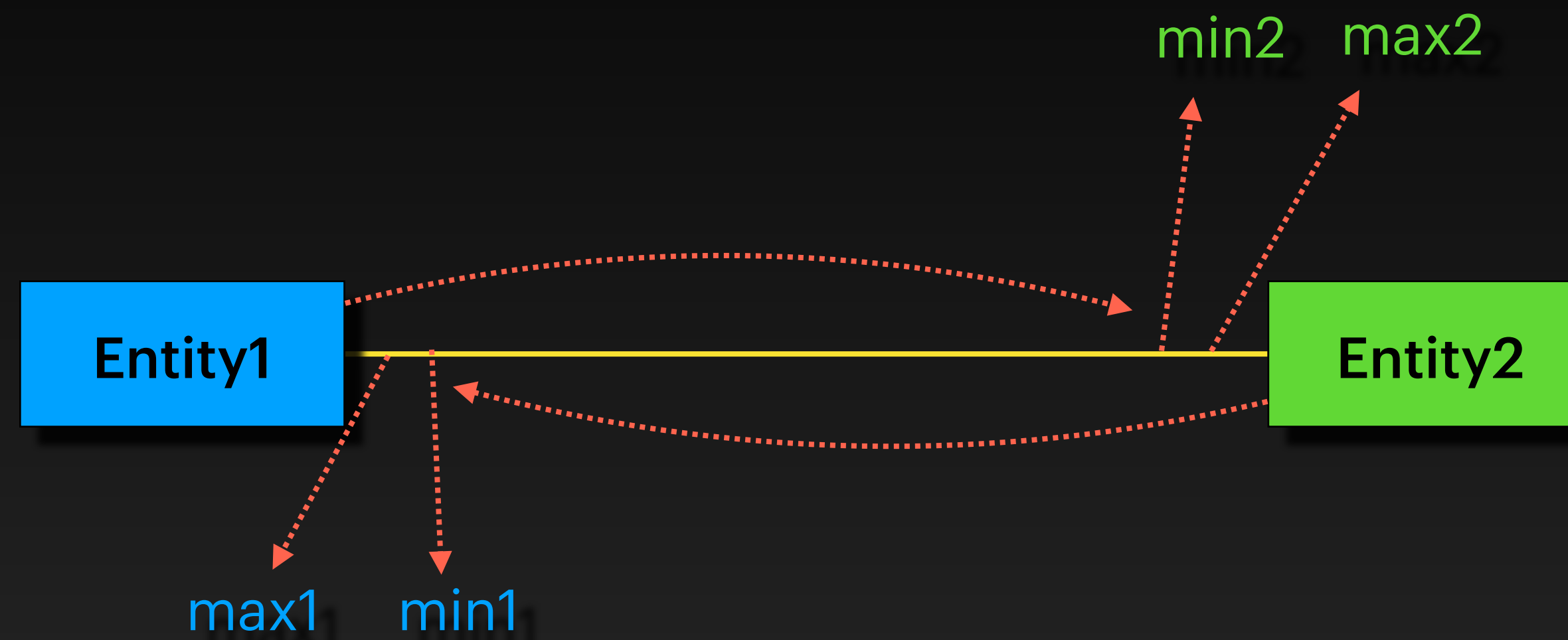
Employee works in: at least 1 department, at most 1 department

Department has: at least 1 employee, at most N employees



Each Entity1 is connected to (min2.. max2) Entity2

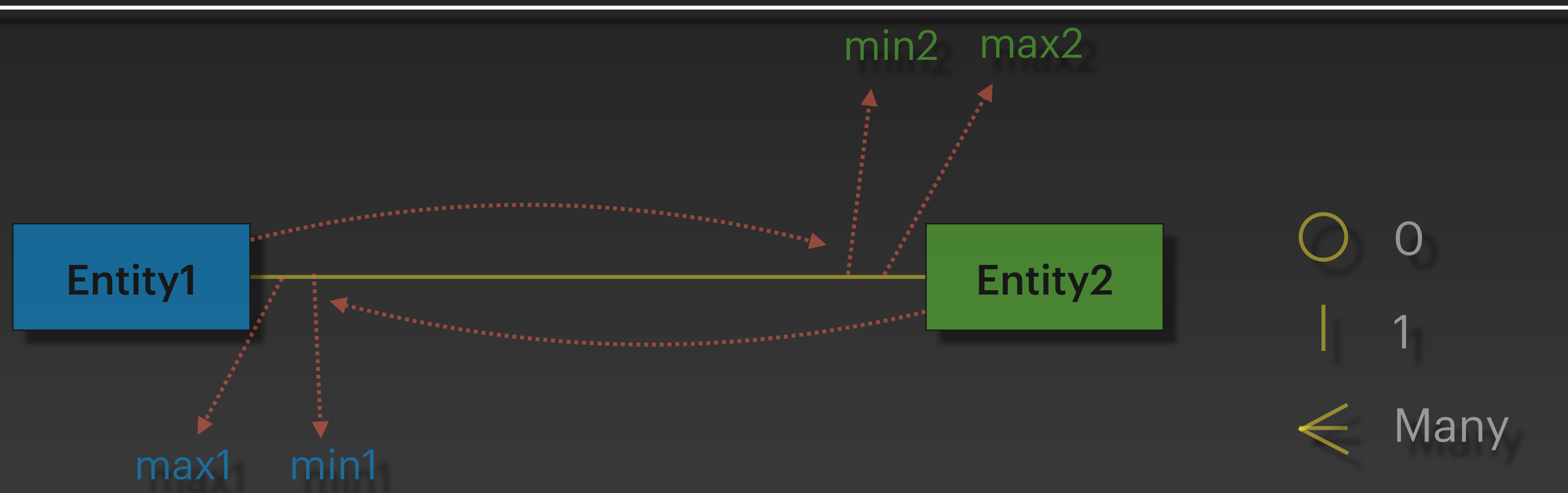
Each Entity2 is connected to (min1.. max1) Entity1





Employee works in: at least 1 department, at most 1 department

Department has: at least 1 employee, at most N employees



An order contains (1.. N) products

A product appears in (0.. M) orders

