

# Administrative notes

## September 11/12, 2024 – CPSC 304

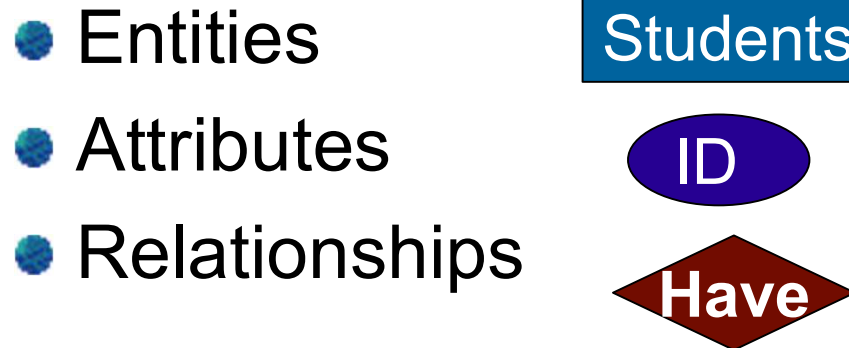
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- Reminder: do your syllabus quiz (due Sep 20)
- Reminder: tutorials start week of the 16th
- Reminder: first “in class” exercise today – due 10pm on the 18th (Later date than usual due to drop/add)
- Start thinking about projects
  - There’s a FAQ in the Project Description in the project module on Canvas
  - The Group Sign Up survey in Milestone 0 is up till Sept 20th

# Now where were we...

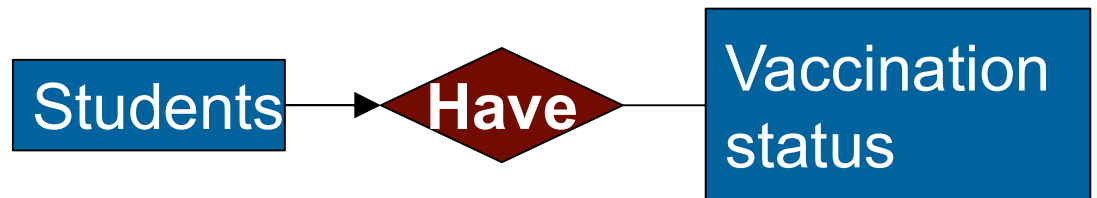
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- We'd just covered most of the basics of ER diagrams:



We'd covered

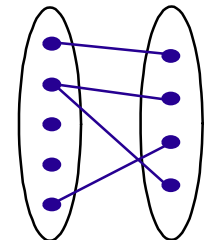
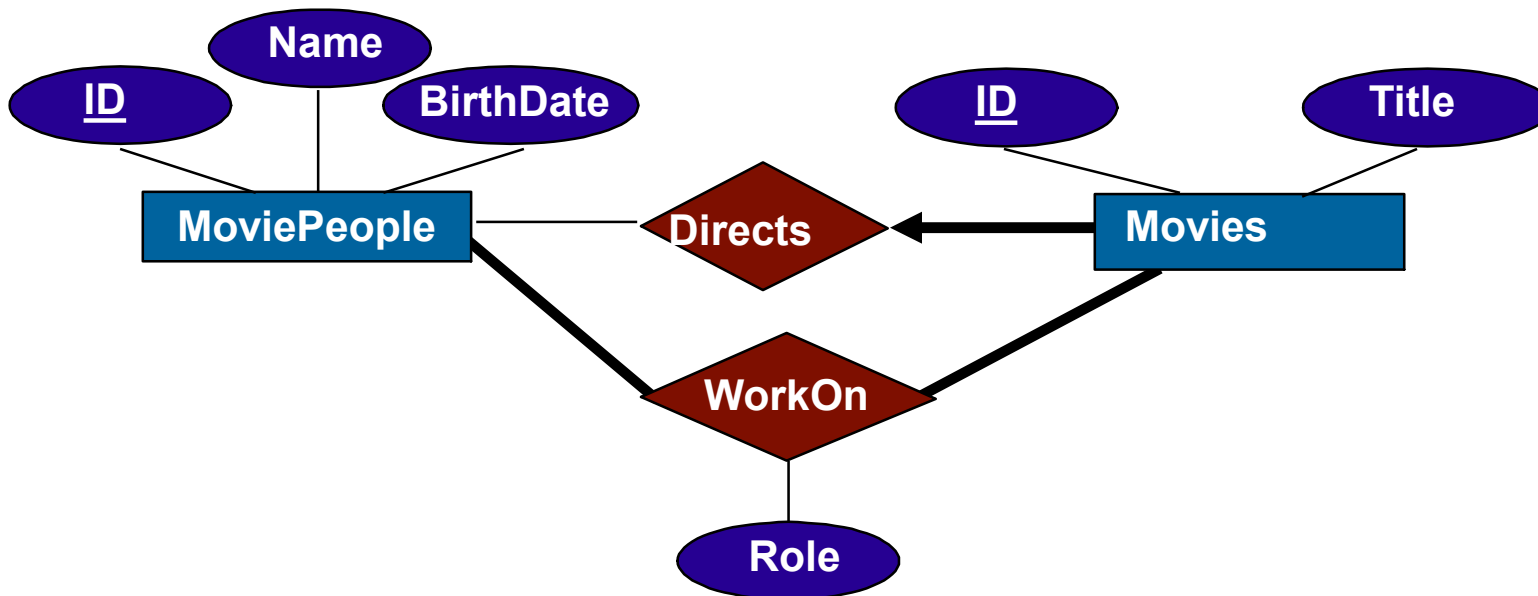
- Key constraints



(think of these as “at most one”)

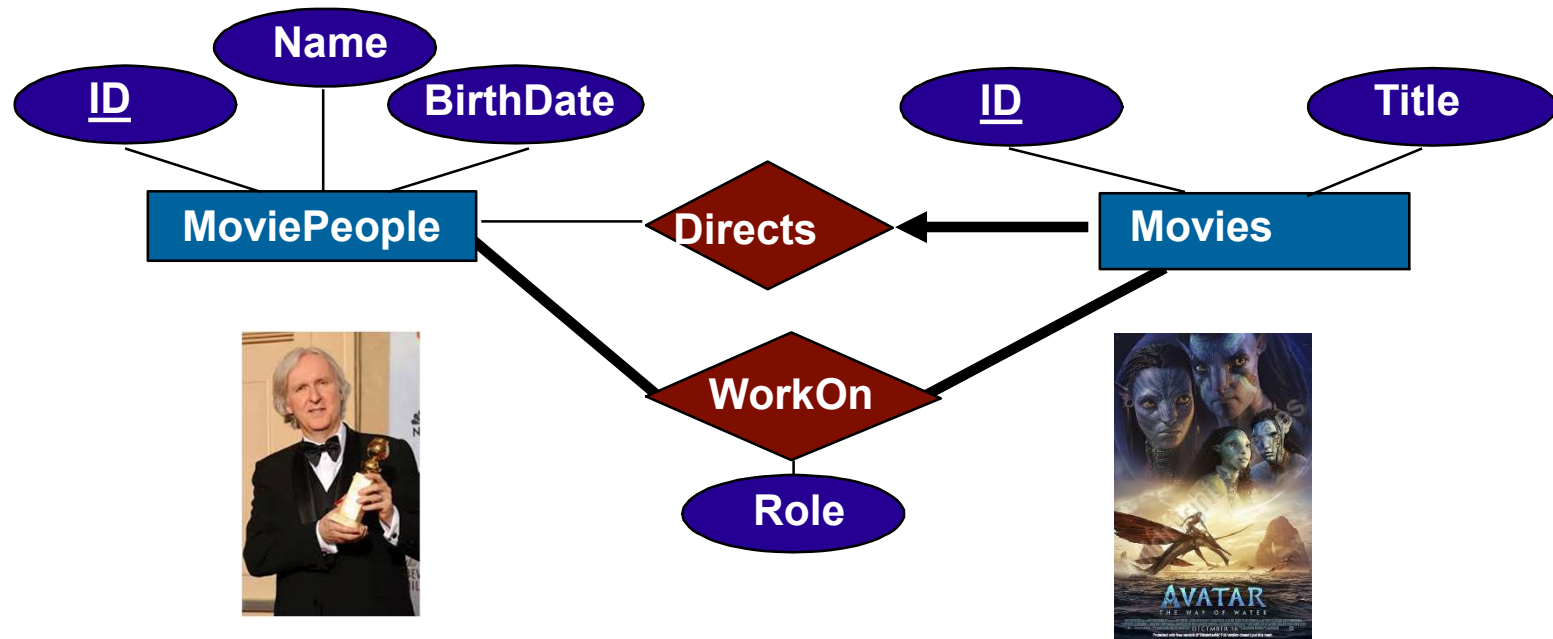
# Participation Constraints

- Participation : Indicates if all entities participate in the relationship.
- An entity's participation can be **total** or **partial**.
- Requiring total participation is a **participation constraint** and it is shown with a thick line
  - Important on deletions
  - i.e., participation of Movie in Directs is total (thick line)
    - Every movie must appear in some relationship in the Directs set



**Remember?**

# Why are participation constraints important



Would I be able to delete James Cameron without deleting Avatar2?

A. Yes B. No C. It depends

Would I be able to delete Avatar 2 without deleting James

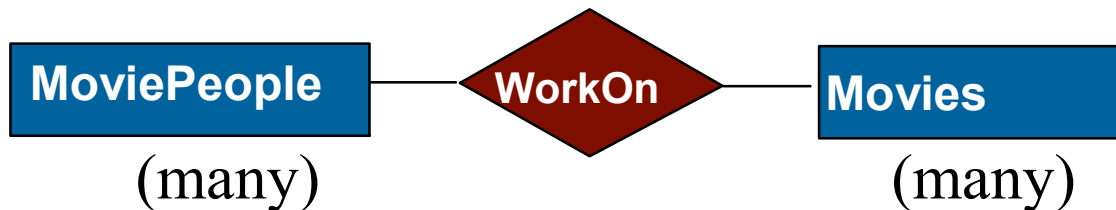
Cameron? A. Yes B. No C. It depends

Look at the “work on” relationship constraints!

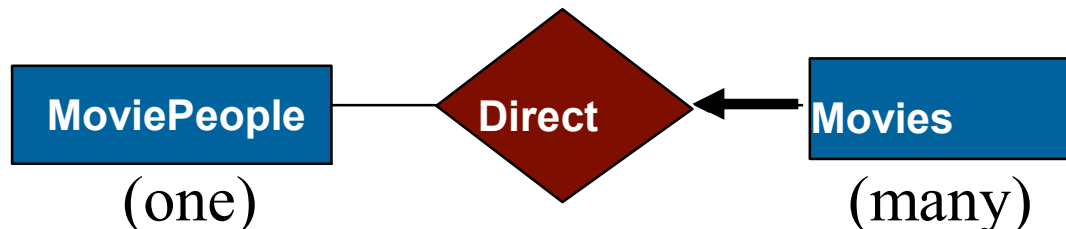
# Line types summarized

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- Plain lines mean many to many:

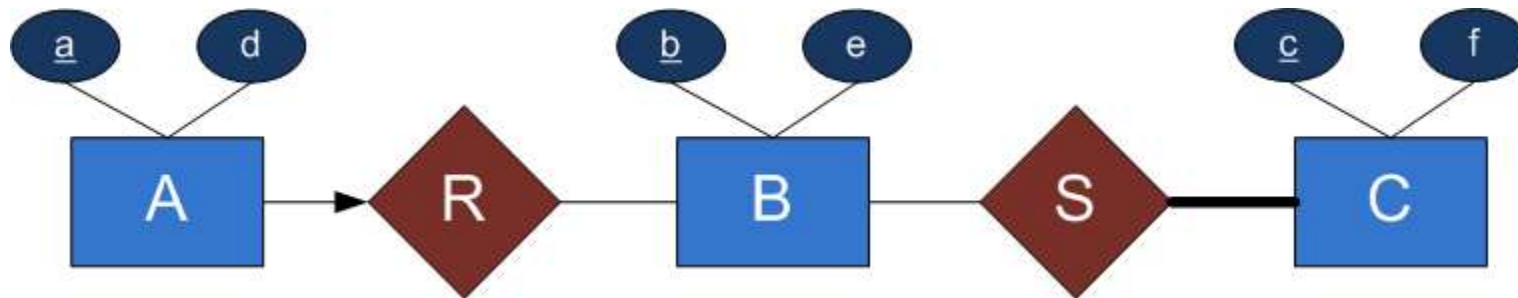


- Arrows mean the other side has a cardinality of one (at MOST one)



- A thick line requires total participation (at LEAST one) and can be added to any line, arrow or not

# Clicker Exercise



Suppose that a1 and a2 are the only entities of A, b1 and b2 are the only entities of B, and c1 and c2 are the only entities of C.

Which of the following relationship sets for R and S are possible according to the diagram, where  $T = \{(e1, f1)\}$  means a relationship between e1 and f1 exists in relationship set T

A.  $R = \{\}; S = \{\}$

B.  $R = \{(a1, b1)\}, S = \{(b2, c2)\}$

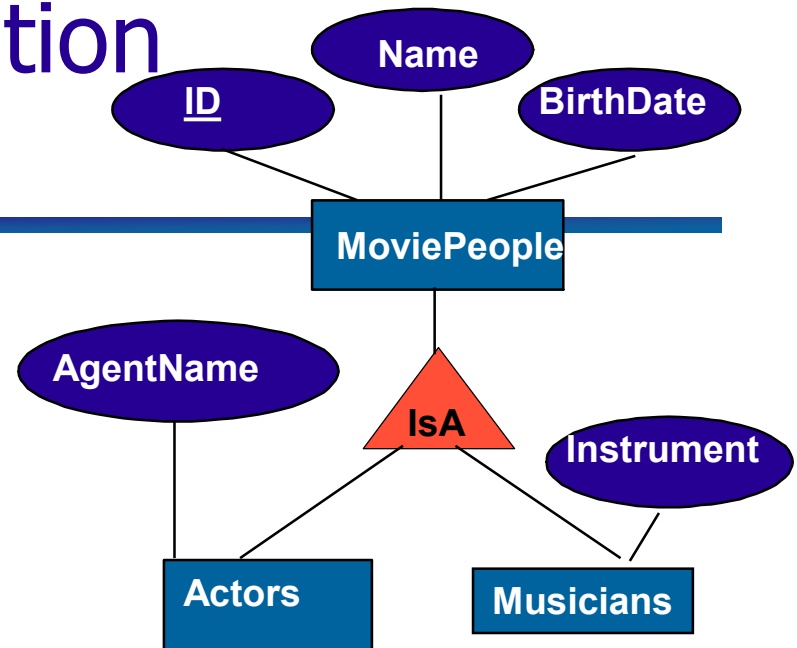
C.  $R = \{(a1, b1), (a1, b2)\}, S = \{(b1, c1), (b2, c2)\}$

D.  $R = \{(a1, b2)\}, S = \{(b1, c2), (b2, c1), (b1, c1)\}$

E. None of the above

# Generalization/Specialization (IsA relationships)

- As in Java, or other PLs, attributes can be inherited.
- If we declare A **IsA** B, every A entity is a B entity.
- Reasons for using IsA:
  - To add descriptive attributes specific to a subclass.
  - To restrict entities that participate in a relationship.



# There are some IsA constraints we can't express in ER diagrams

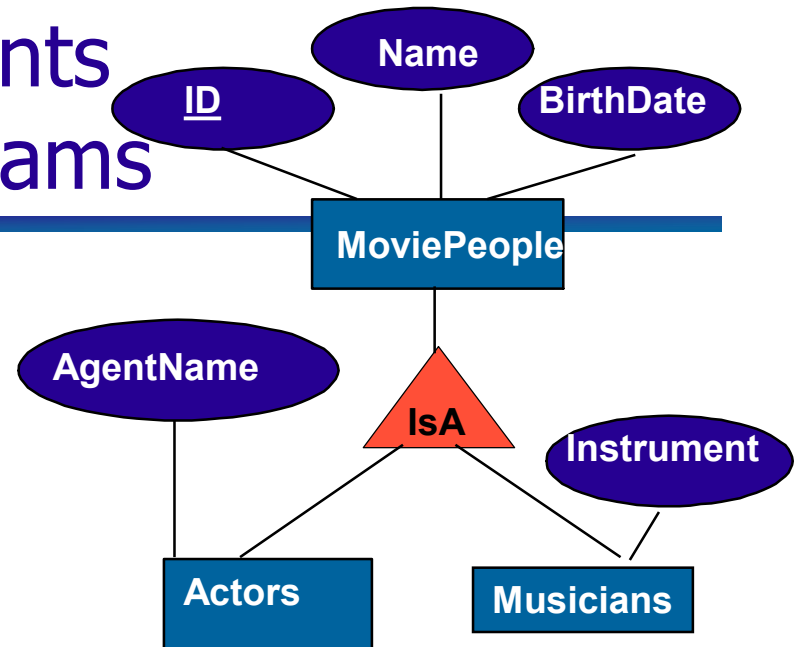
- **Overlap constraints :**

Specializations can be:

- **Disjoint :** a superclass entity belongs to no more than a single subclass
- **Overlapping :** subclasses may overlap

- **Covering constraints :** Specializations can be:

- **Total :** a superclass entity must belong to some subclass
- **Partial :** some superclass entity may not be in any subclass



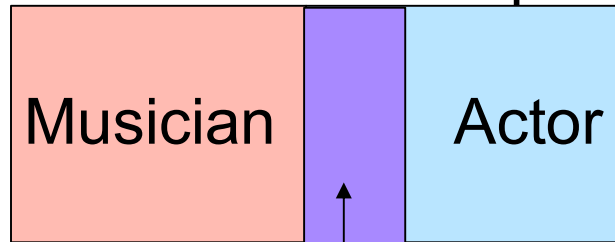
We can represent these constraints by just writing them in.



# IsA constraints Illustrated

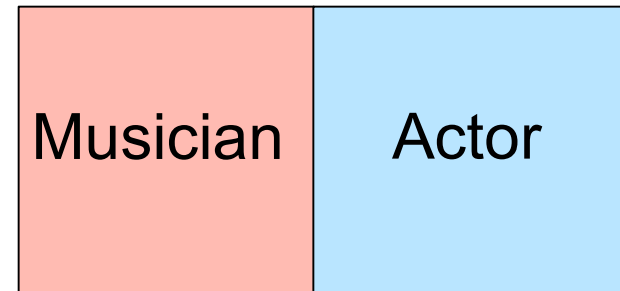
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Total + Overlap

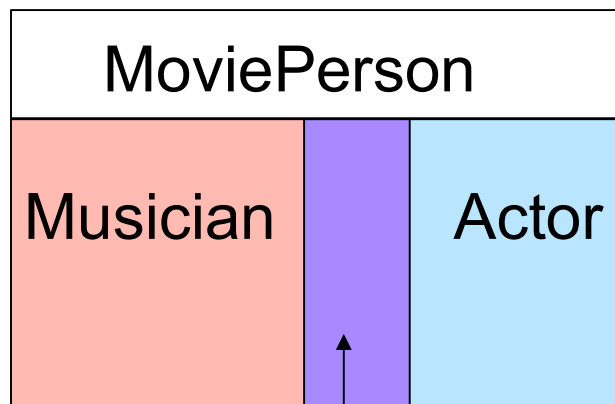


Actor & Musician

Total + Disjoint

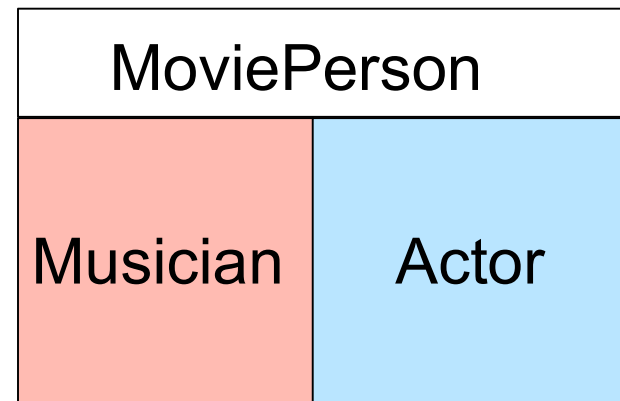


Partial + Overlap



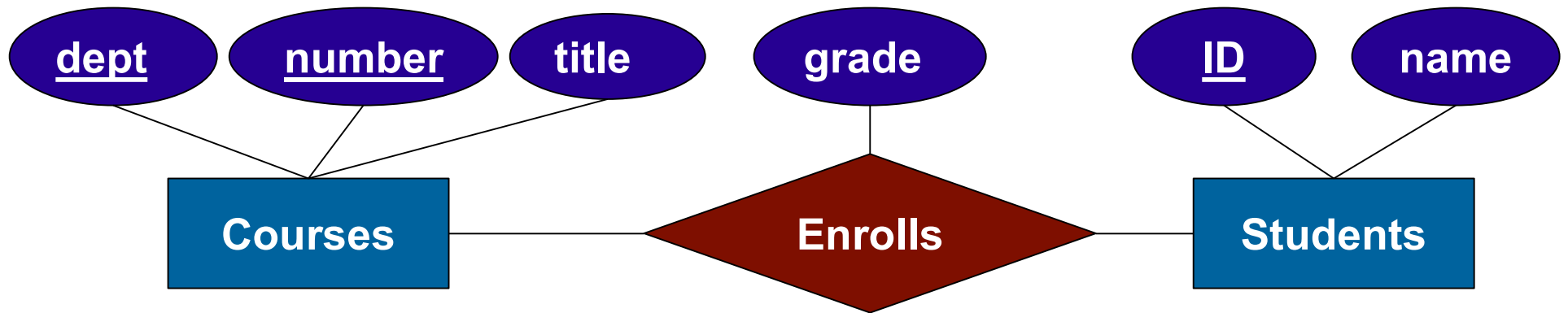
Actor & Musician

Partial + Disjoint



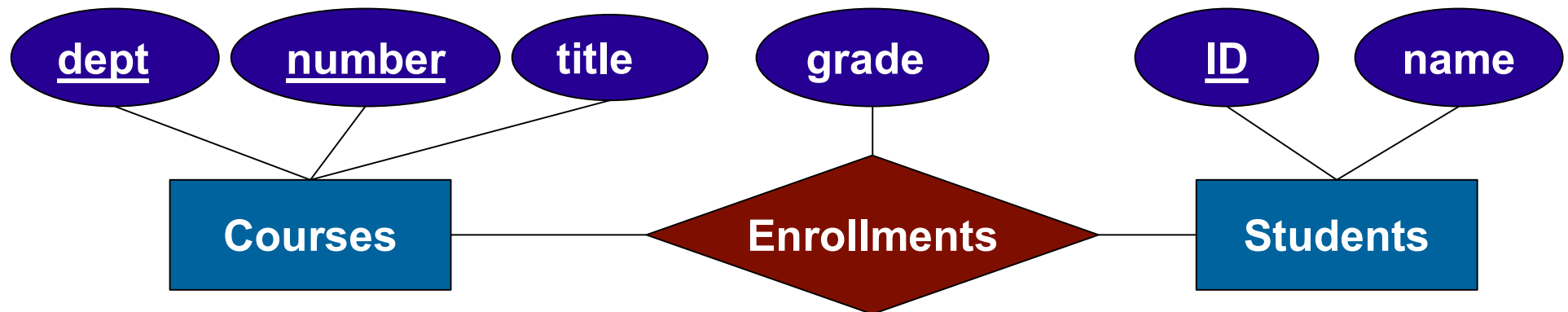
# Review Clicker

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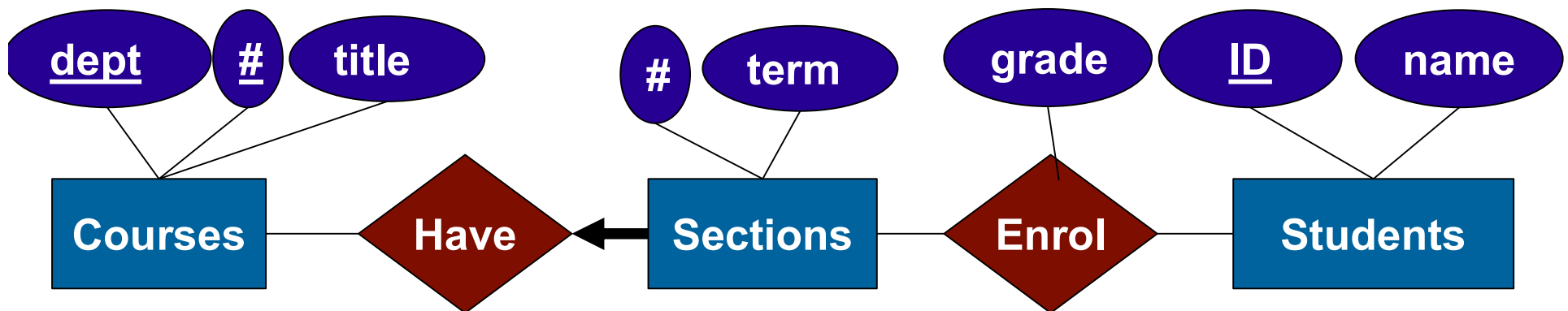


Can a student take a course twice? A. Yes B. No

# Can we improve the design?

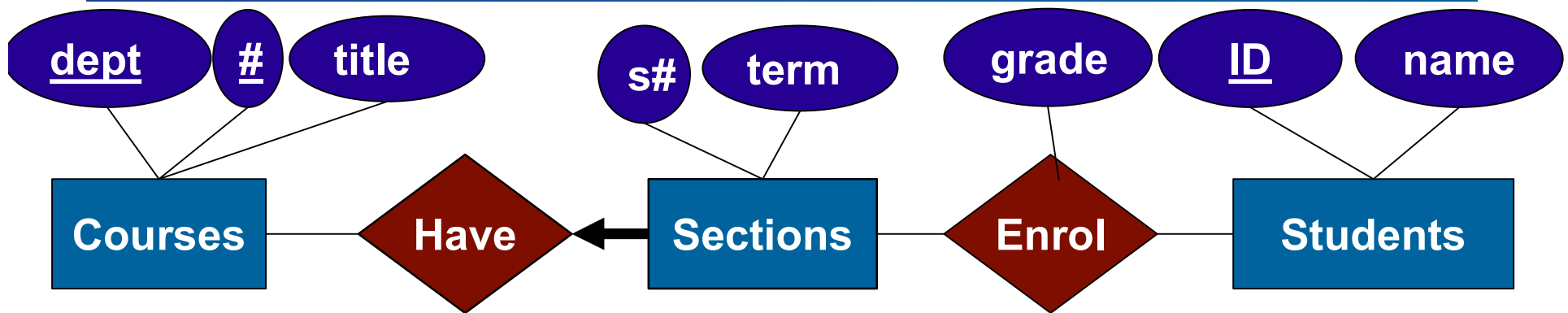


Here a student couldn't take a class more than once. What about:



But what should the key of Sections be?

A better solution would be if Sections could depend on Courses



The key has to be unique, right?

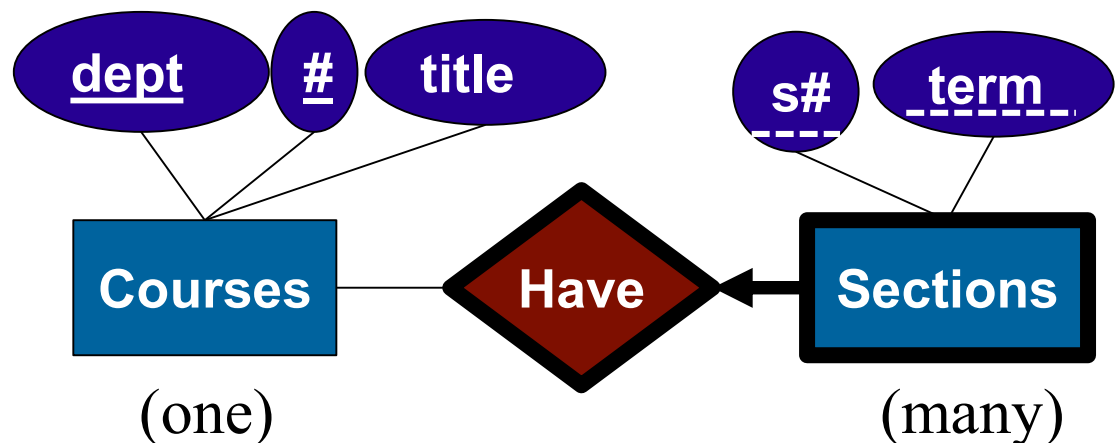
- Looking only at Sections (s# and term):  
101 2021W1 is not unique
- Looking at Courses + Sections (dept # s# term):  
CPSC 304 101 2021W1 is unique

We can do this with a *weak entity*

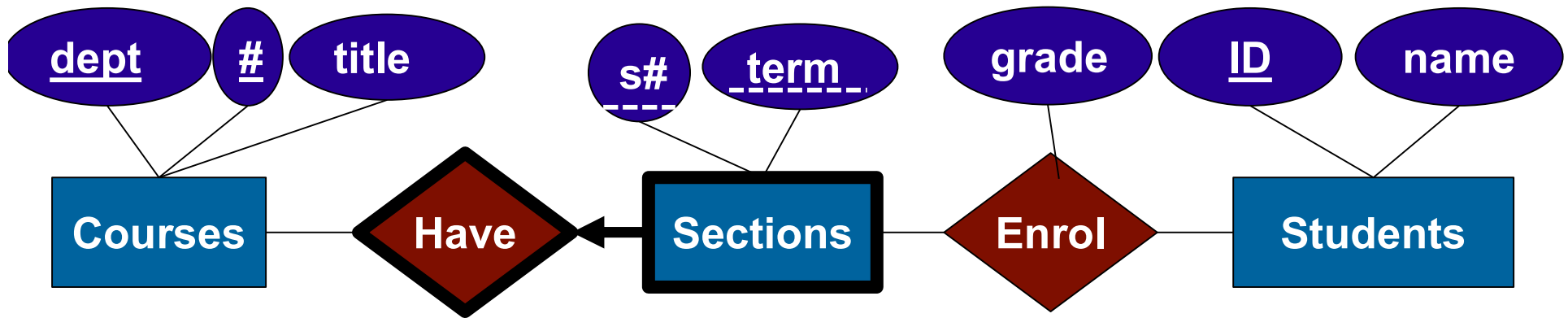
# Weak Entities



- A **weak entity** can be identified uniquely only by additionally considering the key of another (*owner*) entity.
  - Think of this as a “belongs to” relationship.
- Owner entity set and weak entity set must participate in a **one-to-many** relationship set (one owner, many weak entities).
- Weak entity set must have **total** participation in this identifying relationship set.
- Weak entity sets and their identifying relationship sets are shown with **thick** lines.



A better solution would be if Sections could depend on Courses



{dept, #, s#, term} is the **key** for Have.

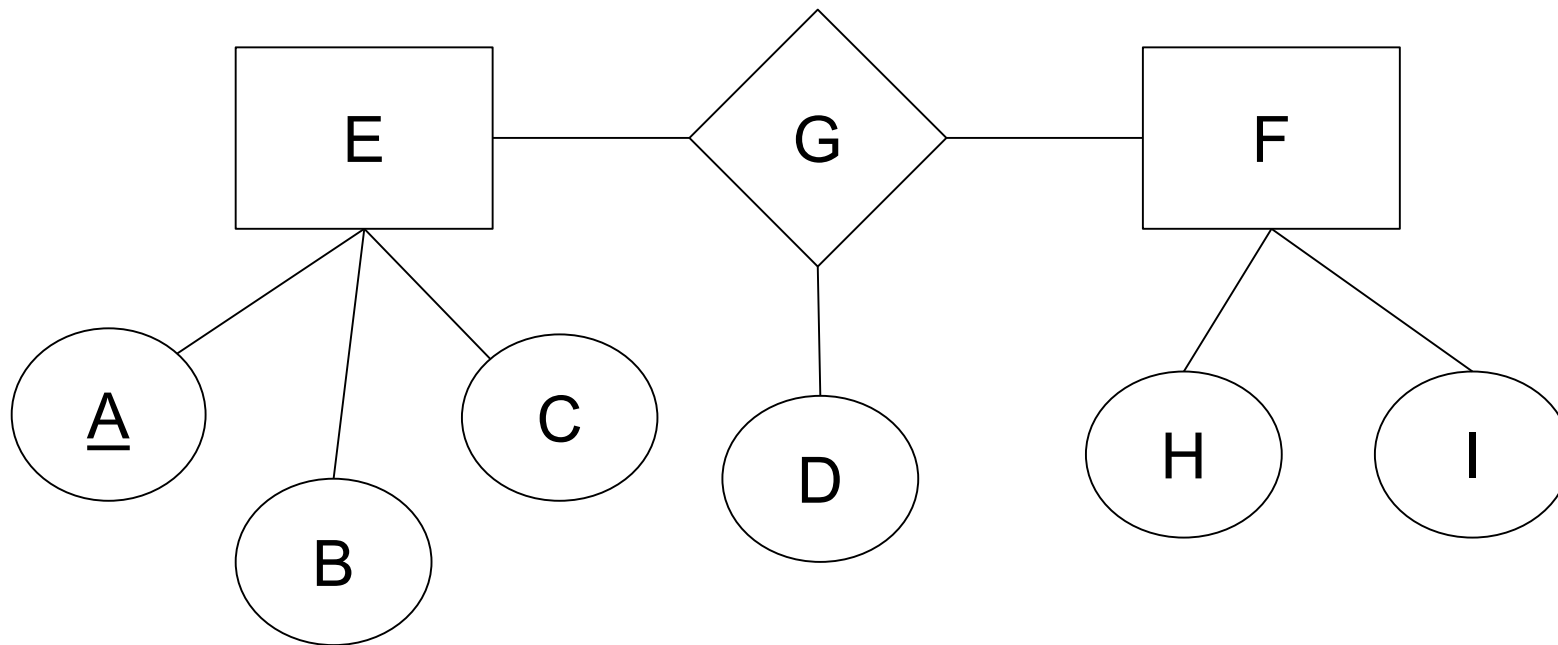
{s#, term} is a **partial key**, underlined with a dashed line.

Congratulations, you can now take CPSC 304 twice! (yay? 😊)

## Exercise:

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Fix the diagram below to say that F is a weak entity set with a partial key, H, and its owner entity set is E.



# Clicker Question

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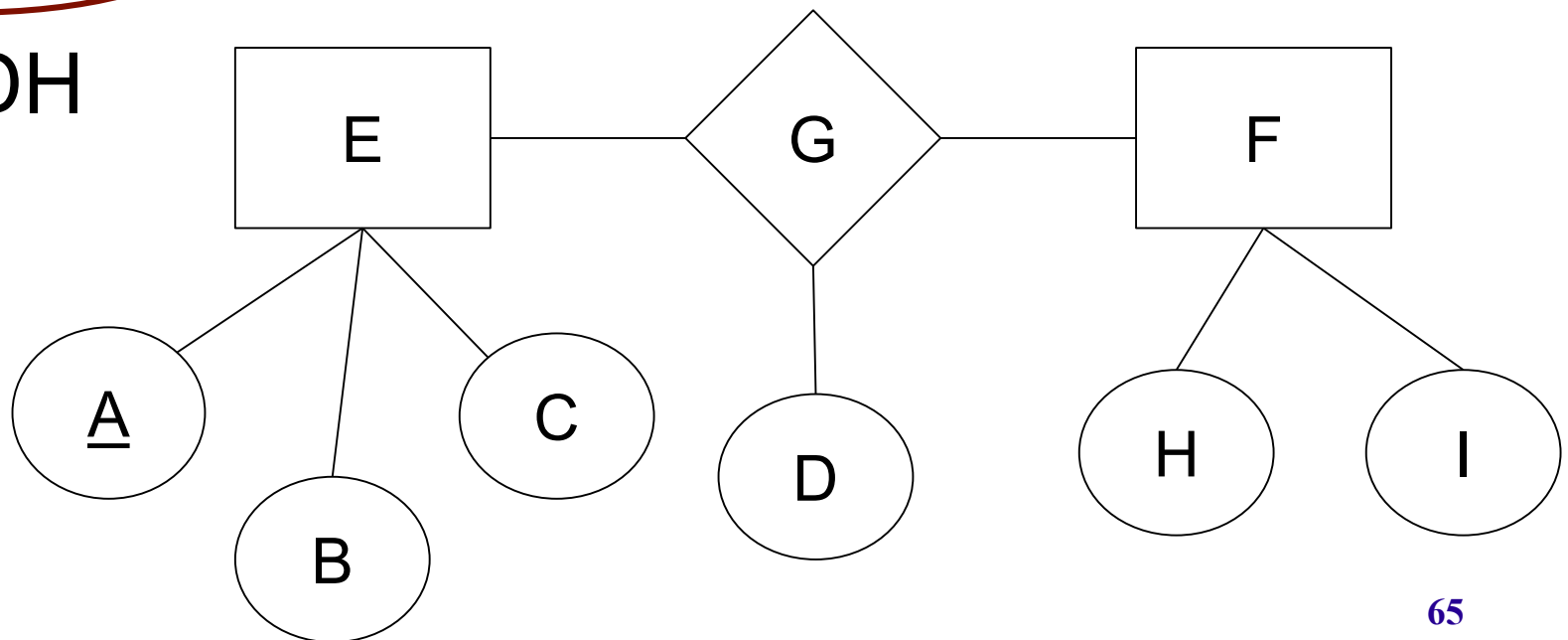
What is the key of entity set F?

A. A

B. H

C. AH

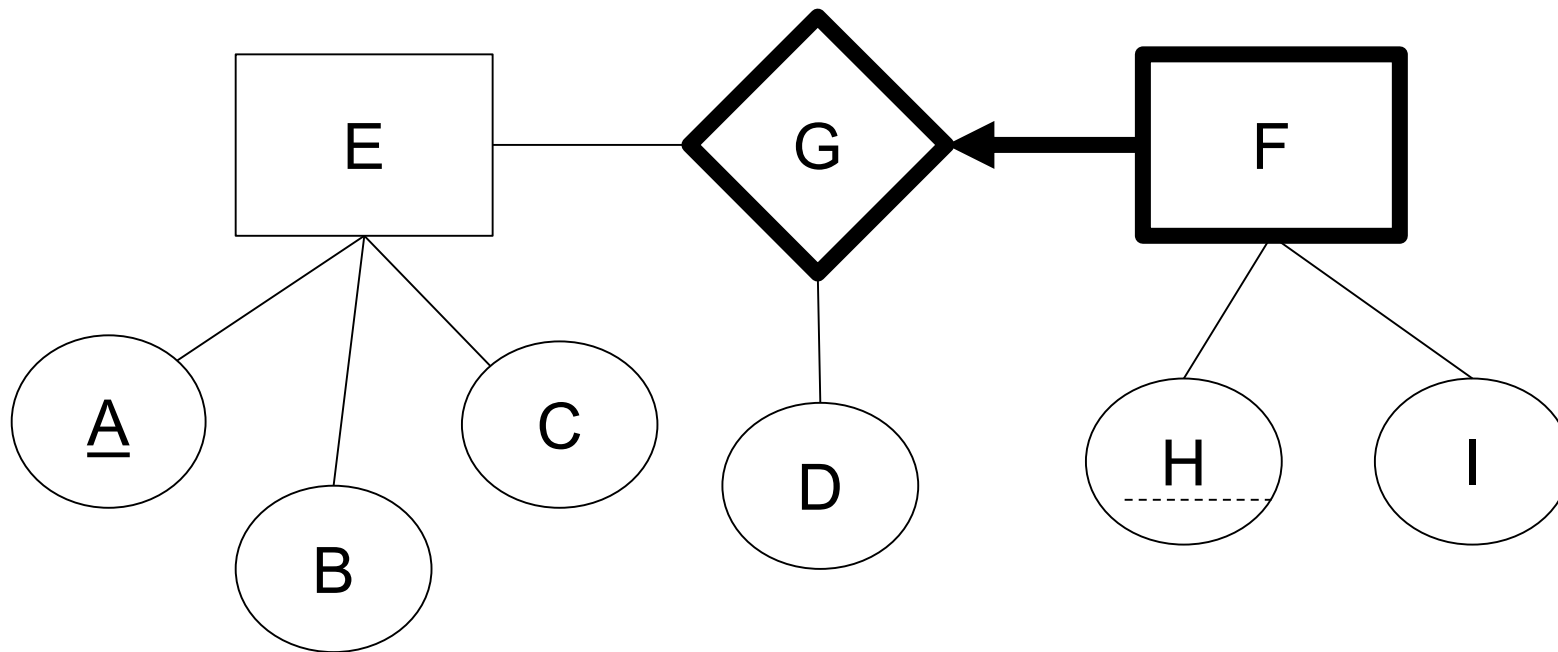
D. ADH





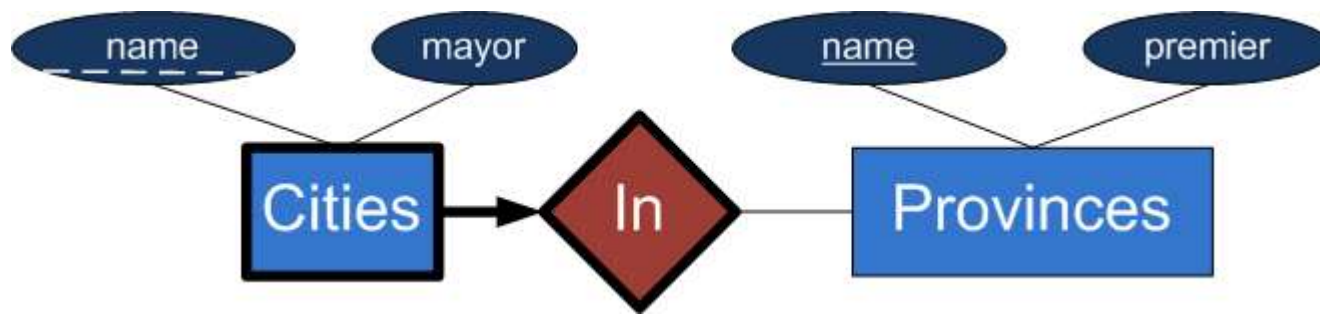
## Exercise solution:

Fix the diagram below to say that F is a weak entity set with a partial key, H, and its owner entity set is E.



# Clicker exercise

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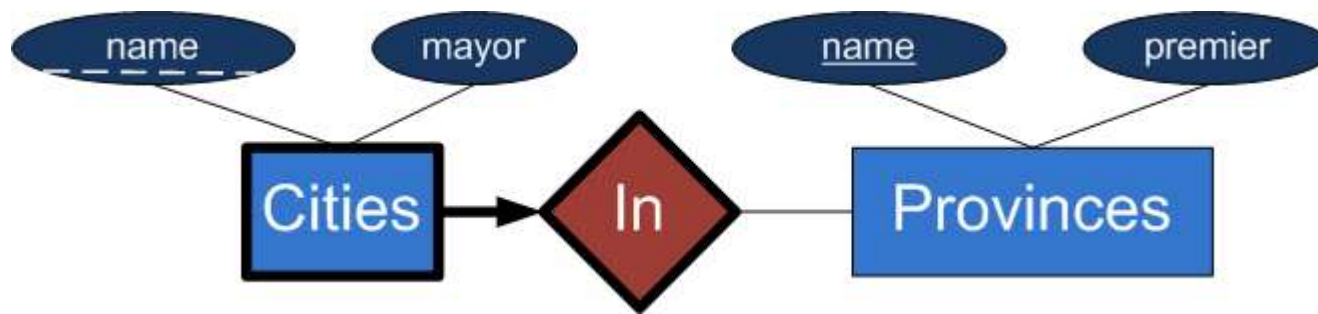


Which of the following is necessarily true:

- A. No two provinces can have premiers with the same name.
- B. No two cities can have mayors with the same name.
- C. No two cities can have the same name.
- D. No person can be the mayor of Cities In two different provinces.
- E. None of the above

# Clicker exercise

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Which of the following is necessarily true:

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Key = name of city + name of province (Victoria, BC)

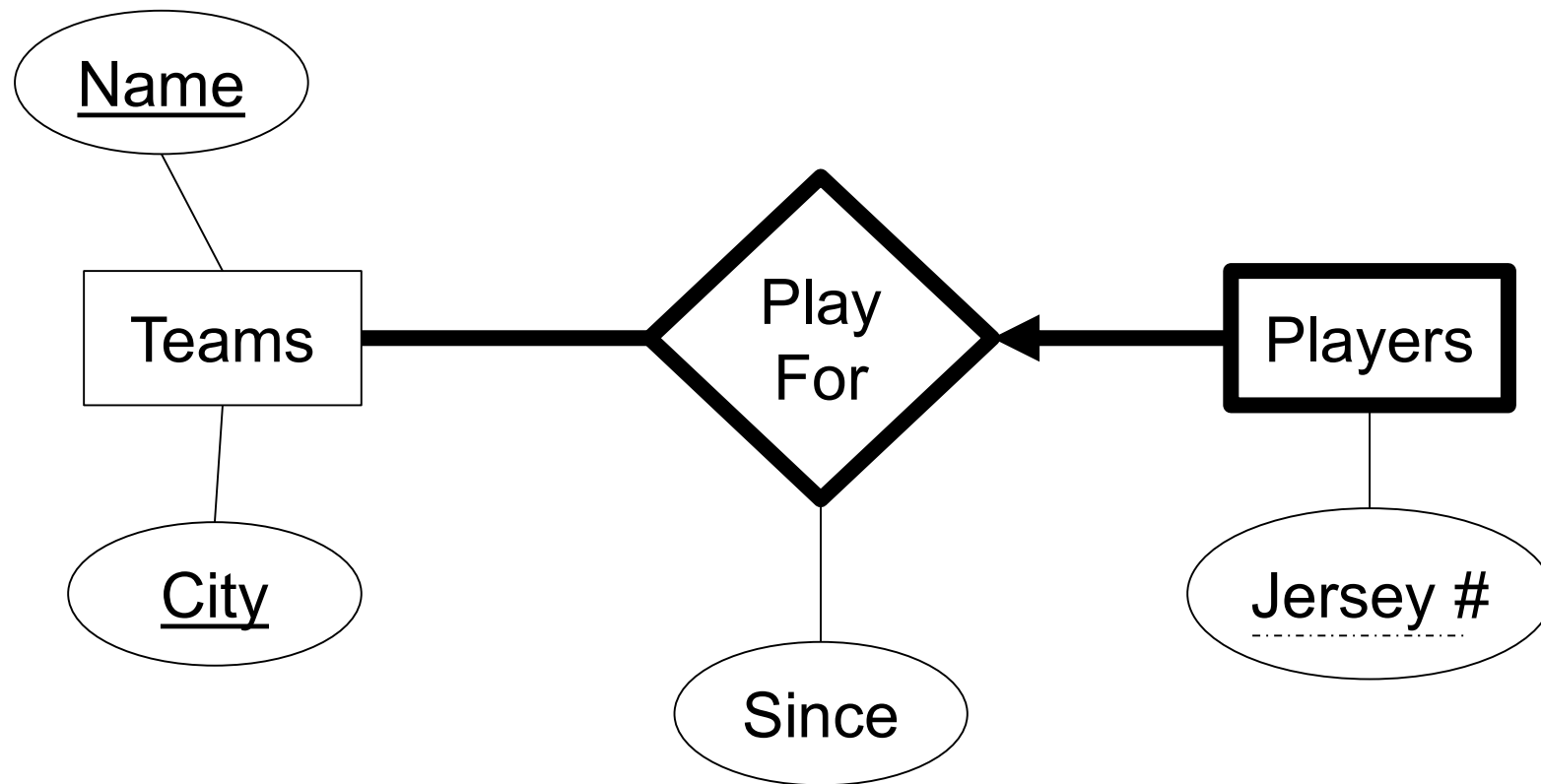
# Exercise: Hockey Teams

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- A hockey team has multiple players
- Each team has a name and a home city.
- No two teams can have the same name and home city combination.
- We do not need to retain past home city or name information.
- A player can only play for one team (we do not retain past team information), and every player must be on a team
- Each player on the team has a unique jersey number; the combination of the jersey number and the team information is unique
- Every team must have players
- We retain the date when the player last started playing for the team.

# Exercise: Hockey Teams

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# In-class Exercise 1

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# In-Class Exercise to turn in

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- Canvas → Assignments → In Class Exercises
- ~~Due one night from now @ 10PM PST~~  
(extended for drop/add to September 18 @10PM)
- Reminder: no late submissions accepted