CS2102

Tutorial 03

Question 7(a)

- **Question:** *Find all area where 'Homer' can go to find at least one of the pizza that he likes.*
- **Relational algebra:**
  - $\pi_{\text{R.area}}\left(\sigma_{\text{R.rname=S.rname}\wedge\text{S.pizza=L.pizza}\wedge\text{L.cname='Homer'}}(\rho_{\text{R}}(\text{Restaurants}) \times\right.$

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Question 7(b)

- **Question:** *find all customer pairs (C1,C2) such that C1 likes some pizza that C2 does not like.*
- **Relational algebra:** from Tutorial 01 Question 15(c)
  - $\pi_{\mathrm{L.cname,D.cname}}\left(\sigma_{\mathrm{L.pizza=D.pizza}}\left(\rho_{\mathrm{L}}(\mathrm{Likes}) \times \rho_{\mathrm{D}}(\mathrm{Dislikes})\right)\right)$

Question 7(b)

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```
SELECT DISTINCT L.cname, D.cname
FROM   Likes L, Dislikes D
WHERE  L.pizza = D.pizza;
```

Question 7(c)

- **Question:** *Find all customer-restaurant pairs (C,R) where C and R are both located in the same area, and C likes some pizza that is sold by R*.
- **Relational algebra:** from Tutorial 01 Question 15(b)
  - $\pi_{\text{C.cname,R.rname}}\left(\sigma_{\text{S.pizza=L.pizza}\wedge\text{R.rname=S.rname}\wedge\text{C.cname=L.cname}\wedge\text{C.area=R.area}}\left(\rho_{\text{R}}(\text{Restaurants}) \times\right.\right.$

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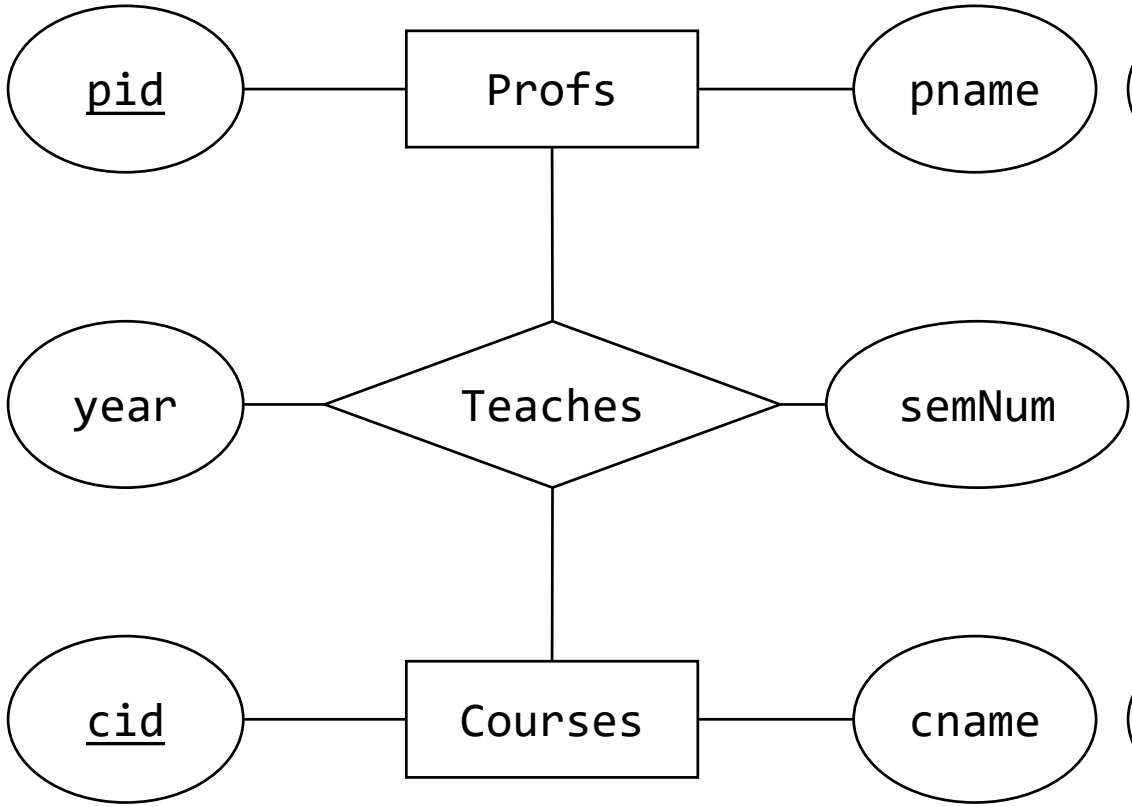
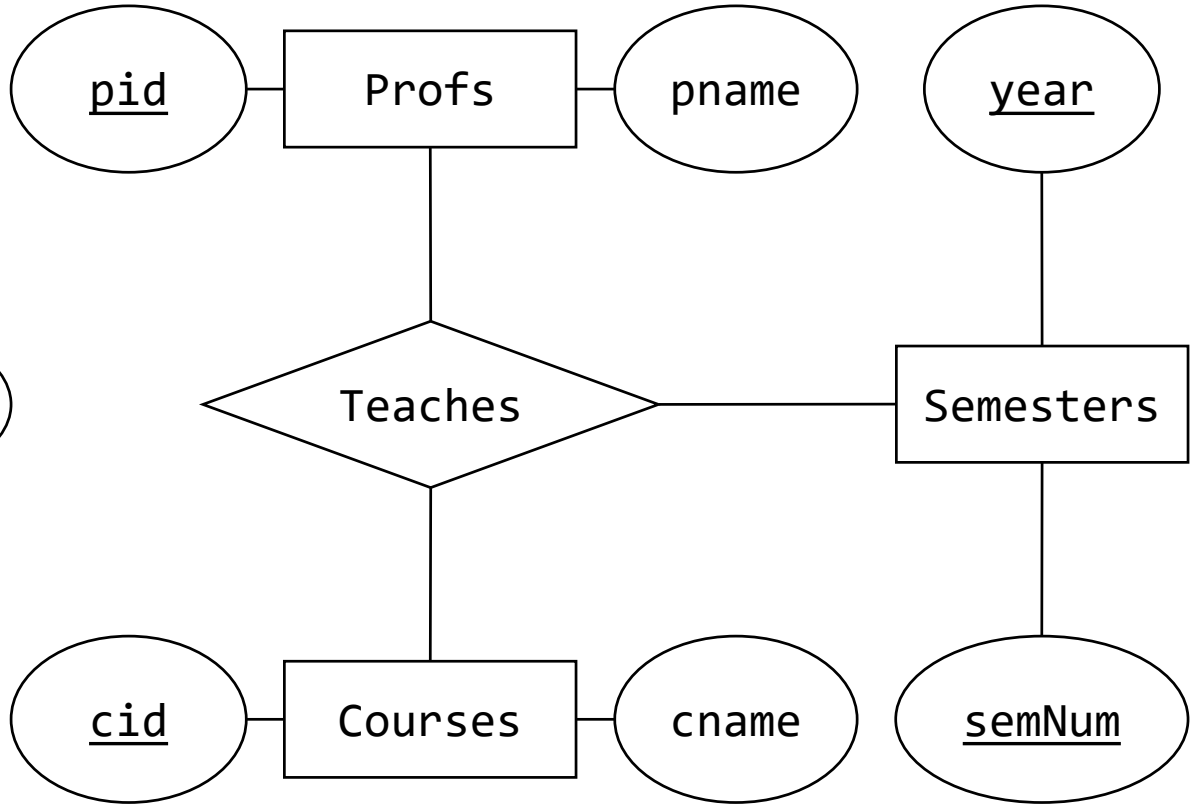
Question 8 (a)

- **Design A**



- **Design B**



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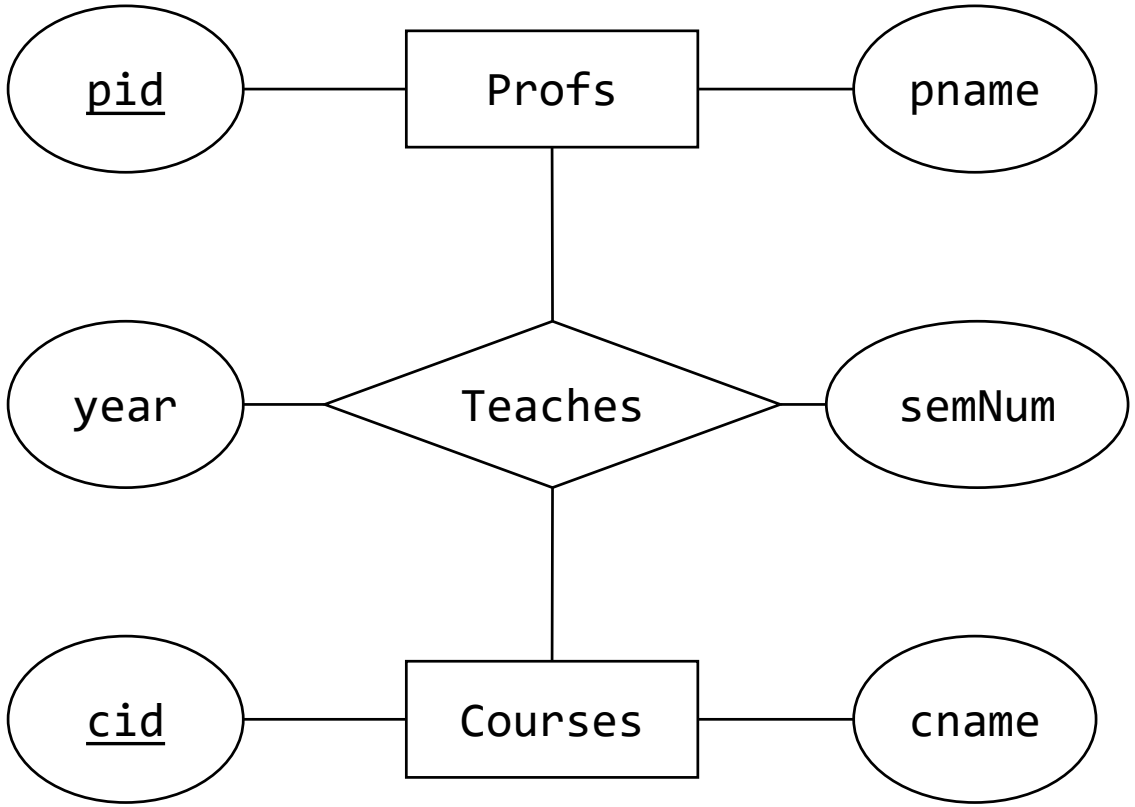


- **Some properties**
  - Every prof can participate in Teaches $n \geq 0$ times
  - Every course can participate in Teaches $n \geq 0$ times
  - Every pair (prof, course) can participate $0 \leq n \leq 1$ times

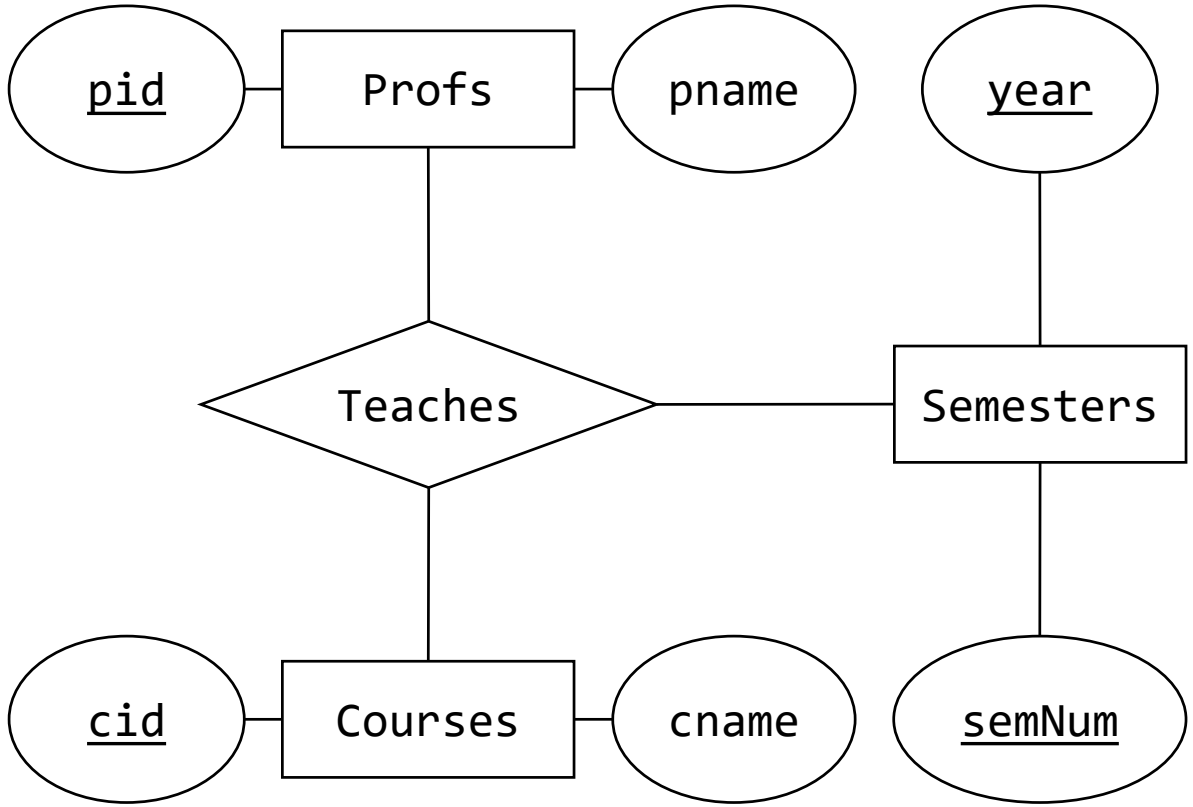
❖Prof can teach a course for only one semester!

Question 8 (a)

- **Some properties**
  - Every prof can participate in Teaches $n \geq 0$ times
  - Every course can participate in Teaches $n \geq 0$ times
  - Every semester can participate in Teaches $n \geq 0$ times
  - Every triples (prof, course, semester) can participate $0 \leq n \leq 1$ times

❖Prof can teach multiple times as long as it is in different semester

- **Design B**



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  ❖Prof can teach a course for only one semester!

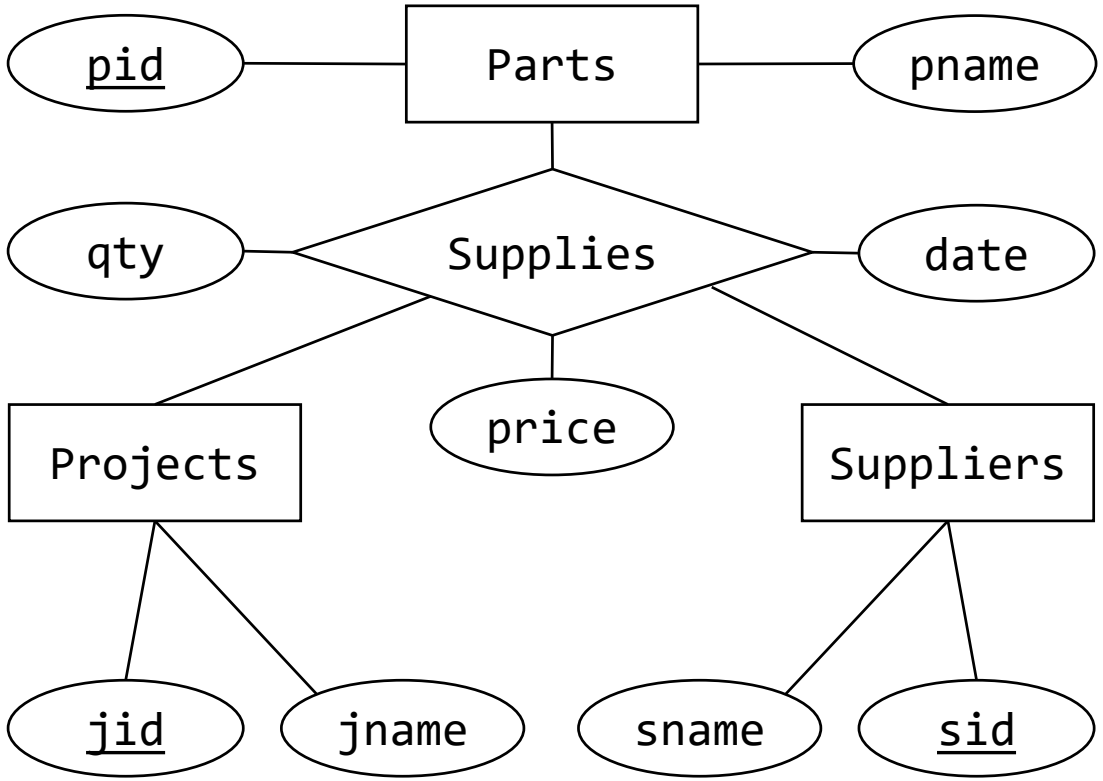
- **Design B**
  - Every prof can participate in Teaches $n \geq 0$ times
  - Every course can participate in Teaches $n \geq 0$ times
  - Every semester can participate in Teaches $n \geq 0$ times
  - Every triples (prof, course, semester) can participate $0 \leq n \leq 1$ times

  ❖Prof can teach multiple times as long as it is in different semester

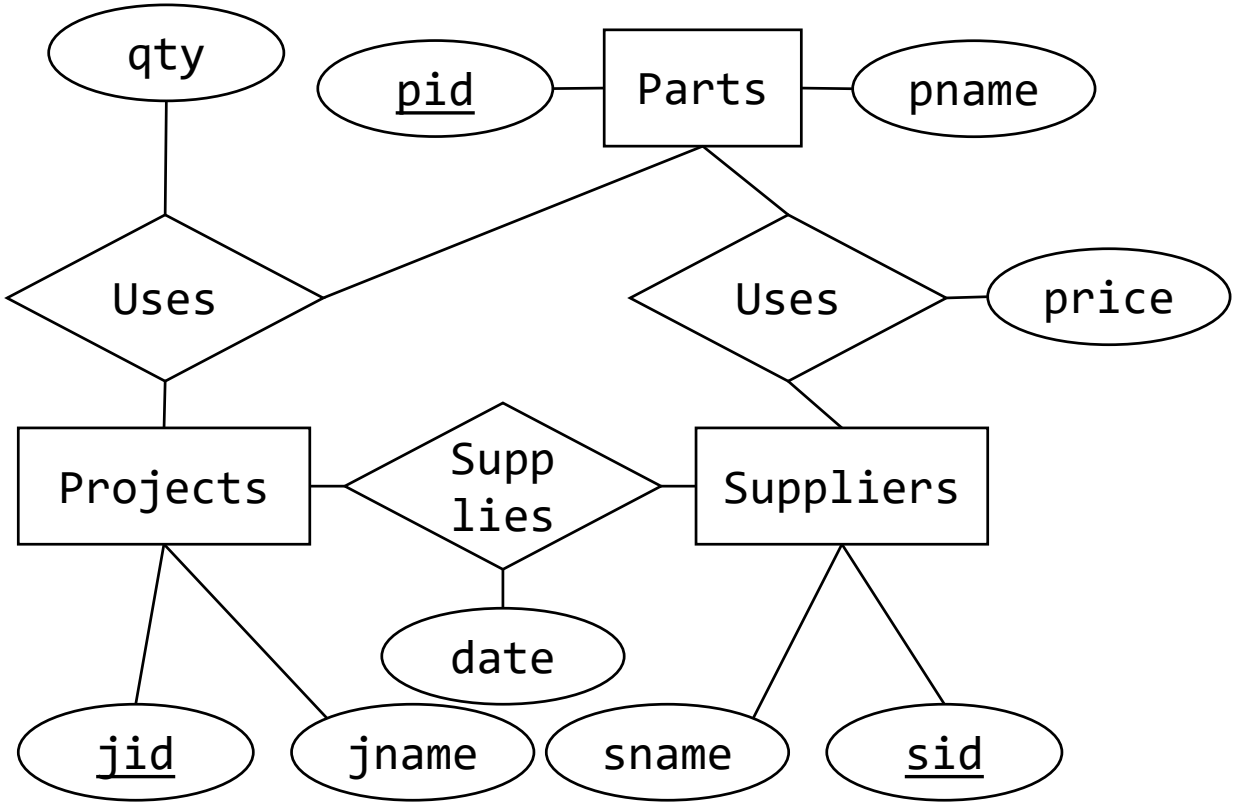
Which one is preferred?

Question 8 (b)

- **Design A**



- **Design B**



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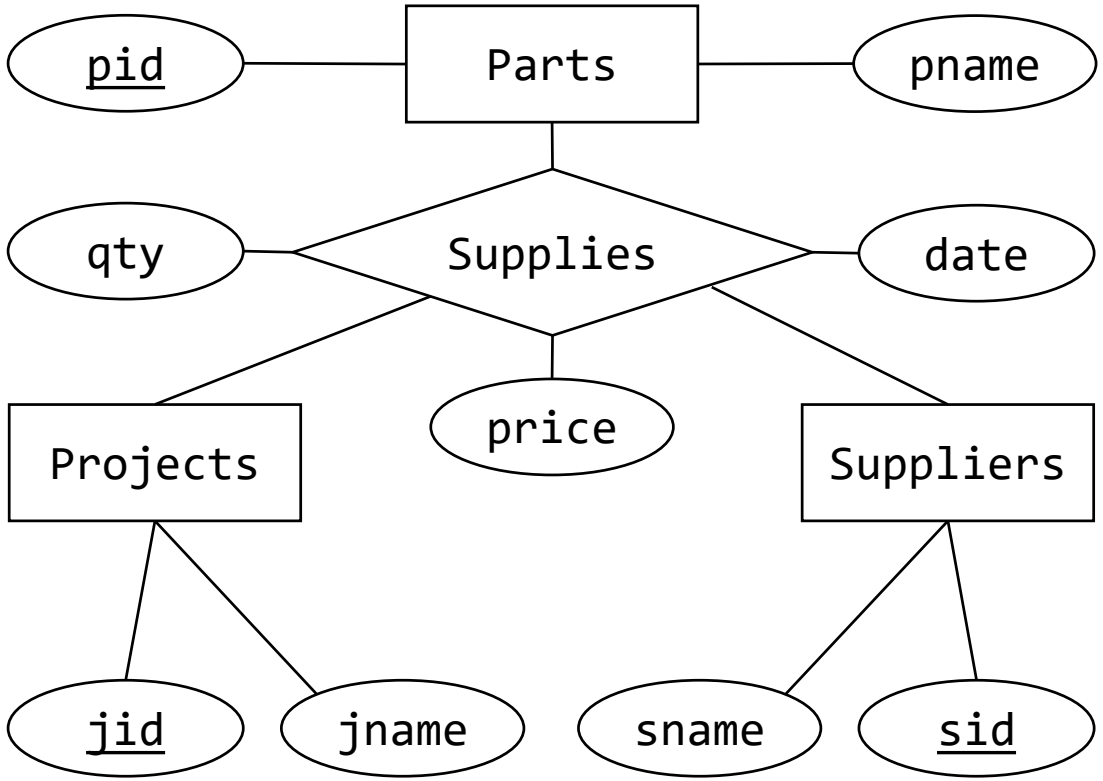
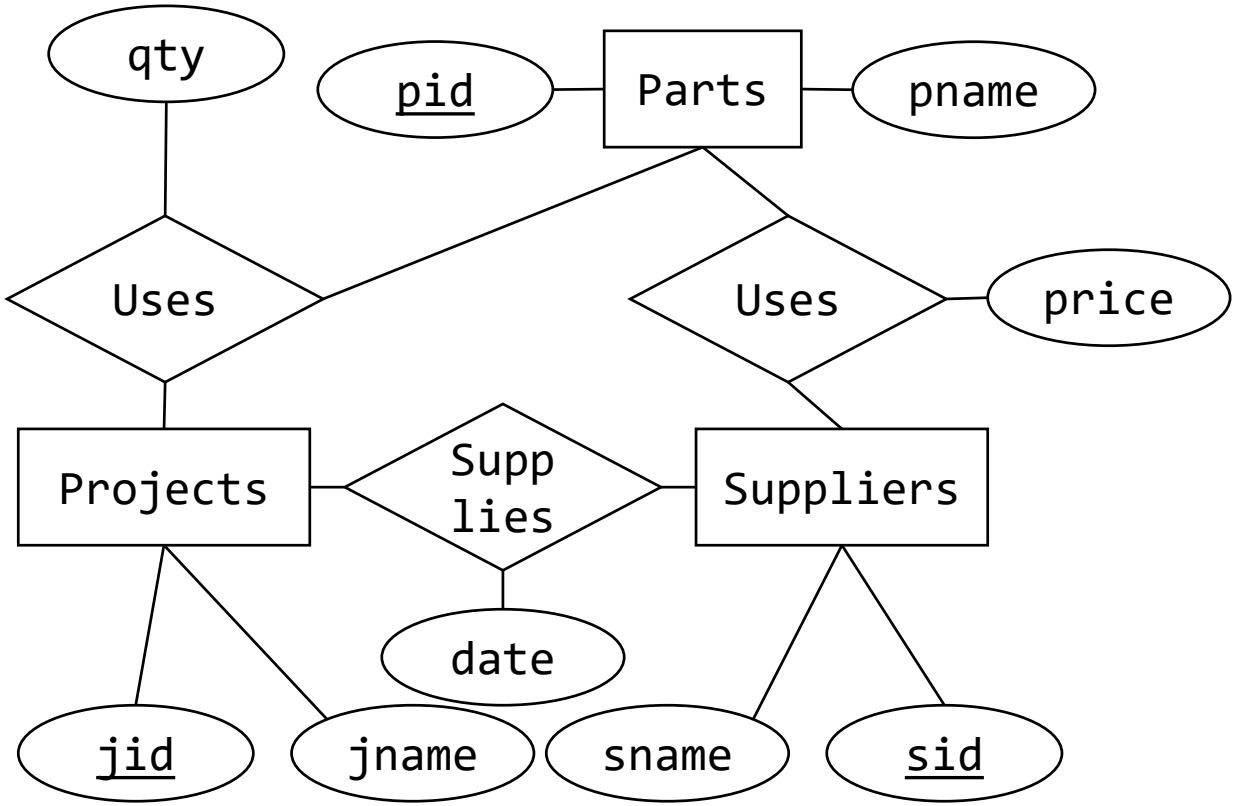


- **Some properties**
  - ...the constraint analysis is omitted for you to practice...
  - ❖Value of (date, qty, price) depends on the triple (supplier, project, parts)
    - ❖Same supplier can sell part P to project J for $10 each
    - ❖But the same supplier is also allowed to sell P to another project J2 for $15 each

Question 8 (b)

- **Some properties**
  - When a supplier uses a part, it must all be the same price
  - When a supplier supplies to a project, the supplier need not have parts to use
  - When a project uses parts, the part need not be supplied by any supplier
  - …

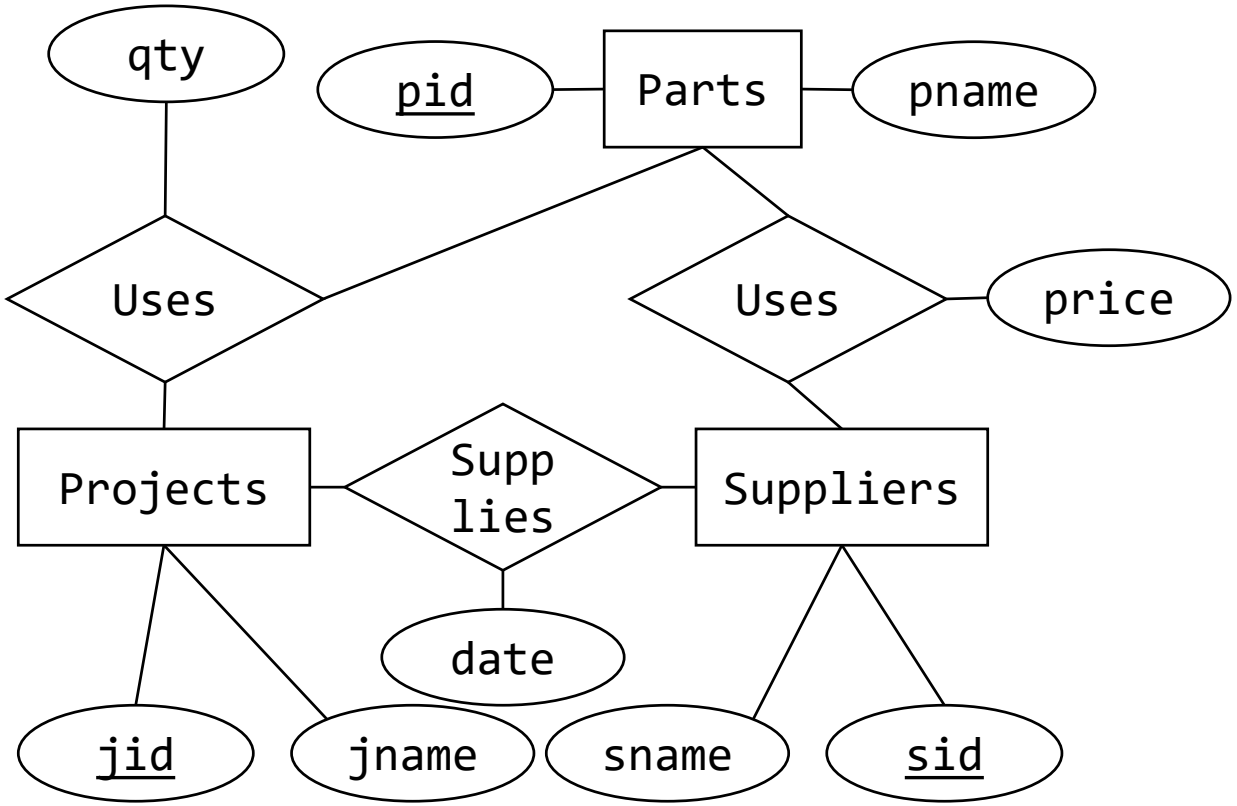
- **Design B**



Question 8 (b)

- **Some properties**
  - …
  - Value of (date, qty, price) depends on a pair of entities
    - ❖Consider
      (S1,P1), (S2,P1), (S1,P2), (S2,P1)
      (S1,J1), (S1,J2), (S2,J1), (S2,J2)
      (P1,J1), (P1,J2), (P2,J1), (P2,J1)
    - ❖We do not know which supplier sells which part to which project!

- **Design B**



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- **Design B**
  - ...the constraint analysis is omitted for you to practice...
  - ❖Value of (date, qty, price) depends on a pair of entities
    - ❖Consider
      ```
      (S1,P1), (S2,P1), (S1,P2), (S2,P1)
      (S1,J1), (S1,J2), (S2,J1), (S2,J2)
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      ```
    - ❖We do not know which supplier sells which part to which project!

Which one is preferred?