

Sample test questions:

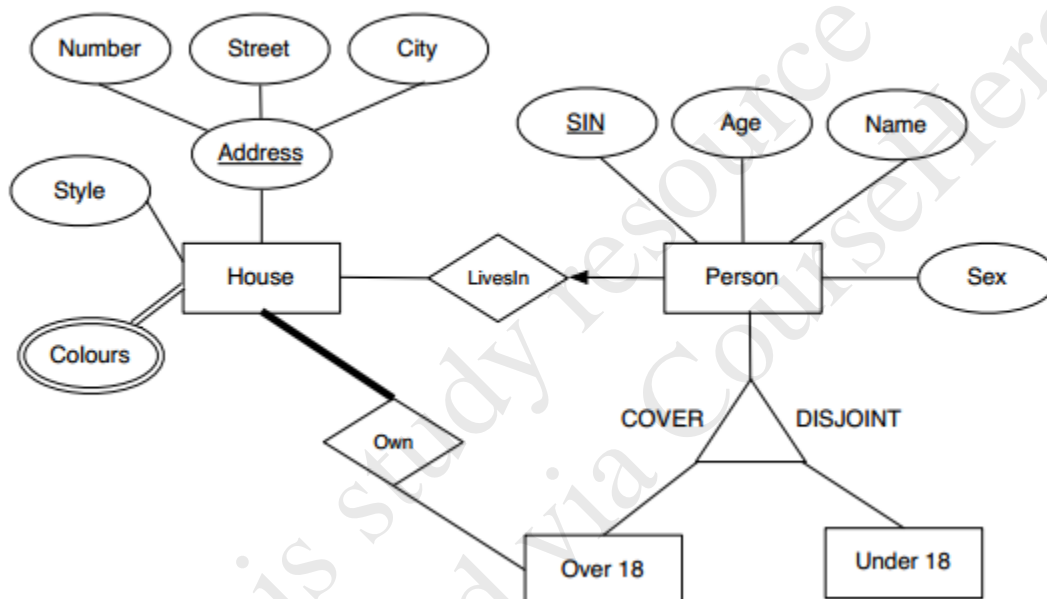
ER Question

Use an Entity-Relationship Diagram to depict the following enterprise. Explain any additional assumptions you make and list any aspects you were not able to depict.

- A house is identified by a three-part address consisting of a number, street, and city. Each house also has a style (e.g., bungalow) and a set of colours.
- A person is identified by a social insurance number. For each person we record his/her name, age, and sex.
- Persons who are at least 18 years old may own zero or more houses, and every house is owned by at least one person.
- Any person (regardless of age) lives in at most one house as his/her principal residence, and a house can have zero or more persons living there.

One possible solution:

Solution:



The opposite is also possible; you may get an ER model and be asked to come up with the schema.

SQL question:

Consider the following relations/tables:

Emp(eno, ename, title, city)
Proj(pno, pname, budget, city)
Works(eno, pno, resp, dur)
Pay(title, salary)

where the primary keys are underlined, and Emp.title is a foreign key to Pay.title, Works.eno is a foreign key to Emp.eno, and Works.pno is a foreign key to Proj.pno.

For each part of this question (considered independently of the other parts), write a single SQL statement that accomplishes the given requirements.

(a) For each city, how many projects are located in that city and what is the total budget over all projects in the city?

One Solution:

```
SELECT ci ty , count ( pno ) AS t o t p r o j ,  
       sum( budget ) AS t o t b u d g e t  
FROM P r o j  
GROUP BY ci ty
```

(b) For each project, what fraction of the budget is spent (in total) on salaries for the people working on that project?
Sort your answer by the value of the budget.

One possible Solution (there are more)

```
SELECT P. pno , pname , s a l / budget AS s a l f r a c  
FROM P r o j P,  
     (SELECT pno , sum( s a l a r y ) AS s a l  
      FROM Works , Emp, Pay  
      WHERE Works . eno=Emp. Eno AND Emp. t i t l e=Pay . t i t l e  
      GROUP BY pno ) AS Q  
WHERE P. pno=Q. pno  
ORDER BY budget
```

(c) Remove the work assignment of all persons to any projects for which more than any 2 persons share the same responsibility.

One possible Solution

```
DELETE from Works  
WHERE pno in  
     (SELECT W. pno  
      FROM Works W  
      GROUP BY W. pno , W. r e s p  
      HAVING count ( * ) >2)
```

(d) List all projects located in Toronto and include for each one the number of persons working on the project.

One possible Solution

```
SELECT Proj.pno, count(*)
FROM Proj LEFT OUTER JOIN Works ON (Proj.pno=Works.pno)
WHERE city='Toronto'
GROUP BY Proj.pno, pname
```

Consider the instance of the Sailors relation given in below where the key is underlined. Show the results of the following queries.

<u>sid</u>	sname	rating	age
22	Dustin	7	45.0
29	Brutus	1	33.0
31	Lubber	8	55.5
32	Andy	8	25.5
58	Rusty	10	35.0
64	Horatio	7	35.0
71	Zorba	10	16.0
74	Horatio	9	35.0
85	Art	3	25.5
95	Bob	3	63.5

(a)

```
SELECT S.sid FROM Sailors S
WHERE S.rating >= ALL
(SELECT S2.rating FROM Sailors S2)
```

Solution:

<u>sid</u>
58
71

(b)

```
SELECT S.rating, AVG(S.age) AS avgage FROM Sailors S
GROUP BY S.rating
HAVING 1 <
(SELECT COUNT(*) FROM SAILORS S2
WHERE S.rating = S2.rating)
```

Solution:

rating	avgage
3	44.5
7	40.0
8	40.5
10	25.5

Know the definitions such as:

Tuple

Conceptual schema

Referential integrity constraint

Keys (Foreign, Primary, ..)

Constraints

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