- Give an example of an **insert** operation on a view *v* to add a tuple *t* that is not visible in the result of **select \* from** *v*. Explain your answer.

# Exercises

**4.14**   Consider the query

> **select** *course_id*, *semester*, *year*, *sec_id*, **avg** (*tot_cred*)
> **from** *takes* **natural join** *student*
> **where** *year* = 2017
> **group by** *course_id*, *semester*, *year*, *sec_id*
> **having count** (*ID*) >= 2;

Explain why appending **natural join** *section* in the **from** clause would not change the result.

**4.15**   Rewrite the query

> **select \***
> **from** *section* **natural join** *classroom*

without using a natural join but instead using an inner join with a **using** condition.

**4.16**   Write an SQL query using the university schema to find the ID of each student who has never taken a course at the university. Do this using no subqueries and no set operations (use an outer join).

**4.17**   Express the following query in SQL using no subqueries and no set operations.

> **select** *ID*
> **from** *student*
> **except**
> **select** *s_id*
> **from** *advisor*
> **where** *i_ID* **is not null**

**4.18**   For the database of Figure 4.12, write a query to find the ID of each employee with no manager. Note that an employee may simply have no manager listed or may have a *null* manager. Write your query using an outer join and then write it again using no outer join at all.

**4.19**   Under what circumstances would the query