

location(country, cnumber)airport(city, ano, cnumber)works(worker, ano)

1. (2.5) For the sample database instance, give the output of the following query:

```
SELECT country
FROM location LEFT JOIN (airport NATURAL JOIN works) USING (cnumber)
WHERE ano IS NULL;
```

2. (2.5) What does the following query list?

```
SELECT L.country, COUNT(*)
FROM location L NATURAL JOIN airport a
WHERE EXISTS
  (SELECT * FROM location L1 NATURAL JOIN airport a1 NATURAL JOIN works w1
   WHERE L.cnumber=L1.cnumber)
GROUP BY L.cnumber;
```

- (a) the number of airports in each country that has an airport.
- (b) the number of airport workers in each country that has an airport.
- (c) the number of airports in each country that has an airport with workers.
- (d) the number airport workers in each country that has an airport with workers.

3. (2.5) What does the following query list?

```
SELECT worker
FROM works NATURAL JOIN (select ano from airport where cnumber=100) AS t
GROUP BY worker
HAVING COUNT(*) <= 1;
```

- (a) All employees who work in none (0) of the airports in UK.
- (b) All employees who work in at most 1 (0, 1) airport in UK.
- (c) All employees who work in 1 (=1) airport in UK.
- (d) All employees who work in at least 1 ( $\geq 1$ ) airport in UK.

4. (2.5) What does the following query list?

```
SELECT worker FROM location NATURAL JOIN airport NATURAL JOIN works
WHERE cnumber = 100 GROUP BY worker HAVING COUNT(*) = 1
UNION
SELECT worker FROM works WHERE worker NOT IN
  (SELECT worker FROM airport NATURAL JOIN works WHERE cnumber=100);
```

- (a) All employees who work in none (0) of the airports in UK.
- (b) All employees who work in at most 1 (0, 1) airport in UK.
- (c) All employees who work in 1 ( $=1$ ) airport in UK.
- (d) All employees who work in at least 1 ( $\geq 1$ ) airport in UK.