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Database Systems

Extra Credit

List the SSN of the Employees who work on ALL projects controlled by the ADMINISTRATION department

$R1 \leftarrow \sigma_{Dname = 'Administration'} (Department)$

$R2 \leftarrow \pi_{Pnumber} (R1 \bowtie Dnumber = Dnum \text{ Project})$

$R3 \leftarrow \pi_{Essn, Pno} (Works_on)$

$Result \leftarrow R3 \div R2$

Solution

<u>Essn</u>

987987987

999887777

```
SQL> CREATE TABLE R1 AS
  2 SELECT Dname, Dnumber
  3 FROM DEPARTMENT
  4 WHERE Dname = 'Administration';
```

Table created.

```
SQL> CREATE TABLE R2 AS
  2 SELECT Dnumber, Dnum, Pnumber
  3 FROM R1, PROJECT
  4 WHERE Dnumber = Dnum;
```

Table created.

```
SQL> CREATE TABLE R3 AS
  2 SELECT Pnumber
  3 FROM R2;
```

Table created.

```
SQL> CREATE TABLE R4 AS
  2 SELECT Essn, Pno
  3 FROM WORKS_ON;
```

Table created.

```
SQL> ALTER TABLE R3
  2 RENAME COLUMN Pnumber TO Pno;
```

Table altered.

```
SQL> SELECT * FROM R3;
```

```
      PNO
-----
      10
      30
```

```
SQL> SELECT * FROM R4;
```

```
      ESSN      PNO
-----
123456789      1
123456789      2
333445555      2
333445555      3
333445555     10
333445555     20
453453453      1
453453453      2
666884444      3
888665555     20
987654321     20
```

```
      ESSN      PNO
-----
987654321     30
987987987     10
987987987     30
999887777     10
999887777     30
```

16 rows selected.

```
SQL> SELECT ESSN, PNO
  2 FROM (SELECT ESSN FROM R4), R3
  3 MINUS
  4 SELECT ESSN, PNO FROM R4;
```

```
      ESSN      PNO
-----
123456789     10
123456789     30
333445555     30
453453453     10
453453453     30
666884444     10
666884444     30
888665555     10
888665555     30
987654321     10
```

10 rows selected.

```
SQL> SELECT ESSN FROM(
  2 SELECT ESSN, PNO
  3 FROM (SELECT ESSN FROM R4), R3
  4 MINUS
  5 SELECT ESSN, PNO FROM R4);
```

```
      ESSN
-----
123456789
123456789
333445555
453453453
453453453
666884444
666884444
888665555
888665555
987654321
```

10 rows selected.

```
SQL> SELECT ESSN FROM R4
  2 MINUS
  3 SELECT ESSN FROM(
  4 SELECT ESSN, PNO
  5 FROM (SELECT ESSN FROM R4), R3
  6 MINUS
  7 SELECT ESSN, PNO FROM R4);
```

```
      ESSN
-----
987987987
999887777
```