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# Authorization Exercises

1. What privileges are needed for a user to execute the following SQL statement over tables *Worker*(ID,name) and *Works*(ID,company)?

```
Delete From Worker  
Where ID In (Select ID From Works Group By ID Having Count(*) > 3)
```

2. What privileges are needed for a user to execute the following SQL statement over tables *Employee*(ID,salary,rank,deptID) and *Department*(ID,category)?

```
Update Employee E1
```

```
Set salary = (Select Avg(salary) From Employee E2 Where E1.rank = E2.rank)  
Where deptID In (Select ID from Department Where category = 'Sales')
```

**3.** Suppose you are the owner of table *Employee*(ID,salary,dept). You want to authorize user Amy to see (but not modify) employee information for those employees who earn less than \$80,000 and work in a department with fewer than 10 people. Specify a SQL statement or sequence of statements that achieves this goal.

**4.** Consider tables *Worker*(ID,name) and *Works*(ID,company), where ID is a key for each table. Consider the following pair of SQL statements. Assume Amy is a valid user, and the statements are issued by a single user who is the owner of both tables *Worker* and *Works*.

```
Create View NoJob As
```

```
Select Distinct ID From Worker, Works Where Worker.ID = Works.ID;
```

```
Grant Delete on NoJob to Amy With Grant Option;
```

Why is this pair of statements disallowed by the SQL standard? Can you write an equivalent pair of statements that conforms to the standard?

**5.** Consider a table *T*(A,B,C) with owner Amy, and the following sequence of statements related to privileges on *T*. Each statement is prefaced with the user issuing it.

```
Amy: Grant Select, Delete on T to Bob With Grant Option  
Amy: Grant Select, Delete on T to Carol With Grant Option  
Bob: Grant Select(A,B), Delete on T to David With Grant Option  
Carol: Grant Select(A,C) on T to David With Grant Option  
David: Grant Select(A), Delete on T to Eve  
Amy: Revoke Select, Delete on T From Bob Cascade
```

What privileges on table  $T$  does Eve have after this sequence of statements?

**6.** Consider a table  $T(A,B,C)$  with owner Amy, and the following sequence of statements related to privileges on  $T$ . Each statement is numbered and prefaced with the user issuing it.

- 1 - Amy: Grant Select on T to Bob With Grant Option
- 2 - Bob: Grant Select on T to Carol With Grant Option
- 3 - Carol: Grant Select(A,C) on T to David With Grant Option
- 4 - Carol: Grant Select(A,B) on T to Eve With Grant Option
- 5 - Amy: Grant Select on T to Eve
- 6 - Amy: Grant Select(C) on T to Frank
- 7 - David: Grant Select(A,C) on T to Frank With Grant Option
- 8 - Eve: Grant Select(A,C) on T to Frank
- 9 - David: Grant Select(A) on T to Gary
- 10 - Eve: Grant Select(A) on T to Gary
- 11 - Amy: Revoke Select on T From Eve Restrict
- 12 - Carol: Revoke Select(A,C) on T From David Restrict
- 13 - David: Revoke Select(A) on T From Eve
- 14 - Bob: Revoke Select on T From Carol Cascade
- 15 - Amy: Revoke Select on T From Bob Restrict

(a) Which of the Grant statements, if any, would be disallowed?

(b) Which of the Revoke statements, if any, would be disallowed?

(c) After the statements complete execution (excluding any disallowed ones), what privileges does user Frank have on table *T*?

**Hide Answers**

1.

*Worker* - Delete, Select(ID)

*Works* - Select(ID)

2.

*Employee* - Update(salary), Select(salary,rank,deptID)

*Department* - Select

3.

```
Create View V As
```

```
  Select * From Employee E1
```

```
  Where salary < 80,0000
```

```
  and 10 > (Select Count(*) From Employee E2 Where E2.dept = E1.dept);
```

```
Grant Select on V to Amy;
```

4.

*NoJob* is not an updatable view so delete privileges are disallowed. The following statements are equivalent, but *NoJob2* is an updatable view.

```
Create View NoJob2 As
```

```
  Select ID From Worker
```

```
  Where ID In (Select ID From Works);
```

```
Grant Delete on NoJob2 to Amy With Grant Option;
```

**5. Select(A)**

**6.**

(a) 8

(b) 12, 13

(b) Select(C)