

Access Control

Sample database

```
CREATE TABLE Department(
  name      VARCHAR2(50),
  code      CHAR(5),
  total_staff_number NUMBER(2)      NOT NULL,
  chair     VARCHAR2(50),
  budget    NUMBER(9,1)             NULL,
  CONSTRAINT dept_pkey PRIMARY KEY(name),
  CONSTRAINT dept_ckey1 UNIQUE(code),
  CONSTRAINT dept_ckey2 UNIQUE(chair),
  CONSTRAINT dept_check1
CHECK (total_staff_number BETWEEN 1 AND 50) );
```

```
CREATE TABLE Course(
  c#        CHAR(7),
  title     VARCHAR2(200)           NOT NULL,
  credits   NUMBER(1)              NOT NULL,
  offered_by VARCHAR2(50)           NULL,
  CONSTRAINT course_pkey PRIMARY KEY(c#),
  CONSTRAINT course_check1
CHECK (credits IN (6, 12) ),
  CONSTRAINT course_fkey1 FOREIGN KEY(offered_by)
REFERENCES Department(name) );
```

GRANT statement

GRANT statement is applied by a user to authorise various kinds of access to his/her relational tables/views by another user or class of users

Example

User **scott** would like to grant to user **janusz** read access to a relational table **Department**

```
connect scott/password
```

```
GRANT SELECT
```

```
ON Department
```

```
TO janusz;
```

Example

User **janusz** would like to grant to user **scott** full access to a view **Course_view**

```
connect janusz/password
```

```
GRANT ALL
```

```
ON Course_view
```

```
TO scott;
```

Example

User **scott** would like to grant to all users the rights to delete the rows from a table **Course**

```
connect scott/password
```

```
GRANT DELETE
```

```
ON Course
```

```
TO PUBLIC;
```

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Keywords

```
GRANT SELECT ON Department TO janusz;  
GRANT ALL ON Course_view TO scott;  
GRANT DELETE ON Course TO PUBLIC;  
GRANT UPDATE ON qqq TO scott WITH GRANT OPTION;
```

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Privileges

```
GRANT SELECT ON Department TO janusz;  
GRANT ALL ON Course_view TO scott;  
GRANT DELETE ON Course TO PUBLIC;  
GRANT UPDATE ON qqq TO scott WITH GRANT OPTION;
```

SELECT

DELETE

INSERT

UPDATE <list of columns>

REFERENCES <list of columns>

ALL

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Objects

```
GRANT SELECT ON Department TO janusz;  
GRANT ALL ON Course_view TO scott;  
GRANT DELETE ON Course TO PUBLIC;  
GRANT UPDATE ON qqq TO scott WITH GRANT OPTION;
```

Relational tables

Views

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Grantee

```
GRANT SELECT ON Department TO janusz;  
GRANT ALL ON Course_view TO scott;  
GRANT DELETE ON Course TO PUBLIC;  
GRANT UPDATE ON qqq TO scott WITH GRANT OPTION;
```

Users

PUBLIC

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Granting rights

```
GRANT SELECT ON Department TO janusz;  
GRANT ALL ON Course_view TO scott;  
GRANT DELETE ON Course TO PUBLIC;  
GRANT UPDATE ON qqq TO scott WITH GRANT OPTION;
```

WITH GRANT OPTION

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Examples

User **scott** grants **SELECT** access rights on **Course** table to user **janusz**

```
GRANT SELECT ON Course TO janusz;
```

User **janusz** selects from **Course** table

```
SELECT *  
FROM scott.Course;
```

To eliminate a reference to **scott** user **janusz** creates a synonym

```
CREATE SYNONYM SCourse FOR scott.Course;  
SELECT *  
FROM SCourse;
```

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Examples

User **janusz** uses a synonym **SCourse** to select from **Course** table

```
SELECT *
FROM SCourse;
```

User **janusz** grants **UPDATE** access rights on the columns **name, budget** from **Department** table to user **scott**

```
GRANT UPDATE (name, budget) ON Department TO
scott;
```

User **scott** updates attribute **budget**

```
UPDATE janusz.Department
SET budget = budget + 100;
```

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Examples

User **scott** grants **ALL** access rights to a relational table **Student** to everyone

```
GRANT ALL ON Student to PUBLIC;
```

Now, anyone can delete a row from **Students** table

```
DELETE FROM scott.Student
WHERE s# = 6509353;
```

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Examples

User **scott** grants the reference access rights on a relational table **Department** to **janusz**

```
GRANT REFERENCES(name) ON Department to janusz;
```

Then, user **janusz** is allowed to reference column **dname** when creating a relational table **BigDepts**

```
CREATE TABLE BigDepts(
dname      VARCHAR(30) NOT NULL,
...        ...
)
CONSTRAINT BigDepts_fkey FOREIGN KEY (dname)
REFERENCES scott.Department (name);
```

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Examples

User **janusz** grants **SELECT** access rights on all courses offered by **Math** department to **scott**

```
CREATE VIEW MathCourse AS (
SELECT *
FROM Course
WHERE offered_by = 'Math');
```

```
GRANT SELECT ON MathCourse TO scott;
```

User **scott** selects the courses offered by **Math** department

```
SELECT *
FROM janusz.MathCourse;
```

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Examples

User **janusz** grants **SELECT** with grant option on a relational table **Course** to **scott**

```
GRANT SELECT ON Course to scott
WITH GRANT OPTION;
```

User **scott** is allowed to grant **SELECT** access rights on a table **Course** to user **joan**

```
GRANT SELECT ON janusz.Course TO joan;
```

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REVOKE statement

REVOKE statement is applied by a user to revoke the access rights granted to another user or class of users

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Example

User **scott** would like to revoke from user **janusz** read access to a relational table **Department**

```
connect scott/password
REVOKE SELECT
ON Department
FROM janusz;
```

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Example

User **janusz** would like to revoke from user **scott** full access to a view **Course_view**

```
connect janusz/password
REVOKE ALL
ON Course_view
FROM scott;
```

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Example

User **scott** would like to revoke from all users the rights to delete the rows from a relational table **Course**

```
connect scott/password
REVOKE DELETE
ON Course
FROM PUBLIC;
```

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Example

User **janusz** revokes **SELECT** with grant option on **Course** table from **scott**

```
REVOKE SELECT ON Course FROM scott;
```

User **scott** is not allowed to select from **Course** and user **joan** is not allowed to select from **Course**

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References

Elmasri R., Navathe S. B., *Database Systems*, chapter 25.2

Ramakrishnan R., Gehrke J., *Database Management Systems*, chapters 21.1, 21.2, 21.3

<https://sai.uow.edu.au/oradocs/>
SQL Reference, **GRANT** statement

<https://sai.uow.edu.au/oradocs/>
SQL Reference, **REVOKE** statement

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