

## 22. Views

# Views

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## 22. Views

### 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) );
```

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### View ? What is it and why do we need it ?

**View** is a logical “window” on selected data from a relational database

We need views to separate database users from implementation details, to enhance access control, to simplify queries

Views versus relational tables:

**CREATE TABLE**      ⇒      real table  
**CREATE VIEW**        ⇒      virtual table

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### Example

Find the names of all departments together with the total number of courses offered by each department

**Department**

name | code | total staff number | chair | budget

**Course**

c# | title | credits | offered by

```
CREATE VIEW VDCNT( name, total_courses ) AS
```

```
( SELECT name, count(c#)
```

```
FROM Department LEFT OUTER JOIN Course
```

```
ON Department.name = Course.offered_by
```

```
GROUP BY name );
```

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## 22. Views

### Example

Find the names of all departments together with the total number of courses offered by each department

```
CREATE VIEW VDCNT( name, total_courses ) AS
( SELECT name, count(title)
  FROM Department LEFT OUTER JOIN Course
    ON Department.name = Course.offered_by
 GROUP BY name );
```

**VDCNT**

name | total\_courses

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### Keywords

Find the names of all departments together with the total number of courses offered by each department

```
CREATE VIEW VDCNT( name, total_courses ) AS
( SELECT name, count(title)
  FROM Department LEFT OUTER JOIN Course
    ON Department.name = Course.offered_by
 GROUP BY name );
```

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### View name

Find the names of all departments together with the total number of courses offered by each department

```
CREATE VIEW VDCNT( name, total_courses ) AS
( SELECT name, count(title)
  FROM Department LEFT OUTER JOIN Course
    ON Department.name = Course.offered_by
 GROUP BY name );
```

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### View schema

Find the names of all departments together with the total number of courses offered by each department

```
CREATE VIEW VDCNT( name, total_courses ) AS
( SELECT name, count(title)
  FROM Department LEFT OUTER JOIN Course
    ON Department.name = Course.offered_by
 GROUP BY name );
```

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### View definition (query)

Find the names of all departments together with the total number of courses offered by each department

```
CREATE VIEW VDCNT( name, total_courses ) AS
( SELECT name, count(title)
  FROM Department LEFT OUTER JOIN Course
    ON Department.name = Course.offered_by
 GROUP BY name );
```

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### Application of a view

Find the names of all departments together with the total number of courses offered by each department

```
CREATE VIEW VDCNT( name, total_courses ) AS
( SELECT name, count(title)
  FROM Department LEFT OUTER JOIN Course
    ON Department.name = Course.offered_by
 GROUP BY name );
```

Find a department that offers more than 5 courses

```
SELECT name
FROM VDCNT
WHERE total_courses > 5;
```

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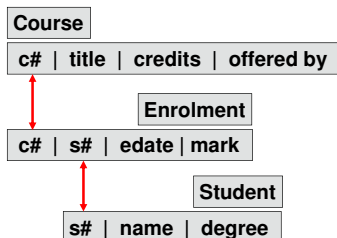
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### Views as "procedures"

Find the names of all students who collected more credit points than a student with number 879546



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## 22. Views

### Views as "procedures"

Find the names of all students who collected more credit points than a student with number 879546

**Q1:** Find the total number of credit points collected by each student

**Q2:** Use Q1 to find the total number of credit points collected by a student with number 879546

**Q3:** Use Q1 and Q2 to find all students who collected more credit points than a student with number 879546

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### Views as "procedures"

Q1: Find the total number of credit points collected by each student

Course: c# | title | credits | offered by

Enrolment: c# | s# | edate | mark

Student: s# | name | degree

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### Views as "procedures"

Q1: Find the total number of credit points collected by each student

Q11: Construct a view that consists of two columns: s# and credits obtained for all completed courses

Q12: Group Q11 on s# and perform summation of all credit points earned by each student

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### Views as "procedures"

Q11: Construct a view that consists of two columns: s# and credits obtained for all completed courses

Course: c# | title | credits | offered by

Enrolment: c# | s# | edate | mark

```
CREATE VIEW Scredits( s#, credits ) AS
( SELECT Enrolment.s#, credits
  FROM Enrolment JOIN Course
    ON Enrolment.c# = Course.c#
 WHERE mark IS NOT NULL AND mark > 49 );
```

Scredits: s# | credits

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### Views as "procedures"

Q12: Group Q11 on s# and perform summation of all credit points earned by each student

Scredits: s# | credits

```
CREATE VIEW Totcredits( s#, total_credits) AS
( SELECT s#, SUM(credits)
  FROM Scredits
  GROUP BY s# );
```

Totcredits: s# | total\_credits

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### Views as "procedures"

Find the names of all students who collected more credit points than a student with number 879546

Q1: Find the total number of credit points collected by each student

Q2: Use Q1 to find the total number of credit points collected by a student with number 879546

Q3: Use Q1 and Q2 to find all students who collected more credit points than a student with number 879546

**DONE!**

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### Views as "procedures"

Q2: Use Totcredits to find the total number of credit points collected by a student with number 879546

Totcredits: s# | total\_credits

```
CREATE VIEW V879546(total_credits) AS
( SELECT total_credits
  FROM Totcredits
  WHERE s# = 879546 );
```

V879546: total\_credits

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### Views as "procedures"

Find the names of all students who collected more credit points than a student with number 879546

**Q1:** Find the total number of credit points collected by each student

**Q2:** Use Q1 to find the total number of credit points collected by a student with number 879546

**Q3:** Use Q1 and Q2 to find all students who collected more credit points than a student with number 879546

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### Views as "procedures"

**Q3:** Use Totcredits and V879546 to find all students who collected more credit points than a student with number 879546

Totcredits    s# | total\_credits

V879546    s# | total\_credits

Totcredits.total\_credits > V879546.total\_credits

```
SELECT Totcredits.s#
FROM Totcredits JOIN V879546
ON Totcredits.total_credits >
   V879546.total_credits;
```

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### View update problem

Is it possible to update the contents of a database through a view ?

Usually NOT, sometimes YES !

It is possible to update the contents of a database through a view if a view is defined on only one relational table, it does not contain computable attributes, and its schema includes all attributes from the relational table it is defined on

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### View update problem

```
CREATE VIEW Totcredits( s#, total_credits) AS
( SELECT s#, sum(credits)
  FROM Scredits
  GROUP BY s# );
```

```
UPDATE Totcredits
SET total_credits = total_credits + 6;
```

Who suppose to get extra 6 credits ?

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### References

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

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