Chapter 10

Application Development with Views

What is a View?

- Stored query

- Demo: Create MS_Faculty view

View Definition Example

SQL provides the CREATE VIEW statement to create a view:

```
CREATE VIEW MS_Faculty AS
  SELECT * FROM Faculty
  WHERE FacDept = 'MS'
```

What can you do with views?

- Query them:
  - SELECT * FROM MS_Faculty WHERE …
- Update / Insert / Delete (sometimes)
  - DELETE FROM MS_Faculty
    WHERE FacSalary > 90000
    - Deletes rows from the Faculty table where
      - FacDept = 'MS' and
      - FacSalary > 90000

Why Create Views?

- Simplify database usage
  - The primary mechanism for abstraction in standard SQL
- Reduce impact of database definition changes on applications
  - (When applications are written using views)
- Unit of database security

Simplifying Queries

- How many students did each instructor teach in Fall 2007?

Faculty

facssn	facfirstname	faclastname	faczipcode	facrank	facdept
543210987	VICTORIA	EMMANUEL	980112242	PROF	MS
654321098	LEONARD	FIBON	981210094	ASSC	MS
765432109	NICKI	MACON	980159945	PROF	FIN
876543210	CRISTOPHER	COLAN	981141332	ASST	MS
98765432	LEONARD	VINCE	981119921	ASST	MS
987654321	JULIA	MILLS	981149954	ASSC	FIN

Enrollment

offerno	stdssn	enrgrade
1234	123456789	3.3
1234	234567890	3.5
1234	345678901	3.2

Offering

offerno	courseno	offterm	offyear	facssn
1111	IS320	SUMMER	2008	null
1234	IS320	FALL	2007	98765432
2222	IS460	SUMMER	2007	null
3333	IS320	SPRING	2008	98765432

Create a View

A view containing offering data and the number of enrolled students.

```
CREATE VIEW  Enrollment_View
   AS
SELECT Offering.OfferNo, CourseNo, OffTerm,
       OffYear, FacLastName, COUNT(*) as NumStudents
  FROM Offering, Faculty, Enrollment
  WHERE  Offering.FacSSN  =  Faculty.FacSSN
    AND Offering.OfferNo  =  Enrollment.OfferNo
  GROUP BY Offering.OfferNo, CourseNo, OffTerm,
          OffYear, FacLastName
```

Simplifying Queries

- How many students did each instructor teach in Fall 2007?

Enrollment_View

offerno	courseno	term	year	instructor	numstudents
1234	IS320	FALL	2007	VINCE	6
4321	IS320	FALL	2007	VINCE	6
5555	FIN300	WINTER	2008	MACON	2
5678	IS480	WINTER	2008	MILLS	5

Real-World Views

- Contest Management System
  - Problem: For each contestant and problem, determine problem status
  - Table: Submission
  - Views:
    - CurrentContestantProblemStatus – selects most recent submission for each contestant, selects from:
    - CurrentSubmission – current submissions, selects from:
    - CurrentSubmissionFiltered – current submissions with multiple correct submissions filtered out, selects from:
    - CurrentSubmissionFilteredBase – current correct submissions

Reduce Impact of Change

- Faculty Table(facssn, facfirstname, faclastname, …)

- Application Query:

  select facfirstname, facsalary
  from faculty
  where facssn = '123456789'

Reduce Impact of Change

- Faculty Table(facssn, facfirstname, faclastname, …)

- create view fac_view as
  select facssn, facfirstname, faclastname, …
  from faculty;

- Application Query:

  select facfirstname, facsalary
  from fac_view
  where facssn = '123456789'

Reduce Impact of Change

- Faculty Table(facssn, **firstname**, **lastname**, …)

- create view fac_view as
  select facssn, firstname as facfirstname,
     lastname as faclastname, …
   from faculty;

- Application Query:

   select facfirstname, facsalary
   from fac_view
   where facssn = '123456789'

Processing View Queries

- Two options available to DBMS engine:
  - Materialization
    1. DBMS executes view and creates temporary table
    2. DBMS executes query against temporary table
  - Modification
    - DBMS merges the view definition into the query and executes resulting query

Modification Examples

Example 5: Query using a view

```
SELECT FacLastName
 FROM MS_Faculty
 WHERE Salary > 90000
```

Example 6: Modified query

```
SELECT FacLastName
 FROM Faculty
 WHERE FacDept = 'MS' AND Salary > 90000
```