

Lecture 9

- Views
- Computed fields

Views: putting it all together

- DB normalisation is a great concept, but...
- It leads to related information being distributed across a large number of tables, even if it is frequently needed
- This makes it difficult to find one's way around a large database
- To get data into a "usable" data set, we need to write complex select queries with joins, table aliasing, etc.
- These queries take significant computation if we need to execute the same query often
- What if we could compute a query once to collect all of the data we need together, and then only make changes to result when the underlying table content changes?
- This is called a "view"

How to create a view

- A view is created like this:

```
CREATE VIEW <view_name>  
  AS <sql_select_statement>;
```

- A view can be queried with SELECT like an ordinary table, e.g.:

```
SELECT * FROM <view_name>;
```

Example

- Consider our social networking database with the separate **City** and **Country** tables that you added as part of your lab sheet
- We can use a view to still see all user data the way we saw it before we separated the city and country data out into their own tables

Example

- This is how it's done (using "Assignment 1 style"):

```
CREATE VIEW vw_user
AS SELECT given_name, surname, address,
City.name as city_name,
Country.name as country_name,
date_of_birth, email
FROM User, City, Country
WHERE
User.city_id = City.city_id
AND
City.country_id =
Country.country_id;
```

SELECT * FROM vw_user in PHPMYAdmin

	given_name	surname	address	city_name	country_name	date_of_birth	email
<input type="checkbox"/>	Tama	Rakete	29 Shipton St.	Auckland	New Zealand	1992-09-04 00:00:00	tamar@example.com
<input type="checkbox"/>	Hine	Rangi	18c Point Road	Wellington	New Zealand	1992-06-21 00:00:00	hinerangi@example.com
<input type="checkbox"/>	Mike	Tupou	95 Collins Crescent	Auckland	New Zealand	1992-02-12 00:00:00	tonganmike@example.com
<input type="checkbox"/>	Iosefe	Johnson	2 Henson Street	Christchurch	New Zealand	1991-11-12 00:00:00	ijay@example.com
<input type="checkbox"/>	Fiona	Cobber	43 Karamatta Street	Melbourne	Australia	1993-04-17 00:00:00	cobweb@example.com
<input type="checkbox"/>	Jenny	Jones	Onetangi Road, RD 6	Wellington	New Zealand	1992-08-27 00:00:00	jj@example.com
<input type="checkbox"/>	Takahiro	Kamabe	7/11/45 Shinagawa/ku	Tokyo	Japan	1992-03-21 00:00:00	eiffelman@example.com
<input type="checkbox"/>	Charlie	Chucker	63732 San Mateo Highway	Los Angeles	USA	1992-08-31 00:00:00	chucks@example.com
<input type="checkbox"/>	Claudia	Cantoni	Via del Contessa di Padua	Rome	Italy	1991-06-19 00:00:00	cantare@example.com
<input type="checkbox"/>	Natascha	Romanova	PO Box 389811	Moscow	Russia	1992-02-27 00:00:00	nata@example.com
<input type="checkbox"/>	Biao	Li	196 Harbour Road	Singapore	Singapore	1992-02-28 00:00:00	libiao@example.com
<input type="checkbox"/>	Shirley	Stocker	45 Reservoir Rd.	Auckland	New Zealand	1992-10-19 00:00:00	stock@example.com
<input type="checkbox"/>	Xin	Xu	BLD02 Debaoxinyuan East District	Beijing	China	1993-07-08 00:00:00	xxl@example.com
<input type="checkbox"/>	Bruce	Bloggs	79 Mamaku Drive	Christchurch	New Zealand	1991-11-10 00:00:00	bloggs@example.com

Updates are reflected in the view

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Views and inserts, updates, and deletes

- Any changes to tables (inserts, updates, deletes) are reflected in the view
- But what about doing an INSERT into a view, doing an UPDATE a record in the view, or deleting a record from a view? Say, like so:

```
DELETE FROM vw_user
  WHERE given_name = 'Jenny
        AND 'surname = 'Jones';
```

- This is sometimes possible but depends on the view and the tables it is based on, as well as on the RDBMS in question. The particular example above, does not work, because the **vw_user** view does not meet MySQL's criteria for updates. We also cannot insert into this view - but we can update fields in the view.

By the way...

- Note the use of field aliases in the SELECT query:

```
CREATE VIEW vw_user
  AS SELECT given_name, surname, address,
           City.name as city_name,
           Country.name as country_name,
           date_of_birth, email
  FROM User, City, Country
  WHERE   User.city_id = City.city_id
         AND
         City.country_id =
           Country.country_id;
```

- We need these here because both the **City** and the **Country** table have a **name** field and we want to use both – but every field in the result set must be able to be referred to uniquely. Hence **city_name** and **country_name**.

Computed fields

- In a SELECT statement, and hence in any view, we can select computed values, not just fields
- This includes values computed from the values in other fields of the tables used in the query

Example: computed fields

- Consider the following CREATE TABLE statement that will store the body temperature measurements of patients:

```
CREATE TABLE Temperature (
  patient_id INT UNSIGNED NOT NULL,
  measured DATETIME,
  temperature TINYINT UNSIGNED,
  PRIMARY KEY (patient_id, measured)
);
```

- Note that we store the temperature as an integer between 0 and 255 and not as a floating-point value, to save space. How?

Conversion of body temperature values

- The actual body temperature is computed as 30 degrees plus 0.1 times the value of the temperature field, i.e.:

temperature field	Actual temperature in °C
0	30
1	30.1
2	30.2
...	...
253	55.3
254	55.4
255	55.5

Conversion via a view

- Create the following view:

```
CREATE VIEW vw_temperature AS
  SELECT patient_id, measured,
         30 + 0.1 * temperature as degC
  FROM Temperature;
```

- This view now contains the temperature in degrees Celsius in a result set field named **degC**

More on computed fields

- Computed fields can also contain functions or be computed from several fields, and the computation need not be mathematical either:

```
CREATE VIEW vw_user2
  AS SELECT
    CONCAT(given_name, ' ', surname) AS name,
    address,
    City.name as city_name,
    Country.name as country_name,
    date_of_birth, email
  FROM User, City, Country
  WHERE
    User.city_id = City.city_id
    AND
    City.country_id =
      Country.country_id;
```

- This view concatenates the user's given name and surname via a space into a single field

View with concatenated fields

- `SELECT * FROM vw_user2:`

	name	address	city_name	country_name	date_of_birth	email
<input type="checkbox"/>	Tama Rakete	29 Shipton St.	Auckland	New Zealand	1992-09-04 00:00:00	tamar@example.com
<input type="checkbox"/>	Hine Rangī	18c Point Road	Wellington	New Zealand	1992-06-21 00:00:00	hinerangi@example.com
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<input type="checkbox"/>	Shirley Stocker	45 Reservoir Rd.	Auckland	New Zealand	1992-10-19 00:00:00	stock@example.com
<input type="checkbox"/>	Xin Xu	BLD02 Debaoxinyuan East District	Beijing	China	1993-07-08 00:00:00	xxl@example.com
<input type="checkbox"/>	Bruce Bloggs	17 Rimutaka Place	Christchurch	New Zealand	1991-11-10 00:00:00	bloggs@example.com
<input type="checkbox"/>	Dude Intruder	1 Fox Hole Place	Auckland	New Zealand	2011-03-08 17:59:13	dude@intrude.com

Today's lab sheet

- ...is on the web.
- Today: views and updates, inserts and deletes on views