Managing Data & Databases

Session 8
Linking your lists

Today's Dose of SQL

- DML
  - Alisases
  - Subqueries
  - INSERT INTO SELECT
  - UNION
  - JOIN
  - EXISTS
- DDL
  - CREATE TABLE LIKE
  - CREATE INDEX
  - FOREIGN KEY

SQL Aliases

- Use case
  - You can give aliases to columns you select or the tables you select from. Aliases are valid only in the query where they are defined.
- Simplified Syntax
  - SELECT `field1_name` AS `alias1`, ...
    FROM `table_name` AS `alias2`;
- Example
  - SELECT Databasers.first_name AS `First Name`,
    Databasers.last_name AS `Last Name`
    FROM people AS Databasers;
  - SELECT seniority*2 AS double_seniority
    FROM people
    WHERE double_seniority <= 2;

SQL Subqueries

- Use case
  - By putting a query in parentheses and attributing an alias to its result set you can turn it into a subquery. Queries treat the results of their subqueries as in-memory tables. Using subqueries you can do multiple operations in a single query, and without saving the intermediary results.
- Simplified Syntax
  - SELECT `field1_name`, …
    FROM (SELECT `field1_name`, …
    FROM `table_name`) AS `alias1`;
- Example
  - SELECT `First Name`
    FROM (SELECT first_name AS `First Name`,
    last_name AS `Last Name`
    FROM people) AS Databasers;

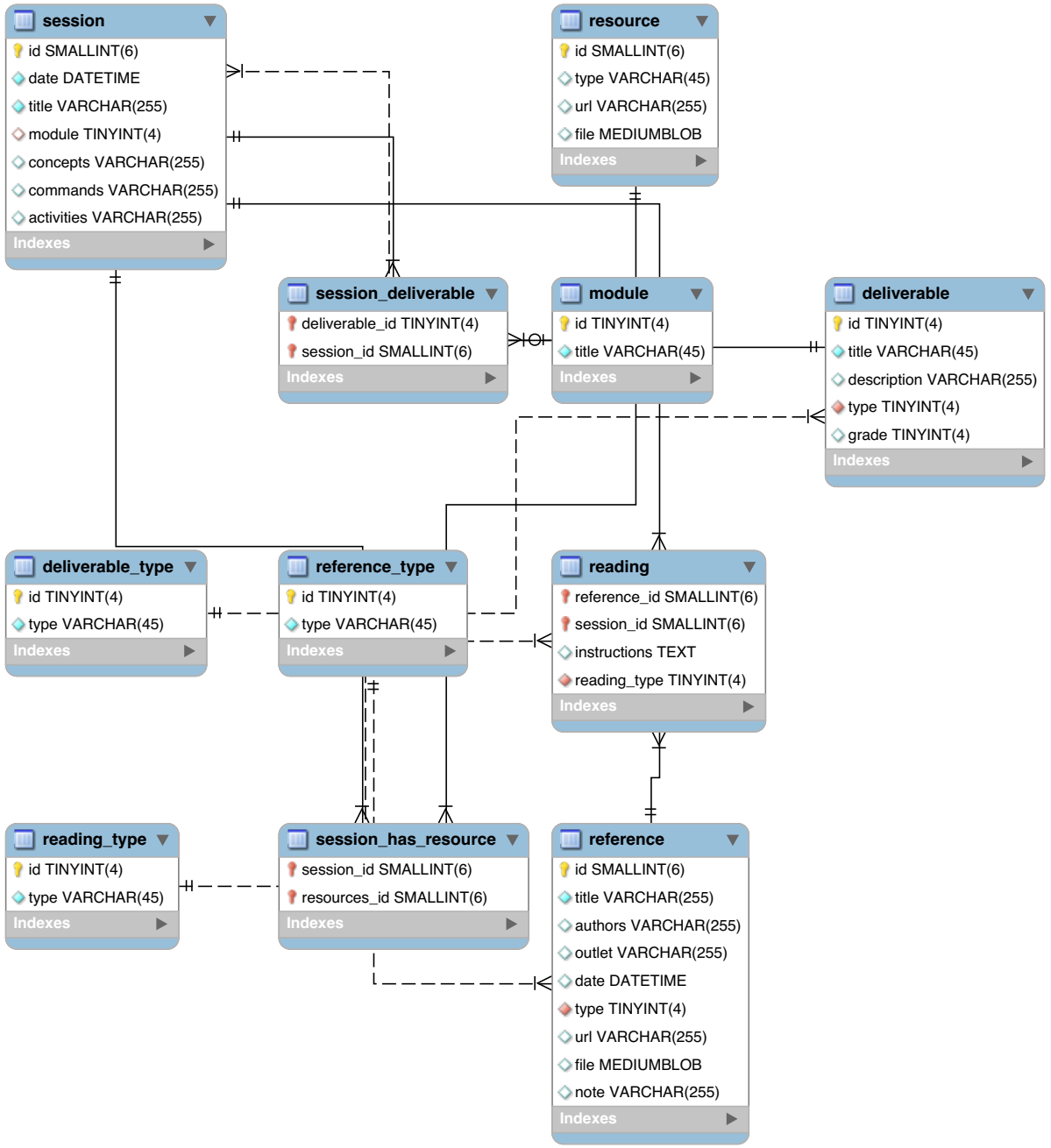
Copying tables in MySQL

- We need to have a table of old people in the class, with the exact same specification as the table "people". MySQL lets you copy the entire structure of a table to a new table using the command CREATE TABLE LIKE. It lets you copy the data from one table to the other using INSERT INTO SELECT. So, all we have to do is:
  - CREATE TABLE decrepits
    LIKE people;
  - INSERT INTO decrepits
    SELECT *
    FROM people
    WHERE seniority>=3;
- You can also check the DDL of the new table to make sure the structure corresponds to what you need:
  - SHOW CREATE TABLE decrepits;

Indexes (Indices?!)

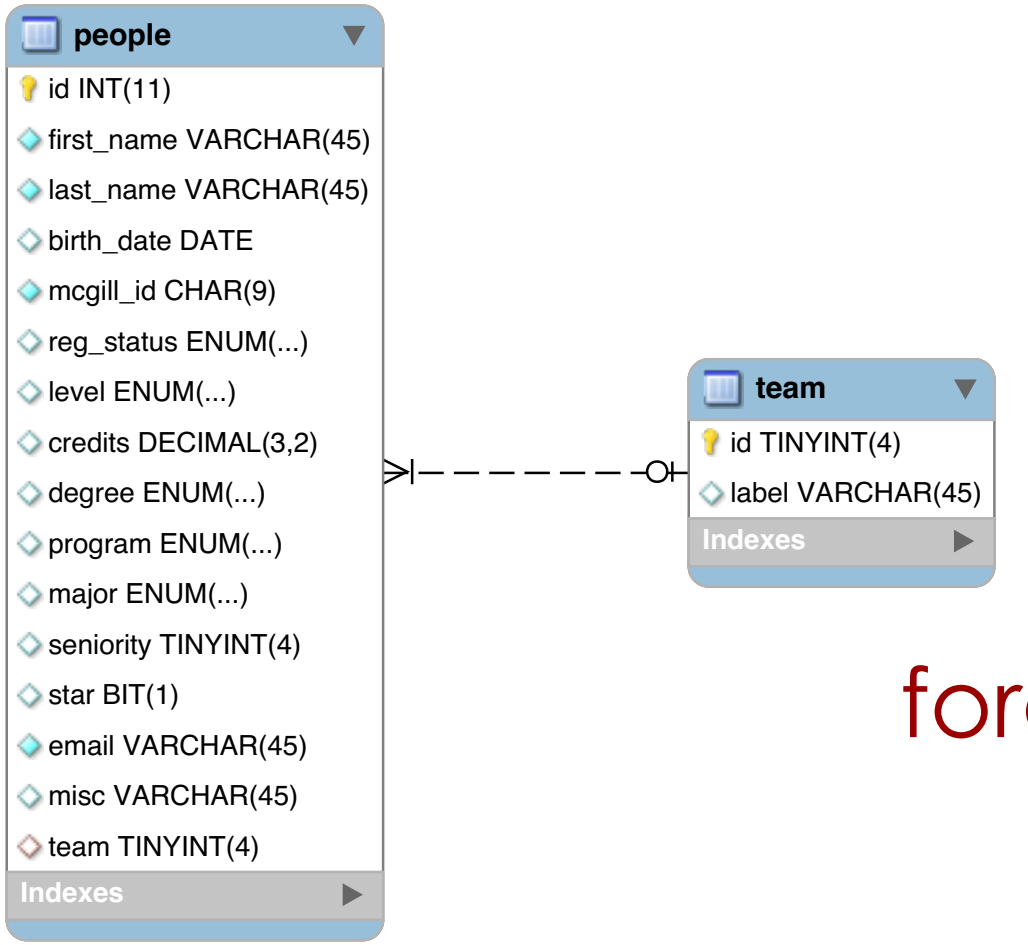
- Use case
  - Indexes are used to speed up sorting, searching and joining. An index may be defined on one or more columns (depending on our needs).
- Syntax
  - CREATE INDEX `index_name`
    ON `table_name`(`column1`, ...);
- Example
  - CREATE INDEX idx_person_name
    ON people (last_name, first_name);
- Since indexes are defined on tables, they should be removed from tables using ALTER TABLE:
  - ALTER TABLE people
    DROP INDEX idx_person_name;

Entity Relationship Diagrams (ERD)



SQL Command FOREIGN KEY

- Use case
  - Creates a link between two tables, making the primary key of one table the lookup list for the foreign key values of the other table.
- Simplified Syntax
  - FOREIGN KEY `field_name`
    REFERENCES `lookup_table_name`(`primary_key`);
- Example
  - CREATE TABLE team
    (id TINYINT AUTO_INCREMENT UNIQUE PRIMARY KEY,
    label VARCHAR(45));
  - ALTER TABLE people
    ADD team TINYINT,
    ADD FOREIGN KEY(team)
    REFERENCES team(id);



What does a foreign key look like?

SQL Command
JOIN

- Use case
  - JOIN is the perfect tool for putting back together all the data that we structure into different tables. JOIN integrates tables vertically.
- Simplified Syntax
  - SELECT `some fields from table_1 and table_2`
    FROM `table_1` JOIN `table_2`
    ON `join_condition`;
- Example
  - SELECT people.id, first_name, last_name, label AS team_label
    FROM people JOIN team
    ON team=team.id;

What does a join look like?

id	first_name	last_name	team
1	Mahmood	Zargar	NULL
11	Omar	Abdelkader	1
21	Saharea	Ahamed	1
31	Liam	Amilhastre	2
41	Shehryar	Bajwa	2
51	Emily	Barber	2
61	Laura	Easton	3
71	Joshua	Frank	3
81	Matthew	Fryml	3
91	Xavier	Guérette	1
101	Blaire	Hinton	NULL
111	Yuan Ping	Jin	NULL

JOIN

id	label
1	Team One
2	Team Two
3	Team Three
4	Team four

=

id	first_name	last_name	label
11	Omar	Abdelkader	Team One
21	Saharea	Ahamed	Team One
91	Xavier	Guérette	Team One
31	Liam	Amilhastre	Team Two
41	Shehryar	Bajwa	Team Two
51	Emily	Barber	Team Two
61	Laura	Easton	Team Three
71	Joshua	Frank	Team Three
81	Matthew	Fryml	Team Three

SQL Command UNION

- Use case
  - Integrates tables horizontally
- Simplified Syntax
  - SELECT Query 1
    UNION
    SELECT Query 2
- Example
  - SELECT id, last_name AS entity_name FROM people
    UNION
    SELECT id, label AS entity_name FROM team;
- Attention
  - The result sets of the two unionized queries must contain the same columns, with the same names and in the same order.

What does a join look like?

id	last_name
1	Zargar
11	Abdelkader
21	Ahamed
31	Amilhastre
41	Bajwa
51	Barber
61	Easton
71	Frank
81	Fryml
91	Guérette
101	Hinton
111	Jin

UNION

id	label
1	Team One
2	Team Two
3	Team Three
4	Team four

=

id	entity_name
1	Zargar
11	Abdelkader
21	Ahamed
31	Amilhastre
41	Bajwa
51	Barber
61	Easton
71	Frank
81	Fryml
91	Guérette
101	Hinton
111	Jin
1	Team One
2	Team Two
3	Team Three
4	Team four

SQL Clause EXISTS

- Use case
  - Conditions the query to the existence of records within a subquery
- Simplified Syntax
  - SELECT `column_name1`
    FROM `table_name1`
    WHERE EXISTS
    (SELECT * FROM `table_name2`
    WHERE `condition`);
- Example
  - SELECT * FROM people
    WHERE EXISTS
    (SELECT * FROM team
    WHERE team.id=people.team);