B0B36DBS: **Database Systems**

http://www.ksi.mff.cuni.cz/~svoboda/courses/202-B0B36DBS/

Practical Class 4

SQL: Data Definition

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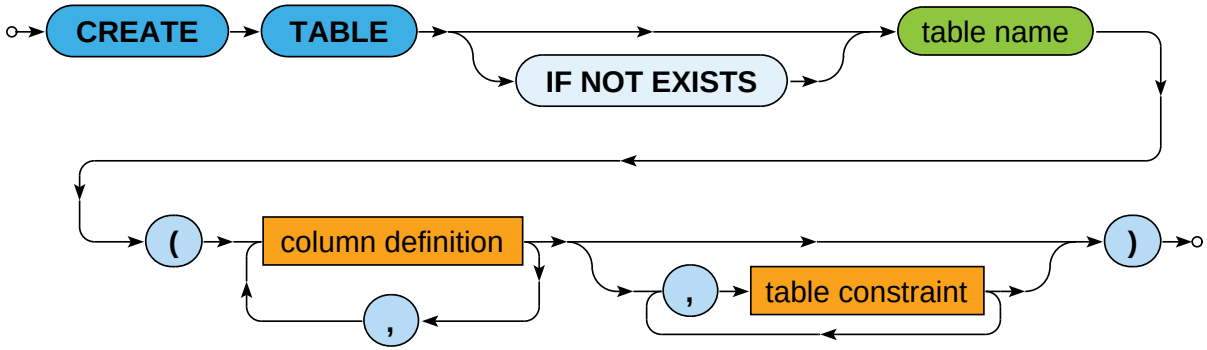
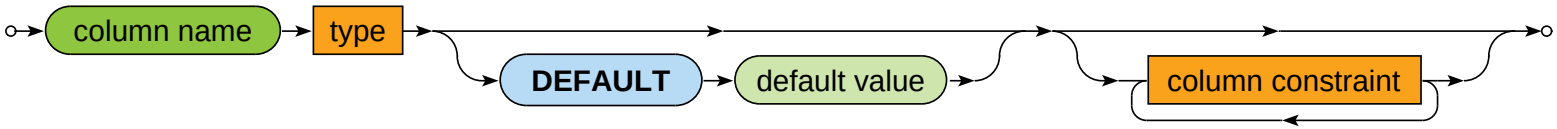
Tables

CREATE TABLE statement

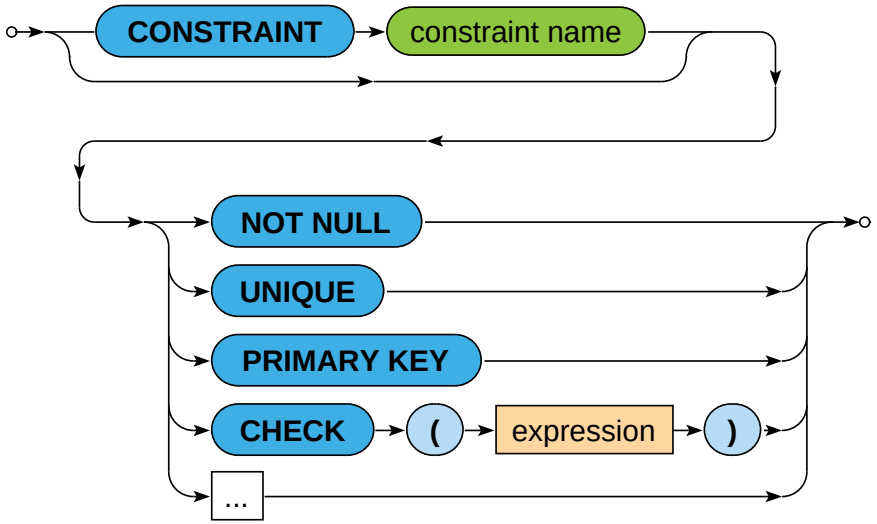


Column definition

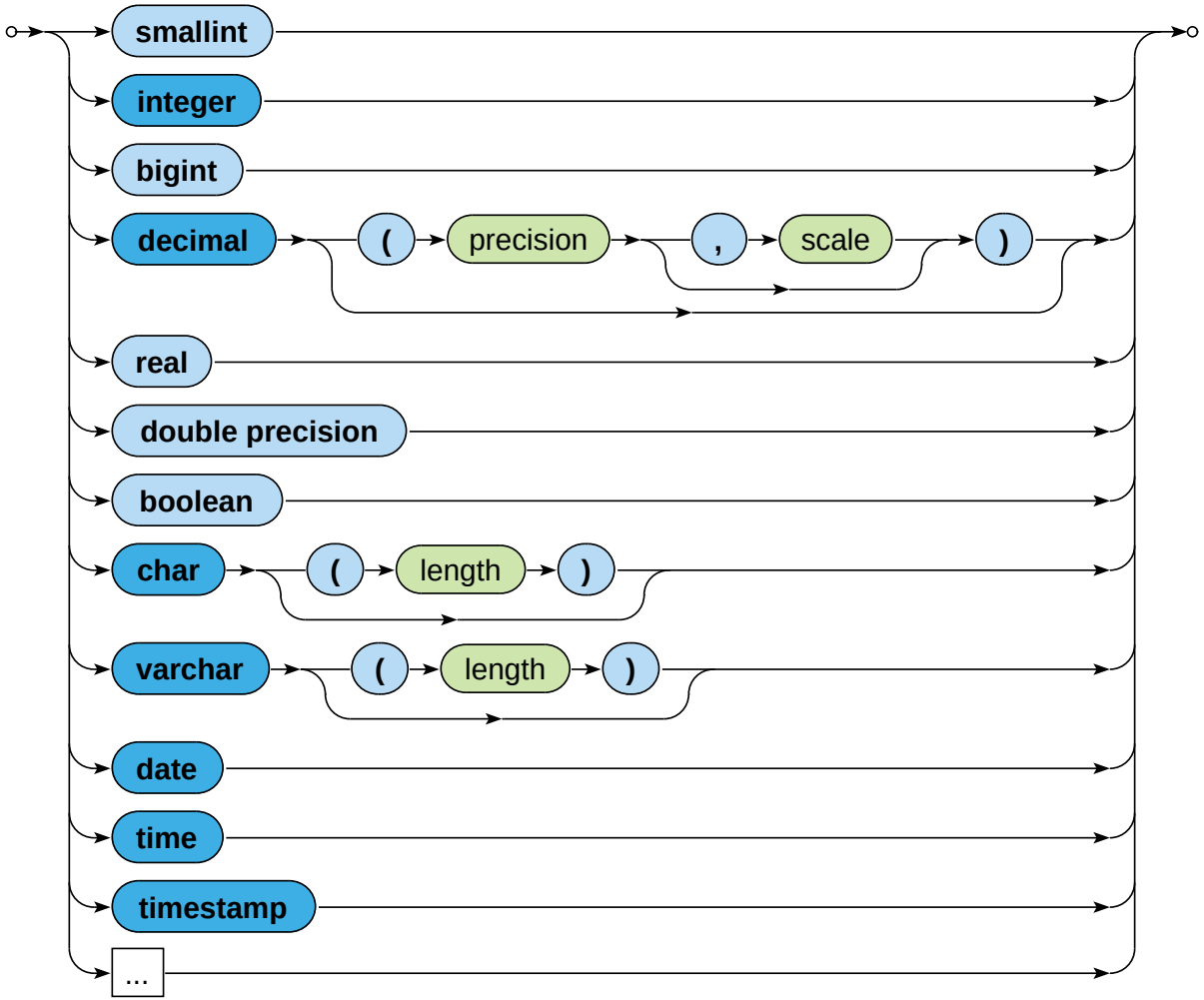


Integrity Constraints

Column-level constraint definition



Data Types


smallint
integer
bigint
decimal
(
precision
,
scale
)
real
double precision
boolean
char
(
length
)
varchar
(
length
)
date
time
timestamp
...

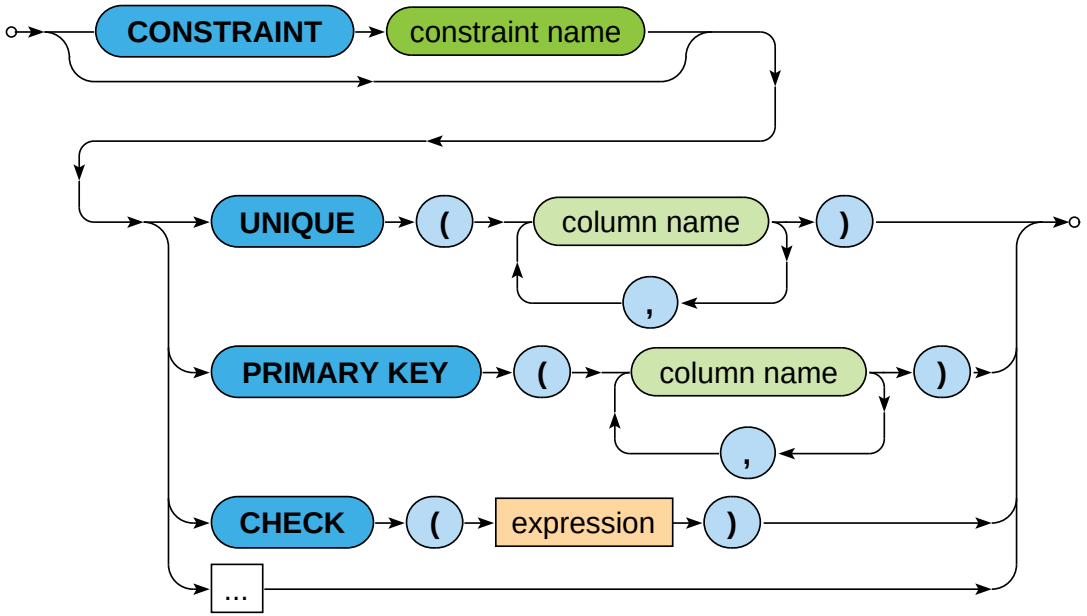
Exercise 1

Create a schema for the following table

- **Library (Name, Street, City, PostalCode)**
- Choose appropriate data types
- Define primary key and `NOT NULL` constraints
  - Use column-level constraints only

Integrity Constraints

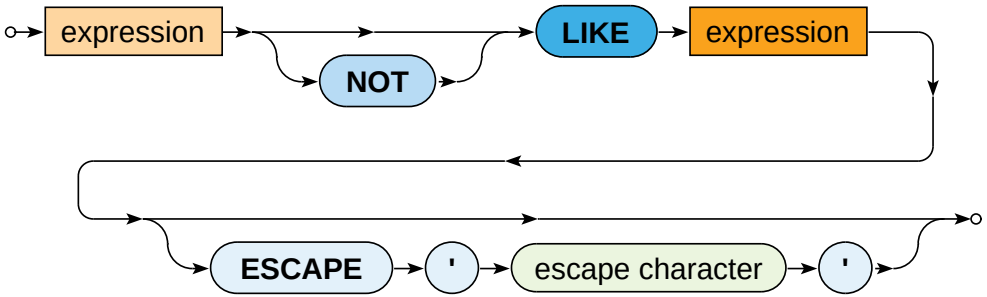
Table-level constraint definition



Exercise 2

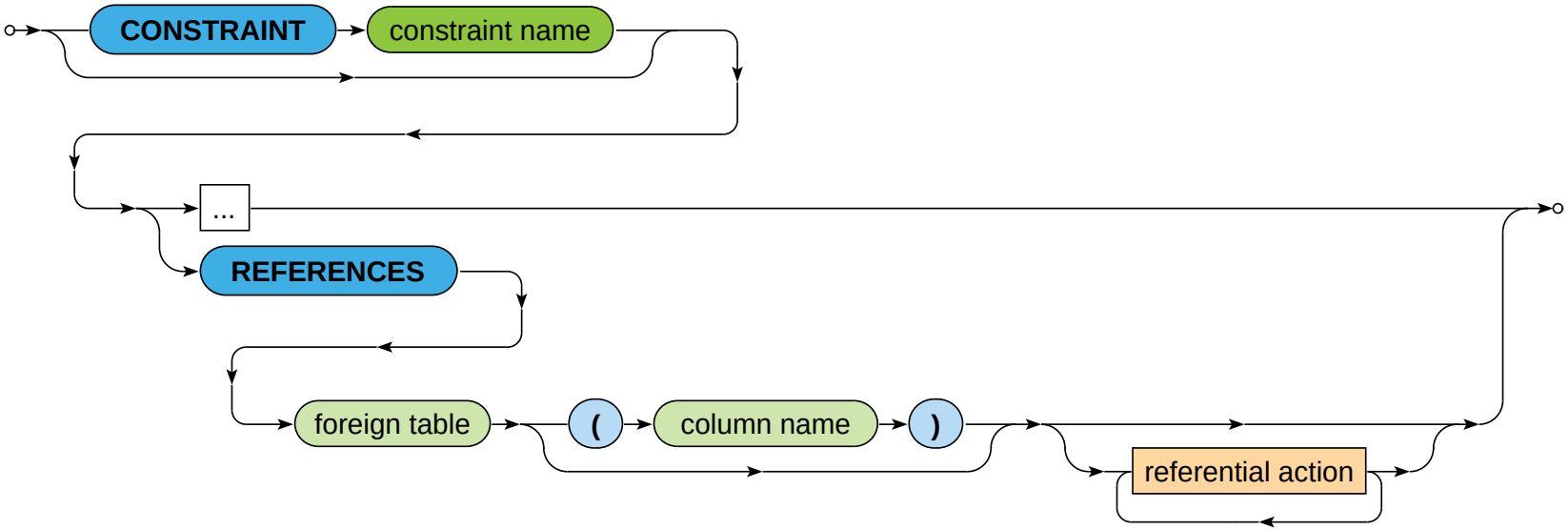
Create a schema for the following table

- **Client (Card, FirstName, LastName, Email, DateOfBirth)**
  - Card is a 16 digit long user card identification number
  - Date of birth is just optional
- Describe all basic integrity constraints
  - Use table-level constraints only
- Check well-formedness of email addresses
  - Use `LIKE` predicate



Foreign Keys

Column-level constraint definition (cont.)



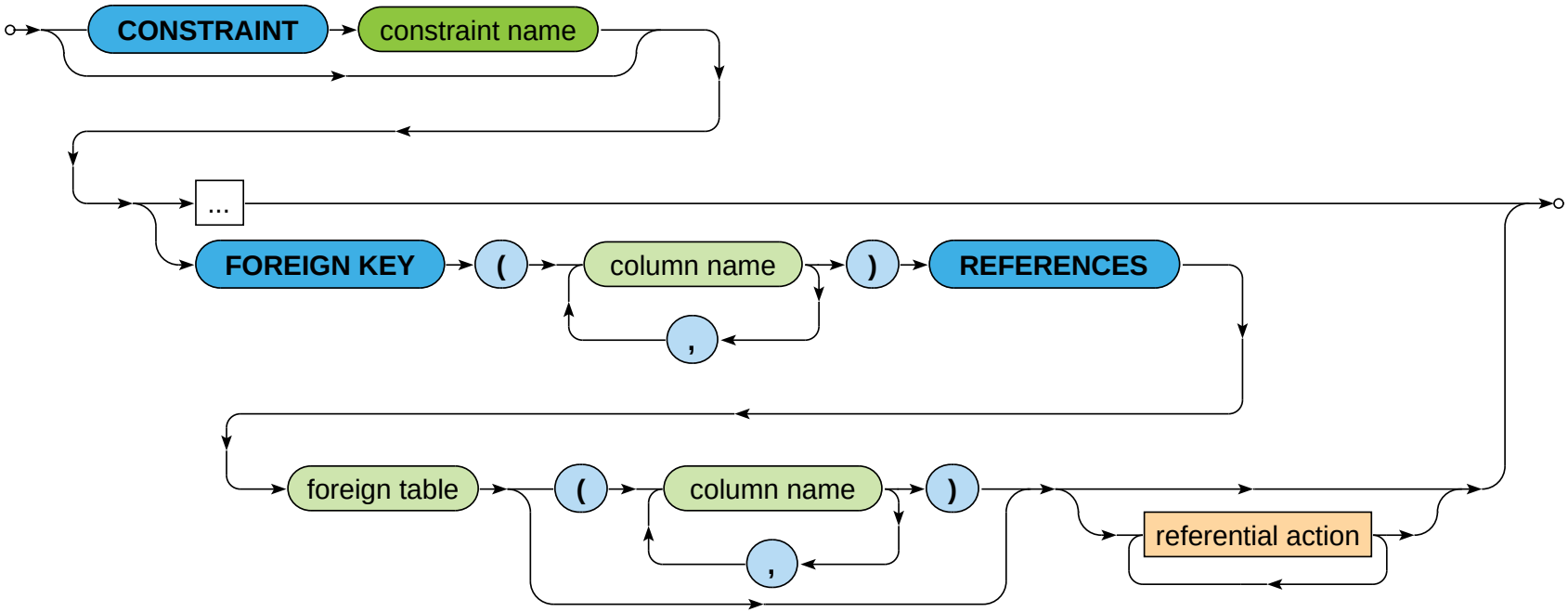
Exercise 3

Create a schema for the following table

- **Phone (<u>Client, Number</u>)**
  Client $\subseteq$ Client (Card)
  - Phone numbers are always 9 digits long
- Describe referential integrity
  - Use a column-level constraint for this purpose

Foreign Keys

Table-level constraint definition (cont.)



Exercise 4

Create a schema for the following tables

- **Title (IdTitle, ISBN, Title)**
  - Id is an artificially generated integer identifier
  - ISBN identifiers are at most 17 characters long
  - Preserve both the relational keys
- **Author (IdAuthor, Name, YearOfBirth, YearOfDeath)**
  - Both years of birth and death are optional
  - Check mutual consistency of their values
- **Authorship(Title, Author)**
  Title $\subseteq$ Title (IdTitle)
  Author $\subseteq$ Author (IdAuthor)
  - Use table-level constraints for the referential integrity

Table Modifications

ALTER TABLE statement

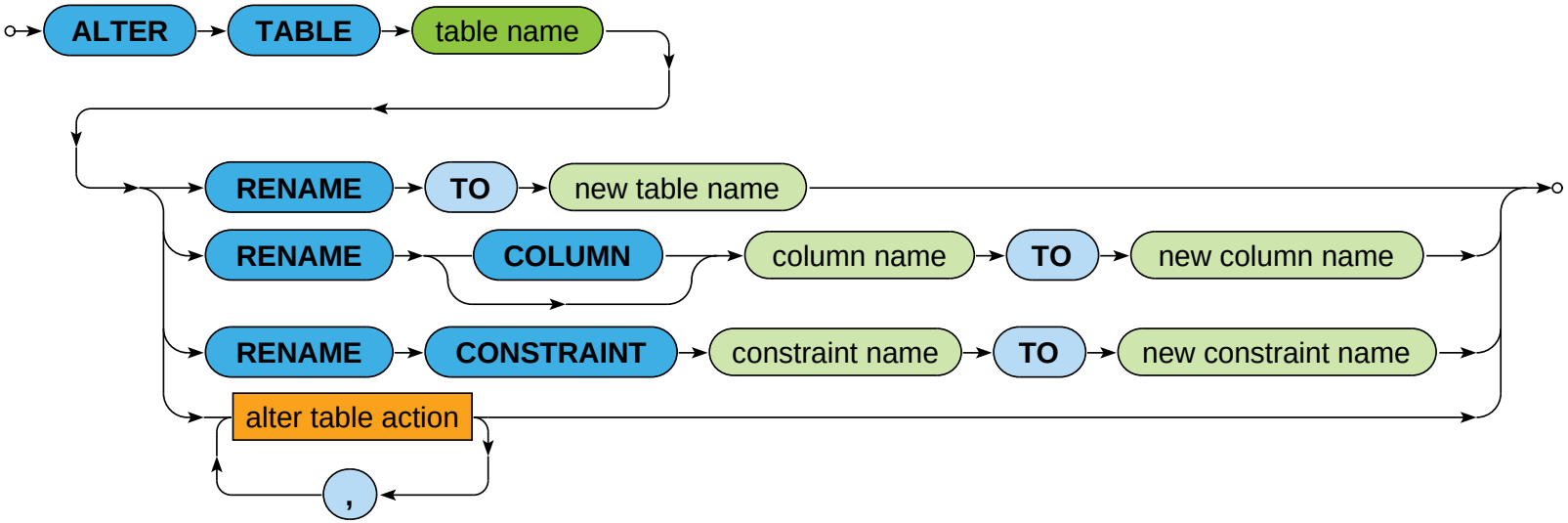
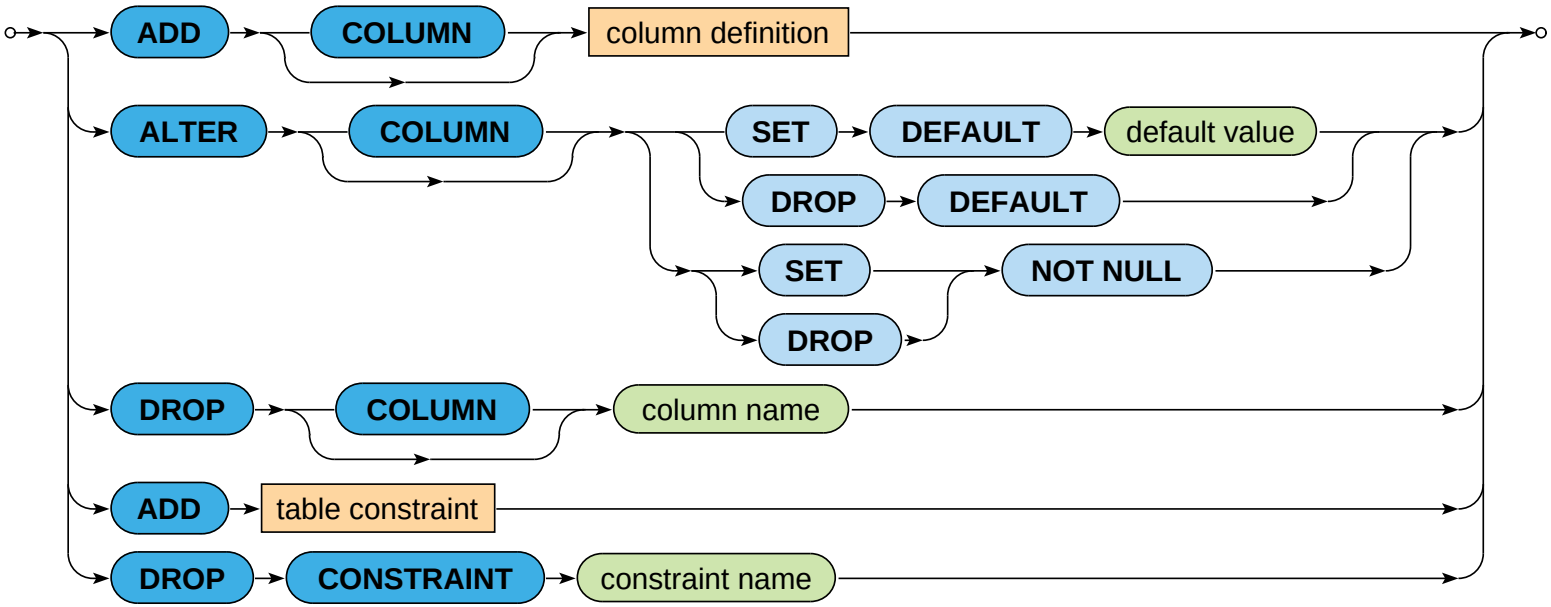


Table Modifications

ALTER TABLE modification action



Exercise 5

Alter schema of a table for libraries

- Add *IdLibrary* as a new primary key of libraries
- Preserve uniqueness of the former *name* column

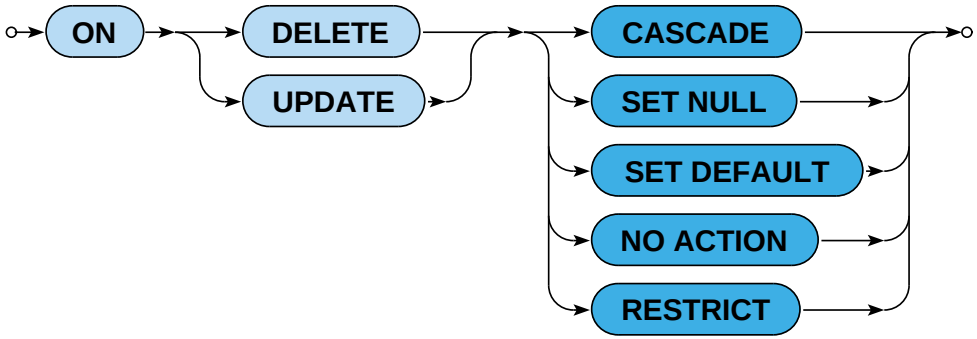
Exercise 6

Create a schema for the following table

- **Book (Library, Signature, Title, DateOfAddition)**
  Library $\subseteq$ Library (IdLibrary)
  Title $\subseteq$ Title (IdTitle)

Referential Actions

Foreign key **referential action**



Exercise 7

Create a schema for the following table

- **Loan (IdLoan, Client, Library, Signature, TimeLoaned, DateReturned)**
  Client $\subseteq$ Client (Card)
  (Library, Signature) $\subseteq$ Book (Library, Signature)
- Date of return is filled in only after successfully returned
- Add suitable referential actions
  - I.e. when a book / client is…
    - updated, then the corresponding loans will be updated, too
    - removed, then the corresponding loans will be preserved

Database Connection

Connection details

- *Host*: slon.felk.cvut.cz
- *Port*: 5432
- *Database*, *user*, and *password*: sent by e-mail

PostgreSQL

- Open-source ORDBMS
- https://www.postgresql.org/

pgAdmin4

- PostgreSQL administration and development platform
- https://www.pgadmin.org/