Course A7B36DBS: **Database Systems**

Practice 03:
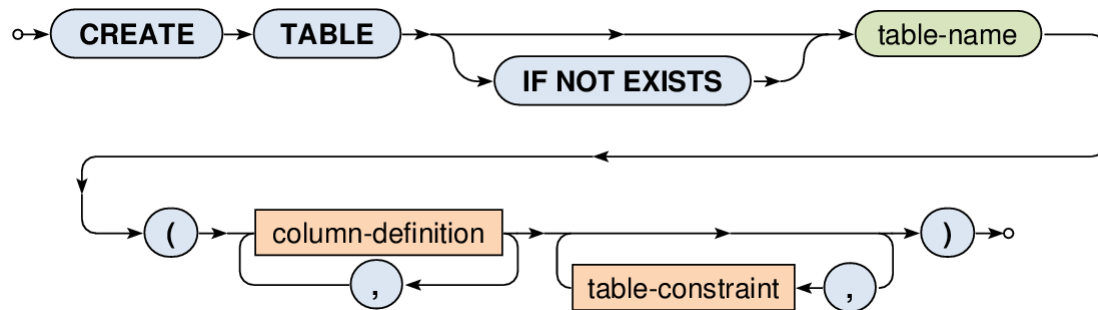
SQL – Data Definition Language

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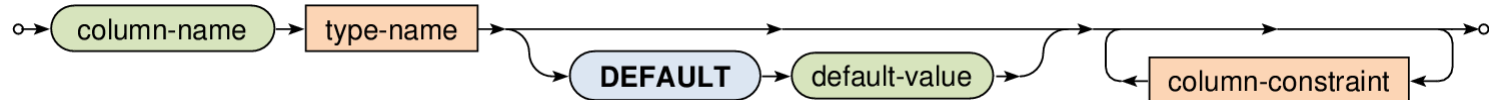
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Create Table Statements

- **Table** creation

- Definition of **columns**

Create Table Statements

- **Data types**
  - INT, BIGINT, DECIMAL, FLOAT, BOOLEAN, CHAR, VARCHAR, DATE, TIME, DATETIME, …

- **Integrity constraints**
  - NOT NULL
  - PRIMARY KEY
  - UNIQUE
  - CHECK
  - FOREIGN KEY with optional referential actions

Assignments

Exercise 1

- Express a CREATE TABLE statement for the following relational schema:

  - Library(<u>Name</u>, Street, City, PostCode)
  - Choose appropriate data types for all attributes
  - Express the PRIMARY KEY and NOT NULL constraints

Exercise 2

- Express a CREATE TABLE statement:
  - User(<u>Card</u>, FirstName, LastName, Email, DateOfBirth)
    - Card is a 16 digits long user card identification number
    - Date of birth may be specified only optionally
  - Describe all basic integrity constraints
  - Check email addresses for correctness
    - I.e. simply verify (using predicate LIKE) that they correspond to a basic pattern of email addresses

Exercise 3

- Express a CREATE TABLE statement:
  - Phone(<u>User, Number</u>)
    User ⊆ User.Card
    - Phone numbers are always 9 digits long
  - Describe referential integrity

Exercise 4

- Express a CREATE TABLE statement:
  - Title(<u>IdTitle</u>, <u>ISBN</u>, Title)
    - IdTitle is an artificially assigned integer identifier
    - ISBN identifiers are at most 17 characters long
    - Transform both the relational keys correctly
  - Author(<u>IdAuthor</u>, Name, YearOfBirth, YearOfDeath)
    - Both years of birth and death are optional
    - Check also consistency of their values
  - Authorship(<u>Title, Author</u>)
    Title ⊆ Title.IdTitle, Author ⊆ Author.IdAuthor

Exercise 5

- Express an ALTER TABLE statement:
  - Add IdLibrary as a new identifier of libraries

Exercise 6

- Express a CREATE TABLE statement:
  - Book(<u>Library, Signature</u>, Title, DateOfAcquisition)
    Library ⊆ Library.IdLibrary
    Title ⊆ Title.IdTitle

Exercise 7

- Express a CREATE TABLE statement:

  - Loan(<u>User, Library, Signature, TimeBorrowed</u>, <u>IdLoan</u>, DateReturned)
    User ⊆ User.Card
    (Library, Signature) ⊆ Book.(Library, Signature)

  - Return date is the actual date of successful return

  - Add suitable referential actions

    - When a book / user is…

      - … updated then the corresponding loans will be updated too

      - … removed then the corresponding loans will be preserved

Exercise 8

- Create INSERT statements for the following data:
  - Two loans undertaken by right one user; these loans correspond to two different books of the same title within one library
  - Specify all the values by yourself, but meaningfully

Exercise 9

- Express the following UPDATE and DELETE statements:

    - Change a signature of the book

    - Remove the user from our database

    - Describe the exact impact on records and their values in all the involved tables