

# T: 22/03/2019

**Master in Informatics and Computing Engineering**  
**Database and Web Applications Laboratory**  
**Instance: 2018/2019**

---

## Lecture #6 :: 22/03/2019

### Goals

By the end of this class, the student should be able to:

- Describe how to implement data business rules using SQL.
- Describe how to maintain consistency of the database in the presence of concurrent accesses.
- Write database user-defined functions.

### Content

1. SQL integrity constraints (recap)
  - Key Constraints.
  - Foreign key constraints.
  - Attribute constraints.
  - Tuple constraints.
  - SQL-3 Triggers.
2. Constraints in PostgreSQL.
3. Triggers in PostgreSQL.
4. Transactions and recovery
  - Transactions.
  - ACID properties.
  - Atomicity of transactions.
  - PostgreSQL and Multiversion Concurrency Control.
5. Database Store procedures
  - User-defined functions in PostgreSQL.

### Bibliography

- R. Ramakrishnan, J. Gehrke. *Database Management Systems*. McGRAW-Hill International Editions, 3rd Edition, 2003, ISBN=0-07-246563-8
- The PostgreSQL Global Development Group. PostgreSQL 9.4 Documentation. Online in <http://www.postgresql.org/docs/9.4/static/>, last accessed on March 2018

## Materials

- Illustrations presented in class: [Integrity constraints, triggers, transactions and user functions \(A6\)](#)
- J. Correia Lopes, Sérgio Nunes. [Database Specification \(EBD\)](#), March 2019
- PostgreSQL. [Constraints](#). [PostgreSQL 9.4.6 Documentation, Section 5.3](#)
- PostgreSQL. [Triggers](#). [PostgreSQL 9.4.6 Documentation, Chapter 36](#)
- PostgreSQL. [Concurrency Control](#). [PostgreSQL 9.4.6 Documentation, Chapter 13](#)
- PostgreSQL. [PL/pgSQL — SQL Procedural Language](#). [PostgreSQL 9.4.6 Documentation, Chapter 40](#)
- PostgreSQL. [User-defined Functions](#). [PostgreSQL 9.4.6 Documentation, Section 35.3](#)

## Summary

- Integrity Constraints in SQL, assertions and triggers. Transactions, ACID properties, Concurrency Control. Database stored procedures.<sup>1)</sup>

— LBAW, 2018/19

[« Previous](#) | [Index](#) | [Next »](#)

<sup>1)</sup>

*Implementação de Restrições de integridade em SQL: de chave, referenciais, de domínio, baseadas em atributos e baseadas em tuplos; asserções; gatilhos. Transações, propriedades ACID, Controlo de concorrência. Procedimentos na base de dados.*

From:

<https://web.fe.up.pt/~jlopes/> - **J. Correia Lopes**

Permanent link:

<https://web.fe.up.pt/~jlopes/doku.php/teach/lbaw/lectures/06>

Last update: **16/03/2019 09:49**

