Study programme(s): Information Technologies

Level: Bachelor

Course title: Databases 2

Lecturer: Miloš Racković

Status: elective

ECTS: 7

Requirements: Databases 1, Object-oriented programming 1

Learning objectives

Introducing principles of development of client-server applications that use database. Understanding of methodologies for connecting applications that use database and principles that functioning of classical and distributed DBMSs are based on.

Learning outcomes

Minimum:

After successful completion of this course students are able to create application which communicates with a database.

Desirable:

After successful completion of this course students are able to understand principles of the JDBC interface and ORM specification for an application which communicate with a database. Students are also able to deeply understand principles of classic and distributed DBMSs.

Syllabus

Theoretical instruction

Client-server architecture. Multilayer architecture. Principles of binding applications and databases. Object-relational mapping (ORM). Normalization of relational datamodel. Physical organization of databases. Transaction management in DBMSs. Distributed DBMSs. Security of databases.

Practical instruction

In practical part of this course students create two-layer application that uses JDBC to communicate with relational database.

Literature

Recommended

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, Database Systems, The Complete Book, Prentice Hall, Pearsons Education International, 2002.
2. C.J. Date, An Introduction to Database Systems, Pearson, Addison Wesley, 2004.
3. Mike Keith, Merrick Schincariol, Pro JPA 2 (Expert's voice in Java), Apress; 2nd ed. edition, 2013.

Weekly teaching load				
Lectures: 2	Exercises: 1	Practical Exercises: 2	Student research: 0	Other:

Teaching methodology

Classical teaching methods using projector are applied during theoretical instruction. Principles of creating applications that use database are described. The object-relational mapping is introduced, too. Classical teaching methods are used on excercises where relational data model normalization examples are described, as well as principles of creating and maintaining physical data structures (B trees).

Practical instruction is performed in computer laboratory where students are introduced with development tools through practical work. Through practical examples and labs, they illustrate a small application that communicate with a database using JDBC driver. After that, student learn to apply ORM and create two-layer application with CRUD functionalities.

On the final exam student has to perform knowlegde of relational data model normalization, principles of physical data structures, as well as functioning of classical and distributed DBMSs.

Grading method (maximal number of points 100)

Pre-exam oblications	**points**	**Final exam**	**points**
Test (theory)	20	Oral exam	40
Practical test	10		
Project	30		