

## WP3 Report: Appendix A

### Laboratory and study work descriptions of partners' existing material

Helia, Helsinki Business Polytechnic	
Concurrency and Isolation Levels	A -1
Transaction programming in distributed applications	A -2
Indexes and Performance	A -3
Distributed transaction programming	A -4
HAMK, Häme Polytechnic	
SQL Queries and Updates	A -5
First design exercise	A -6
Recovery and Commit/Checkpoint Lab	A -7
Database design lab	A -8
Install and configure Oracle DBMS	A -9
Reutlingen University	
Database Lab	A -10
Analytical Information System's Study Work	A -11
TEI of Thessaloniki	
Database Design, Implementation, Queries and Updates	A -12
DB server technology, DB application programming	A -13
Web ORDBMS Technology	A -14
University of Macedonia	
Introduction to Modelator	A -15
SQL Labs	A -16
Using MS Access and Solid FlowEngine	A -17
Building stand-alone and web applications	A -18
Solid FlowEngine stored procedures	A -19
Solid FlowEngine backup/restore tools	A -20
Optimizing Database Performance	A -21
University of Málaga	
Database Fundamentals Lab	A -22
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Creation of a distributed DBMS	A -28
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Database Design Methodology	A-30

**WP3-Final Report Appendix A – 1**

Institution	<b>Helia</b>
Course	<b>Database Programming</b>
Documented by	<i>Martti Laiho</i>
Document date	<i>14 May 2003</i>
Category based on the list of the DBTech Pro lab topics	DB Programming Lab / PL-Isolation
Prerequisite	
Topic	SQL DML + DCL / transactions
Name	<b>Concurrency and Isolation Levels</b>
Description	Set of script for experimenting the effects of isolation levels on various DBMSs
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Demo / guided lab / self-study lab
Deliverables, products	Report of the effects
solo / pair / group work (max. n students)	Solo / pair / group work
Learning goals	Understanding the effects of isolation levels on various DBMSs
Duration of the lab/study	3-4 hours
Appx. student work hours	3-6 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written in-house
Specific study material	Explanation of Isolation levels in textbooks, SQL standard, and manuals
Teacher's instructions	No
Example solution	Yes
Other instruction material	
DBMS product(s)	Oracle, SQL Server, DB2, Solid
DBMS configuration <sup>1</sup>	Solid: 1, Oracle, SQL Server, and DB2: 2 or 3
Operating system	Windows
Specific hardware requirements	See configuration
Comments	

1. **DBMS configurations**/Types of laboratory infrastructures:
2. DBMS installed on each student workstation.
3. DBMS installed on a removable disk to be used in a student workstation.
4. DBMS installed on a server machine in school and accessed over LAN only.
5. DBMS installed on a server machine in school and accessed over WWW.
6. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
7. Student's home installations.
8. DBMS installed on a removable disk to be borrowed for student's home use.

## WP3 Final Report Appendix A – 2

Institution	<b>Helia</b>
Course	<b>Database Programming</b>
Documented by	<i>Martti Laiho and Kari Silpiö</i>
Document date	<i>14 May 2003</i>
Category based on the list of the DBTech Pro lab topics	DB Programming Lab / PL-Tx / Isolation / Performance / Architectures
Prerequisite	
Topic	Transaction programming
Name	<b>Transaction programming in distributed applications</b>
Description	Java / J2EE / COM+ (.NET to be extended) application variants of TPC-A
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Demo / guided lab / self-study lab
Deliverables, products	Report of the effects
Solo / pair / group work (max. n students)	Solo / pair / group work
Learning goals	Understanding the effects of isolation and transaction models under workload
Duration of the lab/study	3-10 hours
Appx. student work hours	5-20 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written in-house
Specific study material	Textbooks, SQL standard, and manuals
Teacher's instructions	No
Example solution	Yes
Other instruction material	
DBMS product(s)	Cloudscape, Oracle, SQL Server, DB2, Solid, "Access?"
DBMS configuration <sup>1</sup>	Cloudscape, Solid: 1, Oracle, SQL Server, and DB2: 2 or 3
Operating system	Windows / Linux (to be extended)
Specific hardware requirements	Client workstations and one or more servers
Comments	Development continues ...

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 3**

Institution	<b>Helia</b>
Course	<b>Database Administration</b>
Documented by	<i>Martti Laiho</i>
Document date	<i>11 May 2003</i>
Category based on the list of the DBTech Pro lab topics	Database Administration Lab / AL-Tuning
Prerequisite	DBMS theory
Topic	SQL DDL
Name	<b>Indexes and Performance</b>
Description	Exercises based on scripts for loading reasonably large base data, creating indexes, and generating transactions
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Guided lab, with proper facilities this can be used as a self study lab
Deliverables, products	Report of the elapsed time in various test runs and explanation of the effects
Solo / pair / group work (max. n students)	Solo / pair / group work
Learning goals	General understanding of the effects of Indexes
Duration of the lab/study	3-4
Appx. student work hours	4 - 6 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written (in Finnish) in-house text
Specific study material	Code and scripts in file
Teacher's instructions	Missing
Example solution	Limited version
Other instruction material	
DBMS product(s)	SQL Server 2000, Oracle, Solid
DBMS configuration <sup>1</sup>	2 or 3
Operating system	Win2000
Specific hardware requirements	Simple experimenting using a typical single disk workstation (configuration 2). Advanced experimenting requires multiple disks (configuration 3)
Comments	Only limited first version in use. Subject is large and the lab will be extended

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

### WP3 Final Report Appendix A – 4

Institution	<b>Helia</b>
Course	<b>Database Programming</b>
Documented by	<i>Martti Laiho</i>
Document date	<i>14 May 2003</i>
Category based on the list of the DBTech Pro lab topics	DB Programming Lab / PL-DTx
Prerequisite	
Topic	Transaction programming
Name	<b>Distributed transaction programming</b>
Description	J2EE global transactions
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Demo / guided lab / self-study lab
Deliverables, products	Report of the effects
Solo / pair / group work (max. n students)	Solo / pair / group work
Learning goals	Understanding the effects of use of global transactions
Duration of the lab/study	3-4 hours
Appx. student work hours	4-6 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written in-house, extended from Sun's J2EE tutorial
Specific study material	J2EE tutorial and specifications
Teacher's instructions	No
Example solution	Yes
Other instruction material	
DBMS product(s)	Cloudscape, Oracle, (SQL Server, DB2 to be included)
DBMS configuration <sup>†</sup>	Cloudscape: 1, Oracle, SQL Server, and DB2: 2 or 3
Operating system	Windows / Linux (to be extended)
Specific hardware requirements	Client workstations and one or more servers
Comments	Development continues ...

<sup>†</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A - 5**

Institution	<b>Häme Polytechnic</b>
Course	<b>Data Management 1</b>
Documented by	<i>Jaakko Rantanen</i>
Document date	<i>7 March 2003</i>
Category based on the list of the DBTech Pro lab topics	DB Programming Lab / PL-ISQLq
Prerequisite	-
Topic	SQL DML
Name	<b>SQL Queries and Updates</b>
Description	57 SQL-statements to write for querying and updating the Course Database (5 tables)
Deliverables, products	One digital document that includes the SQL DML source code solutions
Type written exercise/demo/guided lab/self-study lab/independent practical	Self study lab + independent practical. The even-numbered are examples and odd-numbered are exercises.
Learning goals	Basics of SQL DML (same topics as in Connolly 3ed. chapter 5)
Duration of the lab/study	Total max 4 hrs, 1-2 hrs/week for 3-4 weeks
Appx. student work hours	15 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written in-house
Specific study material	In-house material
Teacher's instructions	No
Example solution	Yes
Other instruction material	No
DBMS	Oracle, Solid, MS SQL Server, DB2, Access etc. are available on the web site ( <a href="http://stud.hamk.fi/sql/">http://stud.hamk.fi/sql/</a> in Finnish only)
DBMS configuration <sup>1</sup>	4 and 3 for queries only, and also 1 or 6 for updates
Operating system	Could be any for web based exercises
Specific hardware requirements	None
Comments	-

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

## WP3 Final Report Appendix A - 6

Institution	<b>Häme Polytechnic</b>
Course	<b>Data Management 1</b>
Documented by	<i>Jaakko Rantanen</i>
Document date	<i>28 March 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	Theoretical background of the concepts relation, primary key, alternate key, data types etc.
Topic	Primary services of a database management system
Name	<b>First design exercise</b>
Description	Learning to understand the key concepts: relational model, relations, keys, functional dependency, principles of normalization and basics of Entity -Relationship model and diagram.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Written exercise - Self-study lab
Deliverables, products	A short report, diagrams and the implemented database file
Solo / pair / group work (max. n students)	Pair work is preferred, solo work is OK
Learning goals	To understand and apply the basic structural concepts
Duration of the lab/study	About 1 hour demo and instruction
Appx. student work hours	3-4 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written, in-house
Specific study material	No
Teacher's instructions	In Finnish only
Example solution	No
Other instruction material	In Finnish only
DBMS product(s)	Microsoft Access
DBMS configuration <sup>1</sup>	1 or 6
Operating system	Any Windows version
Specific hardware requirements	No
Comments	

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP2 Final Report Appendix A - 7**

Institution	<b>Häme Polytechnic</b>
Course	<b>Data Management 2</b>
Documented by	<i>Jaakko Rantanen</i>
Document date	<i>28 March 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Concept
Prerequisite	Theoretical background of the concepts: transaction log, checkpoint, point of consistency, roll-forward recovery, commit & rollback
Topic	Primary services of a database management system
Name	<b>Recovery and Commit/Checkpoint Lab</b>
Description	Learning to understand the key concepts and their significance in backup & restore. Simulating different types of failures and observing the results of database recovery.
Type written exercise/demo/guided lab/self-study lab/independent practical	- Written exercise - Self-study lab
Deliverables, products	A short report of observations. It may include a session spool file (trace file, session log).
Solo / pair / group work (max. n students)	Pair work is preferred, solo work is OK
Learning goals	To understand the fault tolerance and recoverability features of a DBMS, the difference between concepts database backup and file system backup.
Duration of the lab/study	Max 1 hour demo and instruction
Appx. student work hours	2-3 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written, in-house
Specific study material	No
Teacher's instructions	In Finnish only
Example solution	No
Other instruction material	In Finnish only
DBMS product(s)	Solid Embedded Engine
DBMS configuration <sup>1</sup>	1 or 6
Operating system	Windows or Linux etc.
Specific hardware requirements	No
Comments	

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.



## WP3 Final Report Appendix A – 8

Institution	<b>Häme Polytechnic</b>
Course	<b>Data Management 2</b>
Documented by	<i>Jaakko Rantanen</i>
Document date	<i>30 March 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Create, DL-Catalog, DL-Examples, DL-Tools
Prerequisite	Theoretical background of the concepts relation, primary key, alternate key, data types, principles of SQL DDL.
Topic	Primary services of a database management system
Name	<b>Database design lab</b>
Description	<p>Learning to understand relational model, relations, integrity constraints, normalization, Entity -Relationship model and diagram and SQL DDL.</p> <p>An example how to map OO model (in UML) to relational database schema. Video rental company. Discuss issues, e.g. key design, expressing generalization hierarchy, representing history and giving examples of stored procedures to avoid problems of temporal data, utilizing views, etc.</p> <p>Each student is assigned to create the database schema using a professional database designer tool (ER/Studio) and to implement the database solution on a Oracle server.</p> <p>Requirements and descriptions of behaviour of a are given. Student is assigned to design, document and implement a database schema and input test data.</p> <p>Performance tuning. Interpreting execution plans (Oracle). Diagnosing performance problems and finding improvements.</p>
Type written exercise/demo/ guided lab/self-study lab/ independent practical	<p>A guided (partly project type) series of</p> <ul style="list-style-type: none"> <li>- written exercises</li> <li>- self-study labs</li> </ul> <p>that are logically connected by two common application domains.</p>
Deliverables, products	A short report, diagrams and the implemented database file
Solo / pair / group work (max. n students)	Pair work is preferred, solo work is OK
Learning goals	To understand and apply the basic structural concepts
Duration of the lab/study	1-2 hour demo and instruction per exercise
Appx. student work hours	3-4 hours student work per exercise
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	written, in-house
Specific study material	No
Teacher's instructions	In Finnish only
Example solution	No
Other instruction material	In Finnish only
DBMS product(s)	Primarily Oracle, the second to compare similarities and syntactical, semantical etc. differences, is Solid Embedded Engine
DBMS configuration 1	Primarily 3, also 1 and 6
Operating system	Windows workstation and servers, Solaris server
Specific hardware requirements	No
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

## WP3 Final Report Appendix A - 9

Institution	<b>Häme Polytechnic</b>
Course	<b>System Implementation</b>
Documented by	<i>Jaakko Rantanen</i>
Document date	<i>28 March 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Config
Prerequisite	Theoretical background of the concepts: database, tablespaces, database files, transaction log, data dictionary etc.
Topic	Primary services of a database management system
Name	<b>Install and configure Oracle DBMS</b>
Description	Learning to configure data file, redo log and archive log structures and their significance in backup & restore. Writing simple backup & restore scripts.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Written exercise - Guided lab, partly self-study
Deliverables, products	A short report of observations. It may include a session spool file (trace file, session log).
Solo / pair / group work (max. n students)	Group work of 2-4 students is preferred, solo work is not recommended
Learning goals	To understand and implement the fault tolerance and recoverability features of Oracle.
Duration of the lab/study	2 – 3 hours in one week
Appx. student work hours	4-5 hours
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written, in-house
Specific study material	In-house material has references to Oracle manuals, Oracle University course materials are available (OAI agreement)
Teacher's instructions	No
Example solution	No
Other instruction material	In Finnish only
DBMS product(s)	Oracle8 (Oracle9 is also possible but not used so far)
DBMS configuration <sup>1</sup>	2
Operating system	Windows NT/2000/XP professional (or Linux)
Specific hardware requirements	The lab requires a suitable environment. bIT@HAMK runs this in a lab room where all workstations have removable disks; For students there is a set of special disks for this lab: OS is pre-installed on the disks. Installation of OS etc. has been a separate lab for another student group participating in a OS course.
Comments	The lab has been ran 2 times. The experiences are not so encouraging. The problem is that it seems to be too time consuming. There are too many potential technical problems.

<sup>1</sup> **DBMS configurations/**Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

## WP3 Final Report Appendix A – 10

Institution	<b>Reutlingen University</b>
Course	<b>Database and Information Systems</b>
Documented by	<i>Fritz Laux</i>
Document date	<i>24 May 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Concept, AL-Catalog, DL-Create, DL-Examples, DL-Tools, PL-ISQL, PL-Tx, PL-API, PL-Sp
Prerequisite	Course "Database and Information Systems"
Topic	Data Modeling, database services, SQL, Database Programming
Name	<b>Database Lab</b>
Description	<p><i>Contents</i></p> <p>We will analyze and model the management of courses and lecture rooms for our University. First we create semantic data models (Entity-Relationship, object oriented model with UML-Notation) then translate it to a relational model. The students will implement the relational model in Access and develop a simple application for it.</p> <p>In the second part the participants acquire a solid knowledge with SQL and the transaction and locking concept of Oracle. To achieve this, we create tables, insert data, and write queries with grouping and joins. Concurrent transactions are investigated in a multi-user environment.</p> <p><i>Syllabus:</i></p> <p>1 <i>Data modelling:</i> Entity-Relationship Model, Entity-Relationship Diagram, methodology for ER-modelling, object-oriented Model, object-oriented concepts and properties, ODMG object model, object-oriented diagrams, UML syntax for structure and behaviour (static and dynamic model), Tools: IDE Together from Together Soft, OODBMS Fast Objects from Poet, relational model, relations, keys, functional dependency, normalization, rules for the relational model, diagram for RM (Bachman diagram), semantic data modelling, database design, development process, design rules, Tools: MS Access</p> <p>2 <i>Database Languages:</i> SQL, Object Definition/Query Language (ODL/OQL), DDL, Data Dictionary, graphical tools: MS Access</p> <p>3 <i>Transaction Management:</i> serialization (locking, consistent snapshot), Tools: Oracle, Ocelot</p> <p>4 Database Programming: JDBC, ODMG API's, Language: Java</p>
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Guided lab
Deliverables, products	Data Models (ERM, RM, OOM), tested SQL-scripts, Java Program
Solo / pair / group work (max. n students)	Individual and small groups (max. 3 students)
Learning goals	<p>The <i>aim</i> is to practice data modelling, the database language SQL and the use of commercial database systems like Access, Fast Objects and Oracle.</p> <p>The students learn to methodologically design and program databases.</p>
Duration of the lab/study	Max 30 min demo or instruction/week
Appx. student work hours	4 hours/week presence, 4 hours/week independent study
Instructions 1) demo/oral/written 2) in-house / from a source	<p>Written, in-house</p> <p>H. F. Korth, A. Silberschatz, <i>Database system concepts</i>, McGraw Hill 1991</p>

text (which one?)	C. J. Date, <i>An introduction to database systems</i> , Vols. I , II, Addison-Wesley 1995 Hamilton, Cattell, Fisher: <i>JDBC Database Access with Java</i> , Addison-W. Cattell (Ed.), <i>The ODMG Standard, V. 2.0</i> , Addison-W.
Specific study material	No
Teacher's instructions	No
Example solution	Yes
Other instruction material	Lecture notes
DBMS product(s)	Access, Oracle, Poet Fast Objects, SQL front end (JSQL)
DBMS configuration 1	1 and 3 and optionally 6
Operating system	Windows 2000 and Linux Oracle Server
Specific hardware requirements	No
Comments	IEEE CS BOK topics covered: IM1, IM2, IM3, IM4, IM5, IM6, IM7, SE2, SE3

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 11**

Institution	<b>Reutlingen University</b>
Course	<b>Analytical Information Systems</b>
Documented by	<i>Fritz Laux</i>
Document date	<i>24 May 2003</i>
Category based on the list of the DBTech Pro lab topics	WL-OLAP, WL-Schema, ML-Principles, ML-Stages, ML-Market Basket, ML-Case Study, ML-Visualization,
Prerequisite	Course "Analytical Information Systems"
Topic	Data Warehousing, OLAP, Data Mining
Name	<b>Analytical Information System's Study Work</b>
Description	Each student group (max. 2 students) has to work on a different case study. The students have to write a report documenting the analysis, the solution process, and commenting on the findings. The results are presented in the seminar.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Self-study lab - Assistance on request
Deliverables, products	Written report of the knowledge discovery process documenting Data Warehouse model, Data Mining algorithms, discussion of findings
Solo / pair / group work (max. n students)	Small groups (1-2 students)
Learning goals	The <i>aim</i> of this workshop is to get experience in the technologies of data warehouse and analytical information systems, and practise the planning, structuring, and operations for knowledge discovery in large data banks. The students to solve business intelligence problems with the help of MS SQL Server and the Analysis Services. If necessary more sophisticated data mining tools can be used (MIS Delta Miner, Angoss Knowledge Studio, Cognos, Kiwi ).
Duration of the lab/study	1 h presentation / student group
Appx. student work hours	8 hours/week independent study
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written, in-house Literature is the same as for the lectures
Specific study material	No
Teacher's instructions	No
Example solution	No
Other instruction material	Lecture notes
DBMS product(s)	SQL Server with Analysis Services, DB2 UDB for Data Warehousing and OLAP MIS Delta Miner, Angoss Knowledge Studio, Cognos, Kiwi for Data Mining
DBMS configuration <sup>1</sup>	1 and 3 and optionally 6
Operating system	Windows 2000/XP
Specific hardware requirements	No
Comments	<i>IEEE CS BOK topics covered:</i> CS 375 (IM3, IM6 + DW modelling, IM8 + Data Marts), CS 374 (IM10), OLAP (IM5+ multidimensional Query), IS3, IS4, IS8

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

## WP3 Final Report Appendix A - 12

Institution	<b>TEI of Thessaloniki</b>
Course	<b>Database Management Systems I</b>
Documented by	<i>Dimitris Dervos &amp; Athanasios Margaris</i>
Document date	<i>18 April 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Example, DL-Create
Prerequisite	-
Topic	SQL DDL & DML, MS-ACCESS 4GL tools
Name	<b>Database Design, Implementation, Queries and Updates</b>
Description	The MS-Access environment. DB schema creation. Data integrity support (constraints, foreign keys, triggers). The MS-SQLServer 2000 environment. Interactive SQL examples and exercises.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	A library management application (class project), plus a set of SQL (DDL and DML) commands based on queries on the Ramakrishnan & Gehrke 'Boats rental' database.
Deliverables, products	Guided laboratory sessions. Self study lab material. Independent practical (the library management database class project)
Solo / pair / group work (max. n students)	Basics of SQL DML (same topics as in Ramakrishnan & Gehrke 3ed. chapter 5)
Learning goals	2 hrs/week, 12 weeks
Duration of the lab/study	40 hours (including self-study and case study work)
Appx. student work hours	Written In-house / available from the departmental 'DataBase and Information Mining' Web site (In Greek: <a href="http://talos.it.teithe.gr/DBIM">http://talos.it.teithe.gr/DBIM</a> )
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	In-house material
Specific study material	No
Teacher's instructions	No
Example solution	Online (web available) DB vendors' technical manuals. Instructions available on a weekly basis
Other instruction material	MS-Access, MS-SQLServer 2000
DBMS product(s)	MS-Access: DBMS installed on each student workstation MS-SQLServer 2000: DBMS lab software provided by the vendor (MSDNAA program). Students obtain own copy on CD for home use.
DBMS configuration <sup>1</sup>	MS-Windows 2000/XP
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.



### WP3 Final Report Appendix A – 13

Institution	<b>TEI of Thessaloniki</b>
Course	<b>Database Management Systems II</b>
Documented by	<i>Michael Vasilakopoulos &amp; Michael Salabasis</i>
Document date	<i>18 April 2003</i>
Category based on the list of the DBTech Pro lab topics	PL-APIs, AL-DbObj, AL-Catalog, AL-Tuning
Prerequisite	-
Topic	Client-Server DB realizations, advanced SQL command syntax, embedded SQL (C), indexes, access plan based query performance analysis, query optimization
Name	<b>DB server technology, DB application programming</b>
Description	The IBM DB2 UDB environment, interactive SQL examples and exercises, SQL command syntax embedding in 3GL code (MS-C)
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Laboratory exercises/worksheets
Deliverables, products	Guided laboratory sessions. Self study lab material.
Solo / pair / group work (max. n students)	DBMS organization, data and index organization at the internal level, impact on performance
Learning goals	2 hrs/week, 12 weeks
Duration of the lab/study	40 hours (including self-study and case study work)
Appx. student work hours	Written In-house / available from the departmental 'DataBase and Information Mining' Web site (In Greek: <a href="http://talos.it.teithe.gr/DBIM">ttp://talos.it.teithe.gr/DBIM</a> )
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	In-house material
Specific study material	No
Teacher's instructions	No
Example solution	Online (web available) DB vendors' technical manuals. Instructions available on a weekly basis
Other instruction material	IBM DB2 UDB v.8.1
DBMS product(s)	DBMS lab software provided by the vendor (IBM Scholars program). DBMS installed on a server machine in school and accessed over LAN as well as over the internet (via the vendor supplier IBM DB2 UDB client software) Students obtain own copy on CD for home use.
DBMS configuration <sup>1</sup>	MS-Windows 2000/XP
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 14**

Institution	<b>TEI of Thessaloniki</b>
Course	<b>Special Topics on Database Systems</b>
Documented by	<i>Dimitris Dervos &amp; Michael Vasilakopoulos</i>
Document date	<i>18 April 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Concept, PL-Tx, PL-Exception, PL-Sp, PL-SQLJ
Prerequisite	-
Topic	Concurrency Control, Web DB application programming, ODBC/JDBC, CGI
Name	<b>Web ORDBMS Technology</b>
Description	The 3-tier DB architecture and the (basic) technology that makes possible the development of web DB applications
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Laboratory exercises/worksheets Student projects (e.g. like the “e-shop” case study at the Ramakrishnan & Gehrke ( <i>Database Management Systems</i> , 3 <sup>rd</sup> edition book site: <a href="http://www.cs.wisc.edu/~dbbook">http://www.cs.wisc.edu/~dbbook</a> )
Deliverables, products	Guided laboratory sessions. Self study lab material and independent practical.
Solo / pair / group work (max. n students)	Concurrency control and Web DB application programming
Learning goals	2 hrs/week, 12 weeks
Duration of the lab/study	50 hours (including self-study and independent practical)
Appx. student work hours	Written In-house / available from the departmental ‘DataBase and Information Mining’ Web site (In Greek: <a href="http://talos.it.teithe.gr/DBIM">http://talos.it.teithe.gr/DBIM</a> )
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	In-house material
Specific study material	No
Teacher’s instructions	No
Example solution	Online (web available) DB vendors’ technical manuals. Instructions available on a weekly basis
Other instruction material	IBM DB2 UDB v.8.1
DBMS product(s)	DBMS lab software provided by the vendor (IBM Scholars program). DBMS installed on a server machine in school and accessed over LAN as well as over the internet (via the vendor supplier IBM DB2 UDB client software) Students obtain own copy on CD for home use.
DBMS configuration <sup>1</sup>	MS-Windows 2000/XP
Operating system	No
Specific hardware requirements	Alongside with the IBM DB2 UDB v.8.1 software, the students download/install and use the Sambar© Web Server, the Tomcat© application server, Perl© and the Sun© JDK 1.4 software
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student’s home installations.
7. DBMS installed on a removable disk to be borrowed for student’s home use.

### WP3 Final Report Appendix A – 15

Institution	<b>University of Macedonia</b>
Course	<b>Databases I</b>
<i>Documented by</i>	<i>Georgios Evangelidis</i>
<i>Document date</i>	<i>22 April 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Tools
Prerequisite	-
Topic	Database modeling/generation/reverse engineering tools
Name	<b>Introduction to Modelator</b>
Description	Getting familiar with Modelator, a database modeling/generation/reverse engineering tool
Type written exercise/demo/ guided lab/self-study lab/ independent practical	-
Deliverables, products	Self-study lab Independent practical
Solo / pair / group work (max. n students)	Basics of data modeling tools
Learning goals	Total max 1 hrs, 1 hr/week
Duration of the lab/study	2 hrs
Appx. student work hours	Written In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db1">http://macedonia.uom.gr/~gevan/db1</a> (lab 1) in Greek and application help file in English
Specific study material	Yes
Teacher's instructions	No
Example solution	No
Other instruction material	N/A
DBMS product(s)	Modelator 4 (a Norwegian product) has been bought by the University and can be distributed to students for educational usage. It can also be used in a networked installation with 20 licenses.
DBMS configuration <sup>1</sup>	MS Windows
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 16**

Institution	<b>University of Macedonia</b>
Course	<b>Databases I and Databases II</b>
Documented by	<i>Georgios Evangelidis</i>
Document date	<i>22 April 2003</i>
Category based on the list of the DBTech Pro lab topics	PL-ISQLq
Prerequisite	DL-Create
Topic	SQL in MS Access and Solid FlowEngine
Name	<b>SQL Labs</b>
Description	Getting familiar with SQL in MS Access and Solid FlowEngine
Type written exercise/demo/guided lab/self-study lab/independent practical	Solutions to 13 SQL exercises
Deliverables, products	Written exercise Self-study lab Independent practical
Solo / pair / group work (max. n students)	Mastering SQL (DML)
Learning goals	Total max 4 hrs, 1hr/week
Duration of the lab/study	8 hrs
Appx. student work hours	Oral Written In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db1">http://macedonia.uom.gr/~gevan/db1</a> (labs 6, 7, and 8) in Greek <a href="http://macedonia.uom.gr/~gevan/db2">http://macedonia.uom.gr/~gevan/db2</a> (lab 1) in Greek
Specific study material	Yes
Teacher's instructions	Yes
Example solution	No
Other instruction material	MS Access, Solid FlowEngine 3.7
DBMS product(s)	1 - MS Access is installed on all laboratory PCs. 3 - We have an educational license for Solid FlowEngine 3.7, valid for 60 concurrent users (expires 31.12.2003 but can be extended). The DBMS is installed on a Linux machine and students use Solid SQL Editor to interact with the DBMS.
DBMS configuration <sup>1</sup>	MS Windows, Trustix Linux
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use

### WP3 Final Report Appendix A - 17

Institution	<b>University of Macedonia</b>
Course	<b>Databases I and Databases II</b>
Documented by	<i>Georgios Evangelidis</i>
Document date	<i>22 April 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	-
Topic	Create databases using MS Access and Solid FlowEngine
Name	<b>Using MS Access and Solid FlowEngine</b>
Description	Getting familiar with MS Access and Solid FlowEngine
Type written exercise/demo/ guided lab/self-study lab/ independent practical	A small (3 tables) and a medium (10 tables) database with tables, primary and secondary indexes, all types of constraints
Deliverables, products	Written exercise Self-study lab Independent practical
Solo / pair / group work (max. n students)	Basics of database design: creating tables, fields, primary and secondary keys, relationships, referential integrity constraints, input masks, validation rules, default field values, views, check constraints, null values and aggregate functions
Learning goals	Total max 6 hrs, 1hr/week
Duration of the lab/study	12 hrs
Appx. student work hours	Oral Written In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db1">http://macedonia.uom.gr/~gevan/db1</a> (labs 2, 3, 4 and 5) in greek <a href="http://macedonia.uom.gr/~gevan/db2">http://macedonia.uom.gr/~gevan/db2</a> (lab 2) in greek
Specific study material	Yes
Teacher's instructions	Yes
Example solution	No
Other instruction material	MS Access, Solid FlowEngine 3.7
DBMS product(s)	1 - MS Access is installed on all laboratory PCs. 3 - We have an educational license for Solid FlowEngine 3.7, valid for 60 concurrent users (expires 31.12.2003 but can be extended). The DBMS is installed on a Linux machine and students use Solid SQL Editor to interact with the DBMS.
DBMS configuration <sup>1</sup>	MS Windows, Trustix Linux
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A - 18**

Institution	<b>University of Macedonia</b>
Course	<b>Databases I and Databases II</b>
Documented by	<i>Georgios Evangelidis</i>
Document date	<i>22 April .2003</i>
Category based on the list of the DBTech Pro lab topics	PL-APIs
Prerequisite	-
Topic	MS Access 4GL and PHP/MySQL
Name	<b>Building stand-alone and web applications</b>
Description	Using Forms and Reports in MS Access. Dynamic web pages using PHP and MySQL
Type written exercise/demo/ guided lab/self-study lab/ independent practical	PHP scripts that access MySQL and build HTML pages
Deliverables, products	Written exercise Self-study lab Independent practical
Solo / pair / group work (max. n students)	To use simple tools (wizards) in order to build simple stand-alone database applications using Visual Basic for Applications. To learn how to program web database applications using a scripting language.
Learning goals	Total max 2 hrs, 1hr/week
Duration of the lab/study	4 hrs
Appx. student work hours	Oral Written In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db1">http://macedonia.uom.gr/~gevan/db1</a> (lab 9) in greek <a href="http://macedonia.uom.gr/~gevan/db2">http://macedonia.uom.gr/~gevan/db2</a> (labs 7 and 8) in greek
Specific study material	Yes
Teacher's instructions	Yes
Example solution	No
Other instruction material	MS Access, MySQL
DBMS product(s)	1 - MS Access is installed on all laboratory PCs. 4 - The Open Source DBMS MySQL installed on a Linux or Windows machine. Students use PHPMyAdmin to interact with the DBMS and have anonymous ftp access to a directory visible by an Apache Web Server where they run their PHP scripts.
DBMS configuration <sup>†</sup>	MS Windows, Trustix Linux
Operating system	No
Specific hardware requirements	-
Comments	

<sup>†</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 19**

Institution	<b>University of Macedonia</b>
Course	<b>Databases II</b>
Documented by	<i>Georgios Evangelidis</i>
Document date	<i>22 April 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Sp
Prerequisite	-
Topic	Stored procedures
Name	<b>Solid FlowEngine stored procedures</b>
Description	A light introduction to stored procedures
Type written exercise/demo/guided lab/self-study lab/independent practical	A written exercise requiring students to write their own stored procedure.
Deliverables, products	Written exercise Self-study lab Independent practical
Solo / pair / group work (max. n students)	Learn the basic principles of stored procedures in Solid FlowEngine.
Learning goals	Total max 1 hrs, 1hr/week
Duration of the lab/study	2 hrs
Appx. student work hours	Oral Written In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db2">http://macedonia.uom.gr/~gevan/db2</a> (lab 6) in greek
Specific study material	Yes
Teacher's instructions	Yes
Example solution	No
Other instruction material	Solid FlowEngine 3.7.
DBMS product(s)	3 - We have an educational license for Solid FlowEngine 3.7, valid for 60 concurrent users (expires 31.12.2003 but can be extended). The DBMS is installed on a Linux machine. Students use Solid SQL Editor from a client Windows PC.
DBMS configuration <sup>1</sup>	Trustix Linux
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A - 20**

Institution	<b>University of Macedonia</b>
Course	<b>Databases II</b>
Documented by	<i>Georgios Evangelidis</i>
Document date	<i>22 April 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Concept
Prerequisite	-
Topic	Database backup and restore. Commit & Rollback
Name	<b>Solid FlowEngine backup/restore tools</b>
Description	Using soldd, solexp and solload (to export data dictionary and data and to import data). Commit & Rollback in Solid FlowEngine.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	-
Deliverables, products	Self-study lab Independent practical
Solo / pair / group work (max. n students)	To perform complete backups of a database by exporting data dictionary (DDL statements) and actual data (delimited data). To rebuild a database by following the reverse procedure (with the DBMS on-line or off-line). To understand the concept of committing or rolling back one's work and the autocommit feature of Solid SQL Editor.
Learning goals	Total max 2 hrs, 1hr/week
Duration of the lab/study	4 hrs
Appx. student work hours	Oral Written In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db2">http://macedonia.uom.gr/~gevan/db2</a> (labs 3 and 4) in greek
Specific study material	Yes
Teacher's instructions	No
Example solution	No
Other instruction material	Solid FlowEngine 3.7
DBMS product(s)	3 - We have an educational license for Solid FlowEngine 3.7, valid for 60 concurrent users (expires 31.12.2003 but can be extended). The DBMS is installed on a Linux machine. Students use Solid SQL Editor from a client Windows PC and the Solid tools from either a DOS window or a Digital Unix machine where they have telnet access.
DBMS configuration <sup>1</sup>	Trustix Linux, MS Windows, Digital Unix
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.



### WP3 Final Report Appendix A – 21

Institution	<b>University of Macedonia</b>
Course	<b>Databases II</b>
Documented by	<i>Georgios Evangelidis</i>
Document date	<i>22 April 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Tuning, DL-Tuning
Prerequisite	-
Topic	File Organizations and Index access methods. Query Plans.
Name	<b>Optimizing Database Performance</b>
Description	Using a large table (7500 records) to see the impact of file organization: heap vs. B+tree. Same examples shown on Solid FlowEngine and MS SQL Server.
Type written exercise/demo/guided lab/self-study lab/independent practical	-
Deliverables, products	Self-study lab, Independent practical
Solo / pair / group work (max. n students)	Realize the impact the file organization used has on query performance. Heap vs. B+tree. Secondary indexes to speed up certain queries. The SQL statement EXPLAIN PLAN FOR. The Query Analyzer of MS SQL Server.
Learning goals	Total max 2 hrs, 1hr/week
Duration of the lab/study	4 hrs
Appx. student work hours	Oral, Written, In-house
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	<a href="http://macedonia.uom.gr/~gevan/db2">http://macedonia.uom.gr/~gevan/db2</a> (labs 5 and 9) in greek
Specific study material	Yes
Teacher's instructions	No
Example solution	No
Other instruction material	Solid FlowEngine 3.7 and MS SQL Server 2000.
DBMS product(s)	3 - We have an educational license for Solid FlowEngine 3.7, valid for 60 concurrent users (expires 31.12.2003 but can be extended). The DBMS is installed on a Linux machine. Students use Solid SQL Editor from a client Windows PC. 3 – We use MS SQL Server from the University's MSDN subscription. The DBMS is installed on a Windows XP Pro machine and students use the MS SQL client software on the lab Window PCs.
DBMS configuration <sup>1</sup>	Trustix Linux, MS Windows XP Pro
Operating system	No
Specific hardware requirements	-
Comments	

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 22**

Institution	<b>University of Malaga</b>
Course	<b>Database Design and Use</b>
Documented by	<i>J.F. Aldana &amp; A.C. Gomez</i>
Document date	<i>13 June 2003</i>
Category based on the list of the DBTech Pro lab topics	DL-Create, DL-Tools, PL-Sp
Prerequisite	Course "Database Design and Use"
Topic	Data Modeling, SQL, Database Programming
Name	<b>Database Fundamentals Lab</b>
Description	Fundamentals of database modeling and programming. Relational schemas. Triggers and procedures. Embedded SQL.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Guided lab - Self-study lab
Deliverables, products	Commented report, Data Modes (ERR), SQL scripts, programs
Solo / pair / group work (max. n students)	Solo
Learning goals	To practice data modeling, SQL and embedded SQL.
Duration of the lab/study	Max 1 hour demo or instruction/week
Appx. student work hours	2 hours/week presence, 4 hours/week independent study
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written, in-house
Specific study material	No
Teacher's instructions	In Spanish only
Example solution	Yes
Other instruction material	No
DBMS product(s)	Oracle
DBMS configuration <sup>1</sup>	3 and 6
Operating system	Any Windows version or Unix.
Specific hardware requirements	No
Comments	

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

### WP3 Final Report Appendix A – 23

Institution	<b>University of Malaga</b>
Course	<b>Database Laboratory</b>
Documented by	<i>J.F. Aldana &amp; A.C. Gomez</i>
Document date	<i>13 June 2003</i>
Category based on the list of the DBTech Pro lab topics	PL-Sp, PL-APIs
Prerequisite	Course "Database Design and Use"
Topic	SQL, Database Programming, specific environments (web environments, object relational paradigm and temporal databases).
Name	<b>Database Programming Lab</b>
Description	Database programming techniques.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Guided lab - Self-study lab
Deliverables, products	Scripts
Solo / pair / group work (max. n students)	Solo
Learning goals	To practice advanced SQL queries, learn database programming techniques, and practice with extensions of the relational model.
Duration of the lab/study	Max 1 hour demo or instruction/week
Appx. student work hours	3 hours/week presence, 2 hours/week independent study
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written, in-house
Specific study material	No
Teacher's instructions	In Spanish only
Example solution	No
Other instruction material	No
DBMS product(s)	Oracle, Oracle WebDB, object extensions
DBMS configuration <sup>1</sup>	3 and 6
Operating system	Any Windows version or Unix.
Specific hardware requirements	No
Comments	

<sup>1</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A – 24**

Institution	<b>University of Malaga</b>
Course	<b>Advanced Databases</b>
Documented by	<i>J.F. Aldana &amp; A.C. Gomez</i>
Document date	<i>13 June 2003</i>
Category based on the list of the DBTech Pro lab topics	AL-Concept, AL-DbObj, AL-Security, AL-Tuning, PL-Tx, PL-Isolation
Prerequisite	Course "Advanced Databases"
Topic	Distributed databases, XML Schemas and Data Model, Web Applications
Name	<b>Advanced Database Lab</b>
Description	Distribution paradigm in databases. Impact of web technologies in databases.
Type written exercise/demo/ guided lab/self-study lab/ independent practical	- Guided lab - Independent practical
Deliverables, products	Commented report.
Solo / pair / group work (max. n students)	Pair or group work (max 3 students)
Learning goals	To understand distributed databases concepts, new XML standards and Web Applications development principles.
Duration of the lab/study	Max 1 hour demo or instruction/week
Appx. student work hours	2 hours/week presence, 4 hours/week independent study
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Oral, in-house
Specific study material	No
Teacher's instructions	No
Example solution	No
Other instruction material	(Applications manual)
DBMS product(s)	Oracle, XMLSpy, ...
DBMS configuration <sup>†</sup>	1, 3 and 6
Operating system	Any Windows version.
Specific hardware requirements	No
Comments	

<sup>†</sup> **DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A - 25**

Institution	<b>University of Paisley</b>
Course	<b>Introduction to Database Systems + Fundamentals of Database Systems</b>
<i>Documented by</i>	<i>Thomas M Connolly</i>
<i>Document date</i>	<i>20 May 2005</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	-
Topic	Microsoft Access
Name	<b>Microsoft Access</b>
Description	Use of various aspects of Microsoft Access
Deliverables, products	Creation of a sample database, relationships, integrity constraints, with stored queries, forms and an application
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Self study lab + independent practical.
Learning goals	How to use Microsoft Access
Duration of the lab/study	total max 10 hrs, 1-2 hrs/week for 4-5 weeks
Appx. student work hours	10 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	written in-house
Specific study material	in-house material
Teacher's instructions	Full user guide available
Example solution	Yes
Other instruction material	Yes
DBMS	Microsoft Access
DBMS configuration <sup>1</sup>	
Operating system	Windows
Specific hardware requirements	None
Comments	-

**DBMS configurations/Types of laboratory infrastructures:**

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report A - 26**

Institution	<b>University of Paisley</b>
Course	<b>Oracle Database Development</b>
Documented by	<i>Thomas M Connolly</i>
Document date	<i>20 May 2005</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	-
Topic	Oracle Database Development
Name	<b>Oracle Database Development</b>
Description	Use of various aspects of Oracle
Deliverables, products	Creation of a sample database, relationships, integrity constraints, with stored procedures, forms reports, and an application; use of PL-SQL
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Self study lab + independent practical.
Learning goals	How to use Oracle
Duration of the lab/study	total max 20 hrs, 1-2 hrs/week for 10 weeks
Appx. student work hours	20 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	written in-house
Specific study material	in-house material
Teacher's instructions	Full user guide available
Example solution	Yes
Other instruction material	Yes
DBMS	Oracle
DBMS configuration <sup>3</sup>	
Operating system	Windows
Specific hardware requirements	None
Comments	-

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

### WP3 Final Report Appendix A - 27

Institution	<b>University of Paisley</b>
Course	<b>Advanced Oracle Development</b>
Documented by	<i>Thomas M Connolly</i>
Document date	<i>20 May 2005</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	-
Topic	Advanced Oracle
Name	<b>Advanced Oracle</b>
Description	Use of various advanced features of Oracle
Deliverables, products	Creation of a advanced Oracle features including advanced PL-SQL; web-database integration, distributed DBMS, replication, query processing
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Self study lab + independent practical.
Learning goals	How to use advanced features of Oracle
Duration of the lab/study	total max 20 hrs, 1-2 hrs/week for 10 weeks
Appx. student work hours	20 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	written in-house
Specific study material	in-house material
Teacher's instructions	Full user guide available
Example solution	Yes
Other instruction material	Yes
DBMS	Oracle
DBMS configuration <sup>3</sup>	
Operating system	Windows
Specific hardware requirements	None
Comments	-

<sup>†</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A - 28**

Institution	<b>University of Paisley</b>
Course	<b>Distributed Database Systems</b>
<i>Documented by</i>	<i>Thomas M Connolly</i>
<i>Document date</i>	<i>20 May 2005</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	-
Topic	Introduction to Database Systems
Name	<b>Creation of a distributed DBMS</b>
Description	Creation of a distributed DBMS
Deliverables, products	Creation of a distributed DBMS and sample application
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Self study lab + independent practical.
Learning goals	How to develop a global system catalog and distributed DBMS
Duration of the lab/study	total max 20 hrs, 1-2 hrs/week for 10 weeks
Appx. student work hours	20 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	Written in-house
Specific study material	in-house material
Teacher's instructions	Face-to-face direction
Example solution	Yes
Other instruction material	Yes
DBMS	Any underlying DBMS(s)
DBMS configuration <sup>1 or 3</sup>	
Operating system	Windows (typically) but could be others
Specific hardware requirements	None
Comments	-

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.



**WP3 Final Report Appendix A - 29**

Institution	<b>University of Paisley</b>
Course	<b>Object Database Systems</b>
<i>Documented by</i>	<i>Thomas M Connolly</i>
<i>Document date</i>	<i>20 May 2005</i>
Category based on the list of the DBTech Pro lab topics	DL-Create
Prerequisite	Introduction to Database Systems
Topic	Object DBMSs
Name	<b>Creation of an object-oriented DBMS</b>
Description	Creation of an object-oriented DBMS
Deliverables, products	Creation of an object-oriented DBMS and sample application
Type written exercise/demo/guided lab/self-study lab/independent practical	Self study lab + independent practical.
Learning goals	How to develop an object-oriented DBMS (in particular, efficient memory management and pointer swizzling techniques)
Duration of the lab/study	total max 20 hrs, 1-2 hrs/week for 10 weeks
Appx. student work hours	20 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	written in-house
Specific study material	in-house material
Teacher's instructions	Face-to-face direction
Example solution	Yes
Other instruction material	Yes
DBMS	Developed by student (typically using C++)
DBMS configuration <sup>1 or 3</sup>	N/A
Operating system	Any
Specific hardware requirements	None
Comments	-

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.

**WP3 Final Report Appendix A - 30**

Institution	<b>University of Paisley</b>
Course	<b>Various (eg. Introduction to Databases and Fundamentals of Databases)</b>
<i>Documented by</i>	<i>Thomas M Connolly</i>
<i>Document date</i>	<i>20 May 2005</i>
Category based on the list of the DBTech Pro lab topics	DL-Example
Prerequisite	-
Topic	Database Design Methodology
Name	<b>Database Design Methodology</b>
Description	Case-Study
Deliverables, products	Creation of a conceptual, logical and physical database design based on a case study (different case studies exist)
Type written exercise/demo/ guided lab/self-study lab/ independent practical	Written exercise
Learning goals	How to perform conceptual, logical and physical database design
Duration of the lab/study	total max 30 hrs, 3 hrs/week for 10 weeks
Appx. student work hours	30 hrs
Instructions 1) demo/oral/written 2) in-house / from a source text (which one?)	written in-house
Specific study material	in-house material
Teacher's instructions	Face-to-face direction
Example solution	Yes
Other instruction material	Yes
DBMS	N/A
DBMS configuration <sup>1</sup>	N/A
Operating system	Any
Specific hardware requirements	None
Comments	-

<sup>1</sup> **DBMS configurations**/Types of laboratory infrastructures:

1. DBMS installed on each student workstation.
2. DBMS installed on a removable disk to be used in a student workstation.
3. DBMS installed on a server machine in school and accessed over LAN only.
4. DBMS installed on a server machine in school and accessed over WWW.
5. DBMS lab environment provided by a vendor (e.g. IBM Scholars program).
6. Student's home installations.
7. DBMS installed on a removable disk to be borrowed for student's home use.