## WP3 Report: Appendix A

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

## WP3-Final Report Appendix A – 1

| | |
|---|---|
| Institution | **Helia** |
| Course | **Database Programming** |
| *Documented by* | *Martti Laiho* |
| *Document date* | *14 May 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DB Programming Lab / PL-Isolation |
| Prerequisite | |
| Topic | SQL DML + DCL / transactions |
| Name | **Concurrency and Isolation Levels** |
| Description | Set of script for experimenting the effects of isolation levels on various DBMSs |
| Type<br>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<br>1) demo/oral/written<br>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 [1] | 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 | **Helia** |
| Course | **Database Programming** |
| *Documented by* | *Martti Laiho and Kari Silpiö* |
| *Document date* | *14 May 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DB Programming Lab / PL-Tx / Isolation / Performance / Architectures |
| Prerequisite | |
| Topic | Transaction programming |
| Name | **Transaction programming in distributed applications** |
| Description | Java / J2EE / COM+ (.NET to be extended) application variants of TPC-A |
| Type<br>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<br>1) demo/oral/written<br>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 [1] | 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 … |

[1] **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 | **Helia** |
| Course | **Database Administration** |
| *Documented by* | *Martti Laiho* |
| *Document date* | *11 May 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | Database Administration Lab / AL-Tuning |
| Prerequisite | DBMS theory |
| Topic | SQL DDL |
| Name | **Indexes and Performance** |
| Description | Exercises based on scripts for loading reasonably large base data, creating indexes, and generating transactions |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | Guided lab,<br>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<br>1) demo/oral/written<br>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 [1] | 2 or 3 |
| Operating system | Win2000 |
| Specific hardware requirements | Simple experimenting using a typical single disk workstation (configuration 2).<br>Advanced experimenting requires multiple disks (configuration 3) |
| Comments | Only limited first version in use. Subject is large and the lab will be extended |

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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 | **Helia** |
| Course | **Database Programming** |
| *Documented by* | *Martti Laiho* |
| *Document date* | *14 May 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DB Programming Lab / PL-DTx |
| Prerequisite | |
| Topic | Transaction programming |
| Name | **Distributed transaction programming** |
| Description | J2EE global transactions |
| Type<br>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<br>1) demo/oral/written<br>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 [1] | 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 … |

[1] **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 | **Häme Polytechnic** |
| Course | **Data Management 1** |
| *Documented by* | *Jaakko Rantanen* |
| *Document date* | *7 March 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DB Programming Lab / PL-ISQLq |
| Prequisite | - |
| Topic | SQL DML |
| Name | **SQL Queries and Updates** |
| 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<br>written exercise/demo/ guided lab/self-study lab/ independent practical | Self study lab + independent practical.<br>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<br>1) demo/oral/written<br>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 (http://stud.hamk.fi/sql/ in Finnish only) |
| DBMS configuration [1] | 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 | - |

[1] **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 | **Häme Polytechnic** |
| Course | **Data Management 1** |
| *Documented by* | *Jaakko Rantanen* |
| *Document date* | *28 March 2003* |
| Category<br>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 | **First design exercise** |
| Description | Learning to understand the key concepts: relational model, relations, keys, functional dependency, priciples of normalization and basics of Entity -Relationship model and diagram. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Written exercise<br>- 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<br>1) demo/oral/written<br>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 [1] | 1 or 6 |
| Operating system | Any Windows version |
| Specific hardware requirements | No |
| Comments | |

[1] **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 | **Häme Polytechnic** |
| Course | **Data Management 2** |
| *Documented by* | *Jaakko Rantanen* |
| *Document date* | *28 March 2003* |
| Category<br>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 | **Recovery and Commit/Checkpoint Lab** |
| 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<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Written exercise<br>- 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<br>1) demo/oral/written<br>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 [1] | 1 or 6 |
| Operating system | Windows or Linux etc. |
| Specific hardware requirements | No |
| Comments | |

[1] **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 | **Häme Polytechnic** |
| Course | **Data Management 2** |
| *Documented by* | *Jaakko Rantanen* |
| *Document date* | *30 March 2003* |
| Category<br>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 | **Database design lab** |
| Description | Learning to understand relational model, relations, integrity constraints, normalization, Entity -Relationship model and diagram and SQL DDL.<br>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.<br>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.<br>Requirements and descriptions of behaviour of a are given. Student is assigned to design, document and implement a database schema and input test data.<br>Performance tuning. Interpreting execution plans (Oracle). Diagnosing performance problems and finding improvements. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | A guided (partly project type) series of<br>- written exercises<br>- self-study labs<br>that are logically connected by two commmon application domains. |
| 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<br>1) demo/oral/written<br>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. differencies, 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 | |

[1] **DBMS configurations**/Types of laboratory infrastructures:

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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 | **Häme Polytechnic** |
| Course | **System Implementation** |
| *Documented by* | *Jaakko Rantanen* |
| *Document date* | *28 March 2003* |
| Category<br>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 | **Install and configure Oracle DBMS** |
| Description | Learning to configure data file, redo log and archive log structures and their significance in backup & restore. Writing simple backup & restore scripts. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Written exercise<br>- 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<br>1) demo/oral/written<br>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 [1] | 2 |
| Operating system | Windows NT/2000/XP professional (or Linux) |
| Specific hardware requirements | The lab requires a suitable environment.<br>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.<br>The problem is that it seems to be too time consuming. There are too many potential technical problems. |

[1] **DBMS configurations**/Types of laboratory infrastructures:

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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.
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## WP3 Final Report Appendix A – 10

| | |
|---|---|
| Institution | **Reutlingen University** |
| Course | **Database and Information Systems** |
| *Documented by* | *Fritz Laux* |
| *Document date* | *24 May 2003* |
| Category<br>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 | **Database Lab** |
| Description | *Contents*<br>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.<br>In the second part the participants acquire a solid knowledge with SQL and the transaction and locking concept of Oracle.<br>To achieve this, we create tables, insert data, and write queries with grouping and joins. Concurrent transactions are investigated in a multi-user environment.<br>*Syllabus:*<br>*1 Data modelling:* 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<br>*2 Database Languages:* SQL, Object Definition/Query Language (ODL/OQL), DDL, Data Dictionary, graphical tools: MS Access<br>*3 Transaction Management:* serialization (locking, consistent snapshot), Tools: Oracle, Ocelot<br>4 Database Programming: JDBC, ODMG API's, Language: Java |
| Type<br>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 | The *aim* is to practice data modelling, the database language SQL and the use of commercial database systems like Access, Fast Objects and Oracle.<br>The students learn to methodologically design and program databases. |
| 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<br>1) demo/oral/written<br>2) in-house / from a source | Written, in-house<br>H. F. Korth, A. Silberschatz, *Database system concepts*, McGraw Hill 1991 |

| | |
|---|---|
| text (which one?) | C. J. Date, *An introduction to database systems*, Vols. I , II, Addison-Wesley 1995<br>Hamilton, Cattell, Fisher: *JDBC Database Access with Java*, Addison-W.<br>Cattell (Ed.), *The ODMG Standard, V. 2.0*, 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:<br>IM1, IM2, IM3, IM4, IM5, IM6, IM7, SE2, SE3 |

[1] **DBMS configurations**/Types of laboratory infrastructures:

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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 | **Reutlingen University** |
| Course | **Analytical Information Systems** |
| *Documented by* | *Fritz Laux* |
| *Document date* | *24 May 2003* |
| Category<br>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 | **Analytical Information System's Study Work** |
| 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<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Self-study lab<br>- 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 *aim* 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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | Written, in-house<br>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<br>MIS Delta Miner, Angoss Knowledge Studio, Cognos, Kiwi for Data Mining |
| DBMS configuration [1] | 1 and 3 and optionally 6 |
| Operating system | Windows 2000/XP |
| Specific hardware requirements | No |
| Comments | *IEEE CS BOK topics covered:*<br>CS 375 (IM3, IM6 + DW modelling, IM8 + Data Marts), CS 374 (IM10), OLAP (IM5+ multidimensional Query), IS3, IS4, IS8 |

[1] **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 | **TEI of Thessaloniki** |
| Course | **Database Management Systems I** |
| *Documented by* | *Dimitris Dervos & Athanasios Margaris* |
| *Document date* | *18 April 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Example, DL-Create |
| Prerequisite | - |
| Topic | SQL DDL & DML, MS-ACCESS 4GL tools |
| Name | **Database Design, Implementation, Queries and Updates** |
| 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<br>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.<br>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<br>In-house / available from the departmental 'DataBase and Information Mining'<br>Web site (In Greek: http://talos.it.teithe.gr/DBIM) |
| Instructions<br>1) demo/oral/written<br>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.<br>Instructions available on a weekly basis |
| Other instruction material | MS-Access, MS-SQLServer 2000 |
| DBMS product(s) | MS-Access:<br>DBMS installed on each student workstation<br>MS-SQLServer 2000:<br>DBMS lab software provided by the vendor (MSDNAA program).<br>Students obtain own copy on CD for home use. |
| DBMS configuration [1] | MS-Windows 2000/XP |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **TEI of Thessaloniki** |
| Course | **Database Management Systems II** |
| *Documented by* | *Michael Vasilakopoulos & Michael Salabasis* |
| *Document date* | *18 April 2003* |
| Category<br>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 | **DB server technology, DB application programming** |
| Description | The IBM DB2 UDB environment, interactive SQL examples and exercises, SQL command syntax embedding in 3GL code (MS-C) |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | Laboratory exercises/worksheets |
| Deliverables, products | Guided laboratory sessions.<br>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<br>In-house / available from the departmental 'DataBase and Information Mining' Web site (In Greek: ttp://talos.it.teithe.gr/DBIM) |
| Instructions<br>1) demo/oral/written<br>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.<br>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).<br>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)<br>Students obtain own copy on CD for home use. |
| DBMS configuration [1] | MS-Windows 2000/XP |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **TEI of Thessaloniki** |
| Course | **Special Topics on Database Systems** |
| *Documented by* | *Dimitris Dervos & Michael Vasilakopoulos* |
| *Document date* | *18 April 2003* |
| Category<br>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 | **Web ORDBMS Technology** |
| Description | The 3-tier DB architecture and the (basic) technology that makes possible the development of web DB applications |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | Laboratory exercises/worksheets<br>Student projects (e.g. like the "e-shop" case study at the Ramakrishnan & Gehrke (*Database Management Systems*, 3rd edition book site: http://www.cs.wisc.edu/~dbbook ) |
| Deliverables, products | Guided laboratory sessions.<br>Self study lab material and independent practical. |
| Solo / pair / group work (max. n students) | Concurrency control and Wen 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<br>In-house / available from the departmental 'DataBase and Information Mining' Web site (In Greek: ttp://talos.it.teithe.gr/DBIM) |
| Instructions<br>1) demo/oral/written<br>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 [1] | 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 | |

[1] **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 | **University of Macedonia** |
| Course | **Databases I** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Tools |
| Prerequisite | - |
| Topic | Database modeling/generation/reverse engineering tools |
| Name | **Introduction to Modelator** |
| Description | Getting familiar with Modelator, a database modeling/generation/reverse engineering tool |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - |
| Deliverables, products | Self-study lab<br>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<br>In-house |
| Instructions<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db1 (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 [1] | MS Windows |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Macedonia** |
| Course | **Databases I and Databases II** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | PL-ISQLq |
| Prerequisite | DL-Create |
| Topic | SQL in MS Access and Solid FlowEngine |
| Name | **SQL Labs** |
| Description | Getting familiar with SQL in MS Access and Solid FlowEngine |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | Solutions to 13 SQL exercises |
| Deliverables, products | Written exercise<br>Self-study lab<br>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<br>Written<br>In-house |
| Instructions<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db1 (labs 6, 7, and 8) in Greek<br>http://macedonia.uom.gr/~gevan/db2 (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.<br>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 [1] | MS Windows, Trustix Linux |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Macedonia** |
| Course | **Databases I and Databases II** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Create |
| Prerequisite | - |
| Topic | Create databases using MS Access and Solid FlowEngine |
| Name | **Using MS Access and Solid FlowEngine** |
| Description | Getting familiar with MS Access and Solid FlowEngine |
| Type<br>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<br>Self-study lab<br>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<br>Written<br>In-house |
| Instructions<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db1 (labs 2, 3, 4 and 5) in greek<br>http://macedonia.uom.gr/~gevan/db2 (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.<br>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 [1] | MS Windows, Trustix Linux |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Macedonia** |
| Course | **Databases I and Databases II** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April .2003* |
| Category<br>based on the list of the DBTech Pro lab topics | PL-APIs |
| Prerequisite | - |
| Topic | MS Access 4GL and PHP/MySQL |
| Name | **Building stand-alone and web applications** |
| Description | Using Forms and Reports in MS Access. Dynamic web pages using PHP and MySQL |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | PHP scripts that access MySQL and build HTML pages |
| Deliverables, products | Written exercise<br>Self-study lab<br>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<br>Written<br>In-house |
| Instructions<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db1 (lab 9) in greek<br>http://macedonia.uom.gr/~gevan/db2 (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.<br>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 [1] | MS Windows, Trustix Linux |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Macedonia** |
| Course | **Databases II** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Sp |
| Prerequisite | - |
| Topic | Stored procedures |
| Name | **Solid FlowEngine stored procedures** |
| Description | A light introduction to stored procedures |
| Type<br>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<br>Self-study lab<br>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<br>Written<br>In-house |
| Instructions<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db2 (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 [1] | Trustix Linux |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Macedonia** |
| Course | **Databases II** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April 2003* |
| Category<br>based on the list of the DBTech Pro lab topics | AL-Concept |
| Prerequisite | - |
| Topic | Database backup and restore. Commit & Rollback |
| Name | **Solid FlowEngine backup/restore tools** |
| Description | Using soldd, solexp and solload (to export data dictionary and data and to import data). Commit & Rollback in Solid FlowEngine. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - |
| Deliverables, products | Self-study lab<br>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<br>Written<br>In-house |
| Instructions<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db2 (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 [1] | Trustix Linux, MS Windows, Digital Unix |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Macedonia** |
| Course | **Databases II** |
| *Documented by* | *Georgios Evangelidis* |
| *Document date* | *22 April 2003* |
| Category<br>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 | **Optimizing Database Performance** |
| 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<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | http://macedonia.uom.gr/~gevan/db2 (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 [1] | Trustix Linux, MS Windows XP Pro |
| Operating system | No |
| Specific hardware requirements | - |
| Comments | |

[1] **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 | **University of Malaga** |
| Course | **Database Design and Use** |
| *Documented by* | *J.F. Aldana & A.C. Gomez* |
| *Document date* | *13 June 2003* |
| Category<br>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 | **Database Fundamentals Lab** |
| Description | Fundamentals of database modeling and programming.<br>Relational schemas. Triggers and procedures. Embedded SQL. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Guided lab<br>- 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<br>1) demo/oral/written<br>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 [1] | 3 and 6 |
| Operating system | Any Windows version or Unix. |
| Specific hardware requirements | No |
| Comments | |

[1] **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 | **University of Malaga** |
| Course | **Database Laboratory** |
| *Documented by* | *J.F. Aldana & A.C. Gomez* |
| *Document date* | *13 June 2003* |
| Category<br>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 | **Database Programming Lab** |
| Description | Database programming techniques. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Guided lab<br>- 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<br>1) demo/oral/written<br>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 [1] | 3 and 6 |
| Operating system | Any Windows version or Unix. |
| Specific hardware requirements | No |
| Comments | |

[1] **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 | **University of Malaga** |
| Course | **Advanced Databases** |
| *Documented by* | *J.F. Aldana & A.C. Gomez* |
| *Document date* | *13 June 2003* |
| Category<br>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 | **Advanced Database Lab** |
| Description | Distribution paradigm in databases. Impact of web technologies in databases. |
| Type<br>written exercise/demo/ guided lab/self-study lab/ independent practical | - Guided lab<br>- 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<br>1) demo/oral/written<br>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 [1] | 1, 3 and 6 |
| Operating system | Any Windows version. |
| Specific hardware requirements | No |
| Comments | |

[1] **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 | **University of Paisley** |
| Course | **Introduction to Database Systems + Fundamentals of Database Systems** |
| *Documented by* | *Thomas M Connolly* |
| *Document date* | *20 May 2005* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Create |
| Prequisite | - |
| Topic | Microsoft Access |
| Name | **Microsoft Access** |
| 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<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | written<br>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 [1] | |
| 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 | **University of Paisley** |
| Course | **Oracle Database Development** |
| *Documented by* | *Thomas M Connolly* |
| *Document date* | *20 May 2005* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Create |
| Prequisite | - |
| Topic | Oracle Database Development |
| Name | **Oracle Database Development** |
| 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<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | written<br>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 [3] | |
| Operating system | Windows |
| Specific hardware requirements | None |
| Comments | - |

[1] **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 | **University of Paisley** |
| Course | **Advanced Oracle Development** |
| *Documented by* | *Thomas M Connolly* |
| *Document date* | *20 May 2005* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Create |
| Prequisite | - |
| Topic | Advanced Oracle |
| Name | **Advanced Oracle** |
| 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<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | written<br>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 [3] | |
| Operating system | Windows |
| Specific hardware requirements | None |
| Comments | - |

[1] **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 | **University of Paisley** |
| Course | **Distributed Database Systems** |
| *Documented by* | *Thomas M Connolly* |
| *Document date* | *20 May 2005* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Create |
| Prequisite | - |
| Topic | Introduction to Database Systems |
| Name | **Creation of a distributed DBMS** |
| Description | Creation of a distributed DBMS |
| Deliverables, products | Creation of a distributed DBMS and sample application |
| Type<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | Written<br>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 [1 or 3] | |
| Operating system | Windows (typically) but could be others |
| Specific hardware requirements | None |
| Comments | - |

[1] **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 | **University of Paisley** |
| Course | **Object Database Systems** |
| *Documented by* | *Thomas M Connolly* |
| *Document date* | *20 May 2005* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Create |
| Prequisite | Introduction to Database Systems |
| Topic | Object DBMSs |
| Name | **Creation of an object-oriented DBMS** |
| Description | Creation of an object-oriented DBMS |
| Deliverables, products | Creation of an object-oriented DBMS and sample application |
| Type<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | written<br>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 [1 or 3] | N/A |
| Operating system | Any |
| Specific hardware requirements | None |
| Comments | - |

[1] **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 | **University of Paisley** |
| Course | **Various (eg. Introduction to Databases and Fundamentals of Databases)** |
| *Documented by* | *Thomas M Connolly* |
| *Document date* | *20 May 2005* |
| Category<br>based on the list of the DBTech Pro lab topics | DL-Example |
| Prequisite | - |
| Topic | Database Design Methodology |
| Name | **Database Design Methodology** |
| Description | Case-Study |
| Deliverables, products | Creation of a conceptual, logical and physical database design based on a case study (different case studies exist) |
| Type<br>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<br>1) demo/oral/written<br>2) in-house / from a source text (which one?) | written<br>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 [1] | N/A |
| Operating system | Any |
| Specific hardware requirements | None |
| Comments | - |

[1] **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.