



Designing, Implementing and Testing a Database

A Computer Engineering Lesson

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Overview:

In this lesson, student teams will design, implement and test a database for a “real world” user. Each team contacts and arranges to create a database for a different client. Clients are often located on campus, in the business community or in the field of education (K-12).

Learning Objectives or Student Outcomes:

By the end of this lesson, students will be able to

- obtain hands-on experience in the use of a commercial database management system;
- obtain experience in the (somewhat) realistic development of a database application;
- actively participate in the learning process; and
- gain exposure to the type of group interaction that is necessary for success in the workplace.

Length of Lesson:

From the second week of the semester to the last day of classes.

Materials Needed:

Computer and Microsoft Access software—available on most university campus servers and usually supported by campus IT departments.

Assignment(s) to Ensure Student Preparation:

1. Reading IEEE Transactions Paper (See list of Handouts, Overheads, and Forms)
2. Regular classroom lessons and in-class activities
3. Teaming and teambuilding activities

Team Size/Composition:

Teams of 4 or 5 students each—four being preferred and 5 formed as an alternate. Each team is responsible for identifying the specific application to be developed. Teams must identify an expert in the application area to provide input in the design.

For more on [roles](#)

How is *positive interdependence* ensured?

All members of the team build one database; the instructor rewards interdependence; roles are assigned to the students and rotated at the end of each phase.

How is *individual accountability* ensured?

Individual accountability is ensured through self and peer assessments and through individual project products (a form, a report, and a query) handed in at the end of phase 3.

Basis or Components of Assessment:

Deliverables = 60-70% of grade

Group Status Report = 5%

Team Assessment = 20-25% (Relating theory to real world project)

Phase 1 Summary = 10% (Presentation/overview of project)

Returned Phase 1 Intermediate = 0% (Draft deliverable for feedback only)

Group Project Assessment Breakdown = Phase 1	8%	
	Phase 2	12%
	Phase 3	15%
	<u>Group Project Total</u>	<u>35%</u>

Team Skills Needed for Success:

Student Roles used to emphasize team responsibilities:

- Phase Leader
- Phase Recorder
- Phase Checker
- Phase Technical Advisor

Handouts, Overheads, Forms, etc:

As this is a very lengthy assignment, instructors are encouraged to go through all of the following materials in depth prior to beginning the project:

1. Dietrich, Suzanne W. and Susan D. Urban. "A Cooperative Learning Approach to Database Group Projects: Integrating Theory and Practice." *IEEE Transactions on Education* (November 1998).

NOTE: This article must be obtained by the individual instructor from IEEE (http://shop.ieee.org/store/product.asp?CID_LDAP=&PROMO_SRC_CODE=&BUYER_TYPE=&account_type=&member_grade=&hftype=&AUTH=&prodno=025%2D124&mscssid=W5FS83H8RUSE8M89MDSAT5055APT5H4B) for use by the students. This article was written by the lesson authors and gives an overview of this very lesson.

2. [Description of Student Roles](#)
3. Deitrich and Urban's Group Projects web page (<http://www.eas.asu.edu/~cse412/projects.html>), which includes all of the following information and more:
 - Database Group Project Overview
 - Project Guidelines
 - Phase 1 Intermediate Deliverable Sample

- Phase 1 Final Deliverable Sample
- Phase 1 Questionnaire (relating learned theory to their real world project)
- Phase 2 Samples and Questionnaire
- Phase 3 Samples and Questionnaire

Student Roles

PHASE LEADER

Responsibilities:

- Coordinate the activities of the phase.
- Establish intermediate deadlines.
- Prepare intermediate group status report in coordination with the phase recorder.
- Ensure on-time completion of each deliverable, including documentation, group status report and evaluation material.

PHASE RECORDER

Responsibilities:

- Establish an outline and plan for generating the documentation associated with each phase deliverable.
- Delegate subportions of documentation to team members.
- Work with the phase leader in preparation of the intermediate and end-of-phase group status reports.
- Ensure correctness and quality of final documentation.

PHASE CHECKER

Responsibilities:

- Gather and review the assessment for each group member, including the checker!
- Report the results of the assessment.

PHASE TECHNICAL ADVISORS

Responsibilities:

- Serves as technical support for the group.
- Since technical advisors do not have the additional responsibilities of the other roles, technical advisors are primarily responsible for providing support with respect to the technical details of the phase deliverables.

For example, in phases 2 and 3, technical advisors are responsible for determining the process of form and report creation in Microsoft Access and in disseminating this information to their group. (This process will help the consistency of forms and reports.) However, each group member should be responsible for creating at least one form, one report and one query in the phase 2 and 3 deliverables.