

CSI2132-2012

DGD 1: Introduction

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Exercise 1: Discuss the capabilities that should be provided by a DBMS

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A University DB

STUDENT

Name	Student_number	Class	Major
Smith	17	1	CS
Brown	8	2	CS

COURSE

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database	CS3380	3	CS

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	07	King
92	CS1310	Fall	07	Anderson
102	CS3320	Spring	08	Knuth
112	MATH2410	Fall	08	Chang
119	CS1310	Fall	08	Anderson
135	CS3380	Fall	08	Stone

GRADE REPORT

Student_number	Section_identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

PREREQUISITE

Course_number	Prerequisite_number
CS3380	CS3320
CS3380	MATH2410
CS3320	CS1310

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Exercise 2: Identify some queries and updates you would run against this DB.

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Exercise 3: What is the difference between **controlled** and **uncontrolled** redundancy?

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Exercise 4: Specify all the relationships among the records of the database shown in the figure.

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Exercise 5: Cite some examples of integrity constraints that can apply to the database.

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Exercise 6a: What is logical data independence and why is it important?

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Exercise 6b: What is Physical Data Independence?

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Say the name of the 'CS' (Computer Science) Department changes to 'CSSE' (Computer Science and Software Engineering) Department . The corresponding prefix for the course number also changes.

Exercise 7a: Identify the columns in the database that would need to be updated.

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Exercise 7b: Restructure the columns in COURSE, SECTION, and PREREQUISITE tables so that only one column will need to be updated.

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Recent changes in privacy laws have disallowed organizations from using SIDs to identify individuals unless certain restrictions are satisfied. As a result, universities cannot use SIDs as primary keys (except for financial data). In practice, StudentID, a unique ID, a unique identifier, assigned to every student, is likely to be used as the primary key rather than SSN since StudentID is usable across all aspects of the system.

Some database designers are reluctant to use generated keys (also known as *surrogate* keys) for primary keys (such as StudentID) because they are artificial.

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Exercise 8a: What are the advantages of using a surrogate key (an automatic key with no “meaning”)?

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Exercise 8b: Can you propose any natural choices of keys that can be used to store the student record in a UNIVERSITY database?

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Exercise 9: Give examples of systems in which it may make sense to use traditional file processing instead of a database approach.

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Next time

EER diagrams

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