

## Review questions & exercises

1. What is a database?

2. Write about the three main characteristics of a database.

1)

2)

3)

3. For each of the characteristics of a database management system, write why said characteristic matters.

- Access support from remote locations
  -
- Data storage, retrieval and update
  -
- Support for transactions and concurrency
  -
- User accessible catalog or data dictionary describing the metadata
  -
- Enforcing constraints to ensure data in the database abides by certain rules
  -
- Support for authorization of access and update of data
  -
- Facilities for recovering the database should it become damaged
  -
- Control of redundancy
  -
- Efficient query processing
  -

4. What are two objectives of a database management system?

1)

2)

5. These two objectives reached by database management systems both mean that programmers do not have to change programs and scripts. Why?

6. According to you, what relation schemas would be appropriate for:

- YouTube's database?
- Amazon's database?
- Are there any similarities between the relation schemas that you came up with for both websites?

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

**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

8. For the above database:

- Identify some informal queries and update operations that you would expect to apply.
- Specify all the relationships among the records.
- If the name of the 'CS' (Computer Science) Department changes to 'CSSE' (Computer Science and Software Engineering) Department and the corresponding prefix for the course number also changes, identify the columns in the database that would need to be updated.
- Can you restructure the columns in the COURSE, SECTION, and PREREQUISITE tables so that only one column will need to be updated?