

# Review

## CSC230 Database Technologies for Analytics

12 November 2019

1. If we are designing a database to hold information about applicants for employment, we might want to record whether or not an applicant is a veteran. How might we do this? [Look here to find out.](#)
2. Read [Full ACID Support Means ‘Game Over’ for Relational, MongoDB Says](#) by Alex Woodie in the February 15, 2018 issue of *Datanami*.
  - (a) What have been some of the principal attractions of NoSQL database management systems in recent years?
  - (b) What has been a principal obstacle to the adoption of NoSQL database management systems?
  - (c) What has changed that promises to make NoSQL database management systems acceptable to many more organizations?
3. View the [Anomalies in database](#) slideshow.
  - (a) How does the author define ‘delete anomaly?’
  - (b) How does the author define ‘insert anomaly?’
  - (c) How does the author define ‘update anomaly?’
4. Take another look at the chapter on normalization in [SQL for Web Nerds](#), by Philip Greenspun.

In that chapter, Greenspun develops the design of a database to manage speaking events.

  - (a) What is a drawback of the design that defines only two tables (‘talks’ and ‘events’)?
  - (b) What is a drawback of the design that defines only three tables (‘talks,’ ‘venues,’ and ‘events’)?
5. Each letter in BCNF is the first letter of a name or word. Which names and words?
6. In the relational algebra...

- (a) does  $\sigma$  denote a choice of rows or columns in a table?
  - (b) does  $\pi$  denote a choice of rows or columns in a table?
  - (c) which operation does  $\bowtie$  denote?
7. Read [How JSON sparked NoSQL—and will return to the RDBMS fold](#), by Ryan Betts in the May 21, 2014 issue of *InfoWorld*.
- (a) What are the nouns and verbs about which the author speaks?
  - (b) How, in the mind of the author, does JSON compare to XML?
  - (c) What might we gain by using a database that uses the JSON format?
  - (d) What drawbacks might we encounter if we choose a database that uses the JSON format?
8. Michael Rabin won the Turing Award in 1976. He was born in Breslau in 1931.
- Judea Pearl won the Turing Award in 2011. He was born in Tel Aviv in 1936.
- If we want to record the places of birth of all Turing Award winners, why might we have to give some extra thought to how we will record the nations in which these two winners were born?
9. Read [this blog posting](#) by Paul Bennett.
- (a) Why might we prefer **LIKE** over REGEXP in a MySQL query?
  - (b) When might we need to use REGEXP?
10. Read [How and Why to Use SQLite](#), an October 31, 2013 posting by Gareth Dwyer on *digitalocean.com*.
- (a) Why might we prefer SQLite over MySQL, PostgreSQL, Microsoft SQL Server, Oracle, and other database management systems?
  - (b) When might SQLite not meet our needs?
11. Mercurial and Git are distributed version control systems. Although Git is the more popular software, I still prefer Mercurial.
- Read [Mercurial vs. Git: why Mercurial?](#) by Steve Losh on Atlassian's website.
- (a) In what way did the authors of Mercurial follow the UNIX philosophy in their design of the program's functions and commands?
  - (b) Mercurial treats the history of a project differently than does Git. How so?
12. What are several uses of XML? Check the [IBM Knowledge Center](#).

13. Moodle is a [Web application](#).

A relational database is one component of this application. Other components include code that describes Web pages and code that defines the logic and functionality of the application. Software engineers use different languages to describe the layout of Web pages and to describe algorithms. This division into three parts (database, layout, and logic) is a typical organization of Web applications.

If we want to create our own Web application and choose to use the MySQL database management system, what are some of the languages that we could use for the logic? [Check here](#).

14. Look at [this introduction](#) to the Extended Entity Relationship Model from the Department of Computer Science at the University of Toronto. Professor Leo Mark of Georgia Institute of Technology includes a discussion of the EERM in *Database Systems Concepts & Design*, a course that he produced for [Udacity](#).

- (a) What is an example of an entity?
- (b) What is an example of a relationship?
- (c) What is an example of an attribute?

15. Udacity offers other courses that might interest you. Take a look at [SQL for Data Analysis](#).

How do Udacity's free courses differ from its Nanodegree programs (for which students pay tuition)?

16. The IEEE is the Institute of Electrical and Electronics Engineers. It is an international professional society. It publishes journals and books, organizes conferences, develops technical standards, and brings members together in local meetings. Members offer their expertise to governments and volunteer in schools. In these and other ways, the IEEE helps its members share knowledge with one another, promote progress in engineering, and encourage responsible applications of technology.

I have gained much from my membership in the IEEE. It has introduced me to very accomplished people in my field. Through conversations with these people, I have learned more about opportunities that are available to me. I have increased my knowledge and skills. Through service to the organization, I practiced leadership. That experience opened doors for me elsewhere. The Cedar Rapids Section of the IEEE has sent me to meetings all over the United States to represent the engineers of eastern Iowa. You too might gain from membership in this (or another) professional society.

The IEEE's Digital Library contains a paper that was published in the proceedings of the EUROCON 2007 conference ("The International Conference on 'Computer as a Tool' "). The paper is titled *An Example*

*of Use-Case-driven Conceptual Design of Relational Database*, by Drazen Brdjanin and Slavko Maric.

**Here is the abstract.**

Explain what this is all about in language that someone who has never studied computer science could understand.