**Mason Shepherd**

**Homework 1: due January 15th 11:59PM.**

**[4 points] 1.14** - Consider Figure 1.2.

a. 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.

Ans: Under “student” the column for major *may* need adjustment if the previous “CS” major had encompassed Software Engineering as well as Computer Science. If two distinct majors are now available then an “SE” major may need to be specified.

Otherwise, the columns for Course\_number, Department, and Prerequisite\_number where they appear under “Course,” “Section,” and “Prerequisite” will be the only ones needing to be updated.

b. Can you restructure the columns in COURSE, SECTION, and PREREQUISITE tables so that only one column will need to be updated?

Ans: Yes, but it would not be as well organized or informative to users.

**[4 points] 2.14** - if you were designing a Web-based system to make airline reservations and to sell airline tickets, which DBMS Architecture would you choose from Section 2.5? Why? Why would the other architectures not be a good choice?

Ans: A 3+ Tier Client/Server Architecture would be best. This architecture would be more efficient for this use as it can be more specialized and organized than other options. Centralized is heavily outdated, a basic client/server architecture would be too simple and, though a two tier would be better than the former two, it would not be as organized, efficient or secure as a 3 or n-tier architecture.

**[4 points] 2.15** - Consider Figure 2.1. In addition to constraints relating the values of columns in one table to columns in another table, there are also constraints that impose restrictions on values in a column or a combination of columns within a table. One such constraint forces that a column or a group of columns must be unique across all rows in the table. For example, in the STUDENT table, the StudentNumber column must be unique (to prevent two different students from having the same StudentNumber). Identify the column or the group of columns in the other tables that must be unique across all rows in the table?

Ans: “Course\_number” must be unique under the Course and Prerequisite tables. “Section\_identifier” must be unique under the Section table, and either “Student\_number” or “Section\_identifier” must be unique under Grade\_Report depending on whether all of the grades for a single student are being shown or all of the grades for each student in a section are being shown.

**[8 points]** Survey and write a short essay (~1 page) on the local and global impact of database technology on individuals, organizations, and society.

For individuals and society, the varied impacts are seemingly infinite ranging from the purely social impacts to the more economic impacts of modern technology. On the social side of things I would argue that the convenience of modern technology has left the majority of its users lazy and entitled. Tech companies strive to make everything easier to use and more affordable while capable of doing more and more for users. Less effort and thought is required of consumers and “if you don’t use it you lose it.” Because of this, I believe at some point we may arrive at an “evolutionary fork-in-the-road” where the divide between sheep-like people who are content to allow technology to think for them and those of us who understand, create, and develop said technology will widen in a much more noticeable manner.

Economically, the impact is almost entirely positive at the moment. Time, labor and resources are the only real currencies and technology’s continuous evolution tends to save all three of these things for all people affected. The less time a product or service takes, the more people you can sell it to. The less labor and resources are required, the less expensive it will be to produce and the product/service can be made by more organizations, creating more competition, which yields lower prices and/or better quality of the product/service through continuous innovation to remain competitive. These effects will in turn branch out and have numerous smaller effects which cause other effects like dominoes falling over. The end result being a very large impact from what might have seemed to be a small advancement in technology.

On organizations and businesses specifically, the effects yielded by modern database technologies that tend to come to my mind are those having to do with market research, business analytics, scientific research, and the growing field of data-science and it’s applications and uses. Instead of some out-of-touch CEO making decisions based off of biased intuition or research, actual hard facts and information can be kept up with, maintained, sorted, and delved through more efficiently and effectively than ever in order to derive meaningful, relevant insight. This in turn makes decisions in business, politics & government, science, and so on much less risky. Assurance is a valuable thing in any organization when it comes down to decision-making of any sort. With better decisions being made with less hesitancy, time, labor and resources are all used much more effectively and efficiently, drastically improving the quality of life for all parties involved.