IS 201 First Week Class Exercise

Complete the following tasks:

1) Introduce yourselves.
2) Appoint a leader. This person will show your final information visualization method to the class. You will have 2 minutes to display and explain your information visualization method.
3) Appoint a scribe. This person will have readable printing/writing and will produce the visualization method.
4) Read the informational paragraphs.
5) Answer the question for your group by creating the required visualization method.

Informational Paragraphs.

A database management system (DBMS) is a set of computer programs that facilitates the storage and access of data. There are many companies that produce DBMS software packages including Microsoft (Access, SQL Server, and FoxPro), Oracle (Enterprise Oracle and Personal Oracle), and IBM (DB/2 and Informix). There are also a variety of “freeware” DBMS’s, the most popular of which is MySQL. The DBMS software industry is relatively competitive since no vendor really dominates the product (as Microsoft dominates the desktop application project area).

A DBMS works with a computer’s operating system to store and access data in a way that makes it easier for computer users to get the information they need to make decisions. A DBMS, however, is a very complex set of programs that requires substantial computer and human resources. In addition to computer resources, effective use of a DBMS also requires people who understand not only how to use the software, but also how to optimize its use. A DBMS can’t tell you what data to store – a human being must decide what data is necessary to support an application. For example, if a doctor’s office wants to store patient’s health data on a computer, a DBMS can’t decide what data is necessary to store or the best format for storage – that is a person’s job.

A computer’s operating system is responsible for placing data on a secondary storage device, such as a hard disk, and then moving that data when required into main memory. Data must be in main memory to be processed by the computer, but most of the time it lives on disk. An operating system stores related data on disk in files. Within each file, data is stored in a sequential, or list-based format, meaning that one piece of data (a “record”) is placed after another. There is no special order to the placement of data so the operating system simply stores the first record it ever received first, and then places the second one next, and so on. When a piece or pieces of data is/are required to be processed by the computer system (example – a student wants to see what IS 201 sections are available for the Fall semester), the operating system is responsible for locating that data on disk and then moving the records into main memory for processing. It is important that this read and move operation happen quickly because a disk device is accessed very slowly compared to the speed with which main memory processes. Disk access happens in 1000th of a second increments, while main memory processes in 1,000,000,000th of a second increments making a computer’s main memory about a million times faster than its disk.

A DBMS works with an operating system by providing information to the operating system about the structure of data. For example, a DBMS can create an indexing system that will allow data to be accessed by a key field such as a person’s name or telephone number. The DBMS creates the index and then tells the operating system where to look for a particular record on disk so that the operating system does not have to hunt through all the data sequentially. The DBMS tries to limit the number of times an operating system must access disk since disk access is so slow. This ability to speed up disk access, however, comes at a cost since a DBMS is software and requires a substantial amount of main memory, processor time and disk space of its very own. In addition, a
DBMS keeps track of the security requirements for data and communicates those requirements to the operating system. The operating keeps track of who is logged on where, and then the DBMS keeps track of the DBMS rights/privileges for those users. The two must communicate constantly for processing to happen.

A DBMS makes it easier for computer users and application programmers to access data on a system primarily because the DBMS contains programs for data access. These programs include query generators, report generators and form generators. A DBMS usually has many programs to help data access. The DBMS products for small organizations, like Microsoft’s Access and FoxPro, MySQL and Oracle’s Personal Oracle usually have the most programs to make it really easy for users to access data. The programs contain helpful wizards and are designed to be used by people with relatively little computer-related background. These DBMS’s are fairly inexpensive software packages (less than $500). While these packages have lots of user-oriented features, they usually run very slowly and can’t handle large amounts of data.

Easy data access is only one reason that organizations and individuals like to use DBMS’s. A fully-featured DBMS, like Enterprise Oracle or IBM’s DB/2 and/or Informix make it possible for large organizations to process vast amounts of data. Think about the data needs of FedEx, UPS or Wal-Mart. They store huge amounts of data and must have incredibly fast data access. This is done through artificial intelligence and query optimizing algorithms. These algorithms are not available in small-scale packages like Microsoft’s Access. In addition, large organizations must have ways to keep track of data across different geographic locations (called distributed DBMS) and ensure that the data is always synchronized. They must also have ways to backup and restore their data in case a catastrophe occurs. They also need reliable forms of security and encryption for data storage and data access. A large organization pays over $50,000 to get a DBMS (Oracle and/or DB/2) capable of meeting its needs. Microsoft created its SQL Server product to attempt to provide the easy-to-use functions of small-scale DBMS’s with some of the necessary components of fully-featured DBMS packages. This product competes with Informix and has established a strong market share.

Very complex DBMS’s (like Oracle or DB/2) require very sophisticated computer professionals to keep them running effectively. Computer professionals must establish size and space needs for the data stored by the DBMS and then constantly monitor the growth of the database to ensure ongoing needs are met. They must establish data security requirements and monitor the access of data. They must create the backup and recovery procedures and then monitor and test them to make sure they work correctly. They must monitor the use of the database to ensure that computer users get consistent and efficient data access. Computer professionals also assist computer users in making most effective use of a DBMS by explaining how to access data, and also helping users access data.

Use the information provided in the previous section and your knowledge about computer systems to complete the tasks below.

Groups 1, 2: Create an information visualization method that would help a person understand the benefits and drawbacks of using a DBMS in an organization.

Groups 3, 4, 5: Imagine that a manager is considering purchasing a new DBMS software package and needs to understand the important purchasing factors. Create an information visualization method that would help a person compare and contrast DBMS software packages.

Groups 6, 7: Create an information visualization method that would help a person understand the functions of a DBMS as compared to an operating system for storing and accessing data in an organization.

Groups 8, 9: Create an information visualization method to justify to a manager in a human resources department why you need more computer professionals since you installed a new DBMS in your organization.