Database Development and Application Tutorial 1&2

1. i. What is the purpose of the largest databases used by e-commerce companies such as Amazon.com?

ii. How do the e-commerce companies use these databases?

i. The largest databases used by e-commerce companies are Web-activity databases used to track customer behavior so that they can do more accurate projection and planning.

ii. The e-commerce companies' Web-activity databases are used to determine which Web page items are popular and successful, and to test if certain variations in Web page design will generate more orders.

2. You are trying to justify a computerized data management system to your supervisor. You work in a service industry that deals directly with customers. How could collecting information about your customers provide a competitive advantage? What kind of software would you need to detect trends and make projections about customer activities?

To get students to broaden their horizon by looking at the business applications of databases and decision making.

Collect info for Strategic planning
Type of sw : data warehouse, analytical processing, CRM

3. Explain the relationship between information, data and knowledge. Use a relevant example for each of the following organization:
   i. Health care facility
   ii. Institution of higher learning
   iii. Law enforcement agency

The objective of this question is for students to demonstrate understanding about various types of data for different business entities. Students should also explain about what information can be derived from data and how this information can be used in decision making.

i. Health care facility (e.g hospitals, clinics)
Types of diseases, frequency of occurrence, mortality rate

ii. Institution of higher learning
No. of students, popular courses, pass rate, graduation classification (e.g. 1st Class Hons…), employment within 6 months, etc

iii. Law enforcement agency (Police, Customs, Immigration)

Types of crime, smuggling activities, emigration and migration data, etc

4. How is a file-based system different from a database management system?

File-based system
- Files are normally not shareable with other applications, files owned by department that created it
- Access to file is control by applications programs

Database management system
– Data not own by any individual departments, centrally located and sharable
– Access to data controlled by DBMS

Lei Tai Kor runs a convenient store business (EasyBuy Sdn Bhd) selling daily use and household items. Currently, he uses a system written entirely in C++ to monitor his business transactions and inventories. He plans to expand his business in the near future to nearby housing estates and if that is proven successful, he will then expand to nearby cities.

(i) Explain with relevant examples **THREE (3)** problems that EasyBuy will face when they try to expand the business due to the file-based system that they are using now. (9 marks)

5. (ii) Explain how a database system can overcome the **THREE (3)** problems

- Duplication of data – each outlet will have its own inventory files, this type of duplication is wasteful because it requires additional storage space and increased efforts to keep all files up to date.
- Limited data sharing - when management wants to analyse their business performance, they can only analysis each individual outlets, not as a whole company. May require more effort to consolidate each outlet's data into one report.
- Excessive program maintenance - any changes to the programs would require updates and changes to each outlet, including careful and lengthy testing to ensure no errors/bugs at each outlet.
- Program data dependence - any changes to a file structure would require extensive efforts in reprogramming, testing and data transfer to ensure the system would continue to function with minimal data loss.

- Duplication of data – a database does not have uncontrolled redundancy. There is only one database managed by the DBMS that will ensure the database is updated and always consistent
- Limited data sharing - the DBMS will allow data sharing among all authorised users. Different outlets can have different applications running but still able to connect to the database and share data.
- Excessive program maintenance - programs can be maintained easily, changes to program logic does not affect database structure and vice-versa.
- Program data dependence - When using a database and DBMS, changes to a file/table/database structure would require none or minimal efforts in reprogramming and testing. Program and data are independent, especially in a 3-tier (or more) architecture.

6. What is data redundancy, and which characteristics of the file system can lead to it?

Data redundancy exists when unnecessarily duplicated data are found in the database. For example, a customer's telephone number may be found in the customer file, in the sales agent file, and in the invoice file. Data redundancy is symptomatic of a (computer) file system, given its inability to represent and manage data relationships. Data redundancy may also be the result of poorly-designed databases that allow the same data to be kept in different locations. (Here's another opportunity to emphasize the need for good database design!)

7. Explain 5 types of databases with reference to the number of supported users.

Single-user - Supports only one user at a time
Desktop - Single-user database running on a personal computer
Multi-user -Supports multiple users at the same time
Workgroup - Multi-user database that supports a small group of users or a single department
Enterprise - Multi-user database that supports a large group of users or an entire organization

8. What is a DBMS, and what are its functions?

A DBMS is best described as a collection of programs that manage the database structure and that control shared access to the data in the database.
Current DBMSes also store the relationships between the database components; they also take care of defining the required access paths to those components.
The functions of a current-generation DBMS may be summarized as follows:

● The DBMS stores the definitions of data and their relationships (metadata) in a data dictionary; any changes made are automatically recorded in the data dictionary.

● The DBMS creates the complex structures required for data storage.

● The DBMS transforms entered data to conform to the data structures in item

2.

● The DBMS creates a security system and enforces security within that system.

● The DBMS creates complex structures that allow multiple-user access to the data.

● The DBMS performs backup and data recovery procedures to ensure data safety.

● The DBMS promotes and enforces integrity rules to eliminate data integrity problems.

● The DBMS provides access to the data via utility programs and from programming languages interfaces.

● The DBMS provides end-user access to data within a computer network environment.