**1.6 List four applications you have used that most likely employed a database system to store persistent data**

1) Online news sites: updating new, maintenance of archives

2) Booking Airfare: ticket reservations, schedule  
3) Banking online: transactions, bill pay, transfers  
4) University: submitting assignments, course schedule, registering for class

**1.7 List four significant differences between a file-processing system and a DBMS.**

· Both systems contain a collection of data and a set of programs which access that data. A database management system coordinates both the physical and the logical access to the data, whereas a file processing system coordinates only the physical access.

· A database management system reduces the amount of data duplication by ensuring that a physical piece of data is available to all programs authorized to have access to it, whereas data written by one program in a file-processing system may not be readable by another program.

· A database management system is designed to allow flexible access to data (i.e., queries), whereas a file-processing system is designed to allow pre-determined access to data (i.e., compiled programs).

· A database management system is designed to coordinate multiple users accessing the same data at the same time. A file-processing system is usually designed to allow one or more programs to access different data files at the same time. In a file-processing system, a file can be accessed by two programs concurrently only if both programs have read-only access to the file.

**1.8 Explain the concept of physical data independence and its importance in database systems.**

Physical data independence is the ability to modify the physical scheme without making it necessary to rewrite application programs. Such modifications include changing from unblocked to blocked record storage, or from sequential to random access files. Such a modification might be adding a field to a record; an application program’s view hides this change from the program

**1.9 List five responsibilities of a database-management system. For each responsibility, explain the problems that would arise if the responsibility were not discharged.**

**a. interaction with the file manager**.

No DBMS can do without this. If there is no file manager interaction, then nothing stored in the files can be retrieved.

**b. integrity enforcement.**

Consistency constraints may not be satisfied, for example an instructor may belong to a non-existent department, two students may have the same ID, account balances could go below the minimum allowed, and so on.

**c. security enforcement.**

Unauthorized users may access the database, or users authorized to access part of the database may be able to access parts of the database for which they lack authority. For example, a low-level user could get access to national defense secret codes, or employees could find out what their supervisors earn (which is presumably a secret).

**d. backup and recovery.**

Data could be lost permanently, rather than at least being available in a consistent state that existed prior to a failure.

**e. concurrency control.**

Consistency constraints may be violated despite proper integrity enforcement in each transaction. For example, incorrect bank balances might be reflected due to simultaneous withdrawals and deposits on the same account, and so on.

**1.11 Assume that two students are trying to register for a course in which there is only one open seat. What component of a database system prevents both students from being given that last seat?**

Transaction Isolation

**1.15 Describe at least three tables that might be used to store information in a social-networking system such as Facebook.**

1. A table with information about the user, his login, name, age.
2. A table with the user's friends, their names, nickname, login, how to contact them and photos.
3. Table with music, artists, genre, podcasts.