1.8

Four of the significant differences are:

- A DBMS reduces data **redundancy**, **isolation** and **inconsistency** by ensuring all the users authorized access only one physical piece of data, whereas a file-processing system does not.
- A DBMS provides convenient and efficient manners to **access data**, whereas a file-processing system does not. A user can access the data in a way that the designer didn't design with a DBMS.
- When accessing data, it's hard to guarantee **atomicity** in a conventional file-processing system, but a DBMS helps to ensure atomicity.
- A DBMS helps to deal with **concurrent-access anomalies** but a file-processing system does not. That is, when multiple users try to access the same data at the same time, a DBMS helps to keep the data correct.

1.9

Physical data independence:

Although implementation of the simple structures at the logical level may involve complex physical-level structures, the user of the logical level does not need to be aware of this complexity. That is, the user does not need to rewrite the program implementing instructions on the physical level.

Importance:

The physical schema is hidden beneath the logical schema, and can usually be changed easily without affecting application programs. Physical data independence ensures that DBMS is **universal, efficient and robust**, the user does not need to rewrite the program running on the physical level.

1.13

Five responsibilities:

- **Schema definition**. The DBA creates the original database schema.
- **Storage structure and access-method definition**.
- **Schema and physical-organization modification**. The DBA modifies the schema and the physical organization if needed.
- **Granting of authorization for data access**. By authorization, the DBA can easily regulate which parts of the database various users can access.
- **Routine maintenance**.
    - Periodically backing up the database.
    - Ensuring that enough free disk space is available.
    - Monitoring jobs running on the database and ensuring that performance is not degraded

1.15

- A table for *user*
- A table for *circle of friends*
- A table for *relationship*, representing whether two users are friends
- A table for *authorization*, representing the applications the account has authorized