1. Describe each of the following terms;
   a. **Data → used by the organization and a description of this data called the schema.**
   b. **Database → Kumpulan berbagai data logika terkait, dan deskripsi dari data ini, dirancang untuk memenuhi kebutuhan informasi organisasi.**
   c. **Database management system → a software system that enables users to define, create, maintain, and control access to the database.**
   d. **Database application program → a computer program that interacts with the database by issuing an appropriate request to the DBMS.**
   e. **Data independence → a major objective for the three-level architecture.**
   f. **Security → the protection of the database from unauthorized users.**
   g. **Integrity → usually expressed in terms of constrants, which are consistency rules that the database is not permitted to violate.**
   h. **Views → allow each user to have his or her own view of the database.**

2. Describe the approach taken to the handling of data in the early file-based systems.
   - **Collection of application programs that perform services for the end users (e.g. reports).**
   - **Each program defines and manages its own data.**

3. Describe the main characteristics of the database approach and contrast it with the file-based approach.
   Characteristics of the database approach:
   - **Arose because:**
     • **definition of data was embedded in application programs, rather than being stored separately and independently.**
     • **No control over access & manipulation of data beyond that imposed by application programs.**
   - **Result:**
     The database and DataBase Management System (DBMS).
   **Contrast it with the file-based approach:**
   - **Separation and isolation of data→ each program maintains its own set of data.**
   - **Duplication of data→ same data is held by different programs.**
   - **Data dependence→ file structure is defined in the program code**
   - **Incompatible file formats→ programs are written in different languanges, and so cannot easily access each other's files.**
   - **Fixed queries/proliferation of application programs→ programs are written to satisfy particular functions.**

4. Describe the five components of the DBMS environment and how they related to each other.

Five components of the DBMS:
- **Hardware → the hardware can range from a single personal computer, to a single mainframe, to a network of computers.**
- **Software → DBMS, operating system, network software and also the application programs.**
- **Data → used by organization and a description of this data called the schema.**
- **Procedures → instruction and rules that should be applied to the design and use of the database and DBMS**
- **People → the final component is the people involved with the system.**

Hubungan satu sama lain:
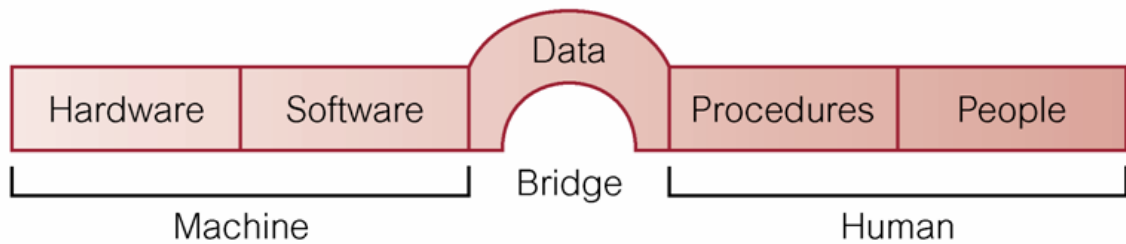
5. Describe the advantages and disadvantages of DBMSs.

Advantages of DBMSs	Disadvantages DBMSs
Control of data redundancy	Complexity
Data consistency	Size
More information from the same	Cost of DBMS
Amount of data	Additional hardware costs
Sharing of data	Cost of conversion
Improved data integrity	Performance
Improved security	Higher impact of a failure
Enforcement of standards	
Economy of scale	
Balance of conflicting requirements	
Improved data accessibility and responsiveness	
Increased productivity	
Improved maintenance through data independence	
Increased concurrency	
Improved backup and recovery services	