

## WEEK 2: FILE-BASED APPROACH VS. DATABASE APPROACH.

### File-based approach

- **File-based System is a** collection of application programs that perform services for the end-users such as the production of reports. Each program defines and manages its own data.
- File-based systems were an early attempt to computerize the manual filing system
- Consider a saving bank enterprise that keeps information about all customers and savings accounts in permanent system files at the bank.
- The bank will need a number of applications e.g.,
  - i. Program to debit or credit an account
  - ii. A program to add a new account
  - iii. A program to find the balance of an account
  - iv. A program to generate monthly statements
  - v. Any new program would be added as per the bank's requirements

Such a typical filing /processing system has the limitation of more and more files and application programs being added to the system at any time.

### Limitations of the File-Based Approach

- i. **Data redundancy and inconsistency** - Since the files and application programs are created by different programmers over a long period of time, the files are likely to have different formats and the programs may be written in several programming languages. Moreover, the same piece of information may be duplicated in several files. This redundancy leads to higher storage and access costs. It may also lead to inconsistency i.e.; the various copies of the same data may no longer agree.
- ii. **Data isolation** - Since data is scattered in various files and files may be in different formats, it may be difficult to write new applications programs to retrieve the appropriate data.
- iii. **Concurrent access anomalies** - Interaction of concurrent updates may result in inconsistent data e.g., if two customers withdraw funds say Kshs. 1000 and Kshs.2000 from an account at about the same time the result of the concurrent execution may leave the account in an incorrect state.
- iv. **Security problems** - Not every user of the database system should be able to access all the data. Since application programs are added to the system in an ad-hoc manner, it is difficult to enforce security constraints.

Therefore, these limitations have prompted the adoption of the database approach.

## **DATABASE APPROACH**

Unlike the file system with may separate and unrelated files, the Database consists of logically related data store in a single data repository. The problems inherent in file systems make using the database system very desirable and therefore, the database represents a change in the way the end user data are stored, accessed and arranged.

### **Advantages of Database approach**

1. **Centralized Control** - Via the DBA it is possible to enforce centralized management and control of data. This means that necessary modifications, which do not affect other application changes, meet the data independence DBMS requirement.
2. **Reduction of redundancies** - Unnecessary duplication of data is avoided effectively reducing total amount of data required, consequently the reduction of storage space. It also eliminates extra processing necessary to trace the required data in a large mass of data. It also eliminates inconsistencies. Any redundancies that exist in the DBMS are controlled and the system ensures that his multiple copies are consistent.
3. **Shared data** – sharing of data under the control of a DBMS by a number of application programs and user is possible.
4. **Integrity** - Centralized control can also ensure that adequate checks are incorporated to the DBMS provide data integrity. Data integrity means that the data contained in the database is both accurate and consistent
5. **Security** - Only authorized people must access confidential data. The DBA ensures that proper access procedures are followed including proper authentication schemes process that the DBMS and additional checks before permitting access to sensitive data. Different levels of security can be implemented for various types of data or operations.
6. **Data Independence** - It involves both logical and physical independence. Logical data independence indicates that the conceptual schemes can be changed without affecting the existing external schemes. Physical data independence indicates that the physical storage structures/devices used for storing the data would be changed without necessitating a change in the conceptual view or any of the external use.

### **Disadvantages of Database approach**

1. Cost - in terms of:
  - Migration (movement from tradition separate systems to an integrated one)
  - Training users
2. Centralization Problems

Adequate backup would be required in case of failure You would experience increased severity of security breaches and disruption of operation of the organization because of downtimes and failures.