DATABASE ESSENTIALS

Lecture 1

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INTRODUCTION

- A database is a structured collection of data that is organized and stored in a way that allows efficient retrieval, management, and manipulation of information.

INTRODUCTION…

- Life without a database

INTRODUCTION…

- Life without a database

manual file system

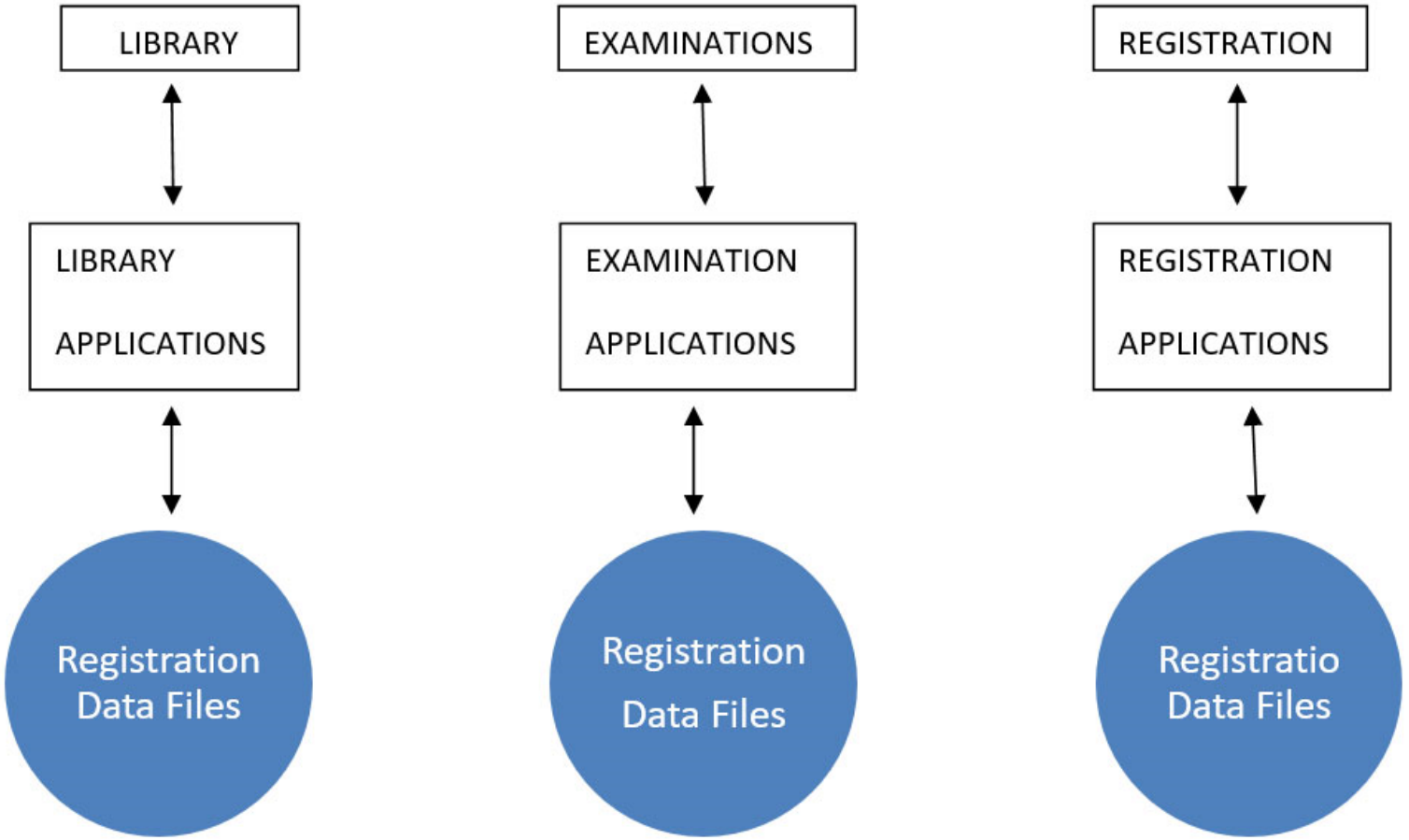
INTRODUCTION…

Traditional File-processing system

- Refers to a system whereby computer files were used to store the data.
- Each unit or department in an organization has its own set of separate files.
- The data in one file may not relate to the data in any other file.

INTRODUCTION…

Traditional File-processing system



INTRODUCTION…

Disadvantages of traditional file-processing system

- Data redundancy
  - ✓this leads to higher storage and access cost
- Data inconsistency
  - ✓mismatch of various copies of the same data
- Difficulty in accessing data
  - ✓takes much time to access accurate data

INTRODUCTION…

Disadvantages of traditional file-processing system

- Data isolation
  - ✓data are scattered in different files. Files may also be in different formats

INTRODUCTION…

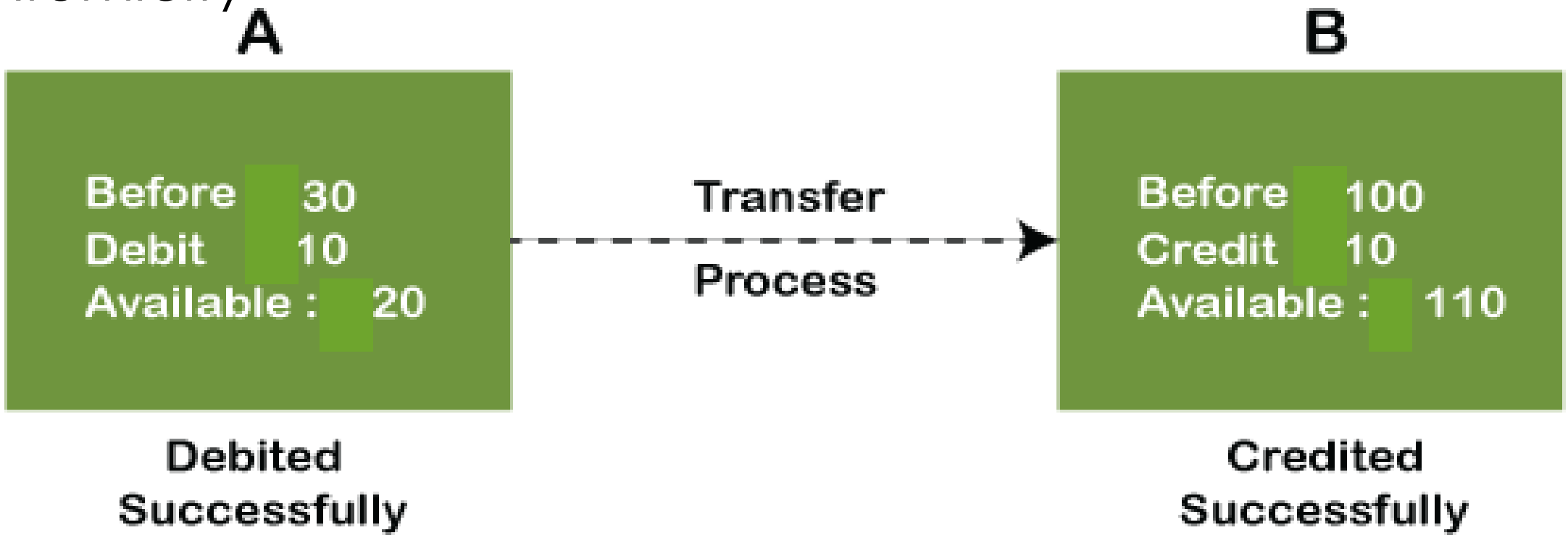
Disadvantages of traditional file-processing system

- Atomicity problems
  - ✓Atomicity is DB transaction property where all the actions within the transaction are executed as a single, indivisible unit of work.
  - ✓It ensures that the transaction is either fully completed or fully rolled back to the state it was in before the transaction began.

INTRODUCTION…

Disadvantages of traditional file-processing system

- Atomicity



INTRODUCTION…

- The purpose of database systems is to eliminate the disadvantages of file-processing system

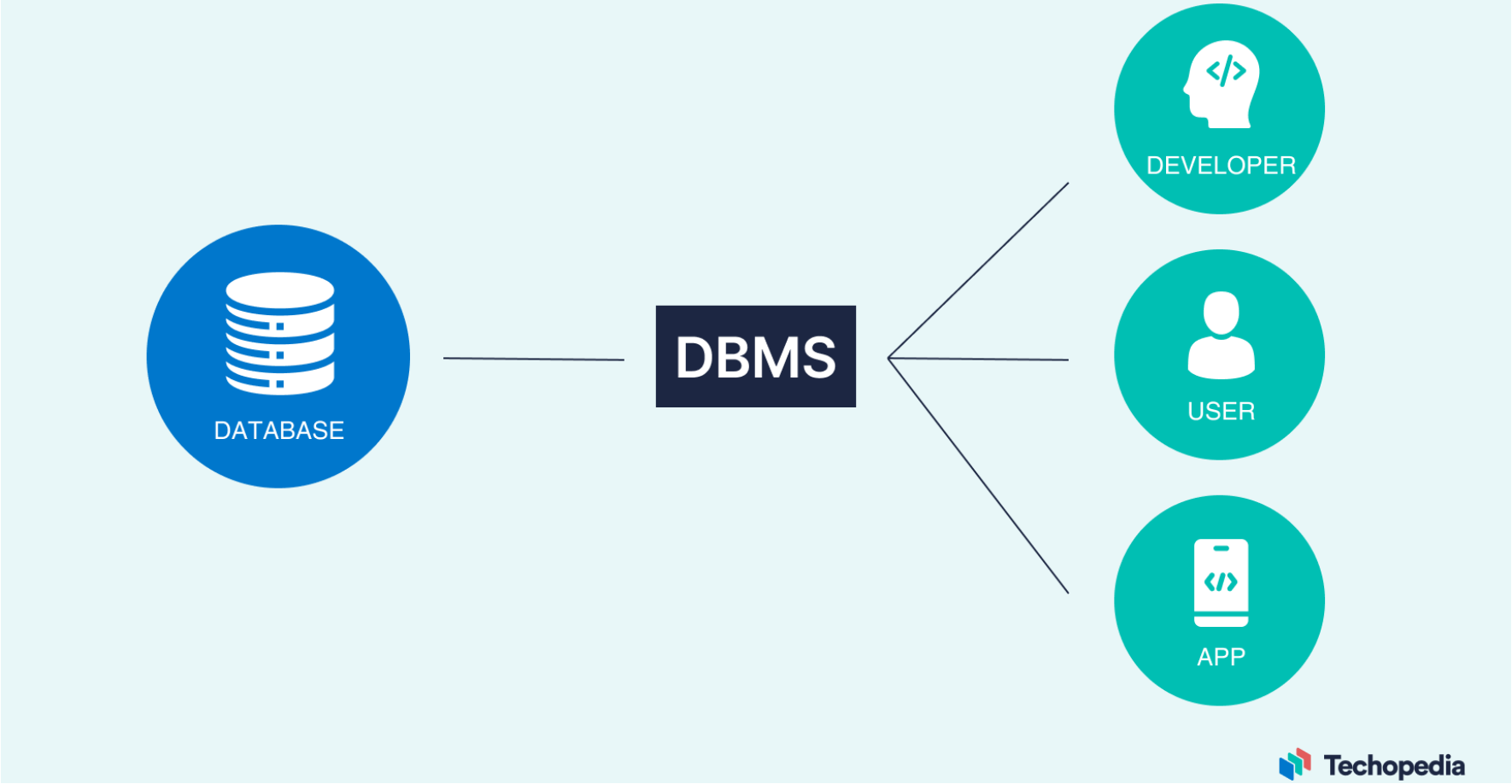
INTRODUCTION…

- A database management system (DBMS) is a program(s) used to create, process, store, retrieve, control and manage the data.

- DBMS acts as an interface between the user and the data stored in the database.

INTRODUCTION

- A database and a DBMS



DATA VS INFORMATION

- Data
  - raw facts from which the required information is produced.

- Information
  - refined or processed data.
  - consists of images, text, documents and voice in a meaningful content.

DATA VS INFORMATION…

Attributes of information.

- Accuracy
- Timeliness
- Relevancy

DATA VS INFORMATION…

Attributes of information.

- Accuracy
  - ✓information is free from errors, and it clearly and accurately reflects the meaning of data on which it is based.
  - ✓free from bias and conveys an accurate picture to the recipient.

DATA VS INFORMATION…

Attributes of information.

- Timeliness
  - ✓the recipients receive the information when they need it and within the required time frame.

- Relevancy
  - ✓usefulness of the piece of information for the corresponding persons.

DATABASE SYSTEM APPLICATIONS

- The earliest database systems dates back to 1960s.
- Both the old and new database systems have a common factor, which is data.
- Data is the central aspect of every database system.
- Most corporations are valuable because of the information they own.

DATABASE SYSTEM APPLICATIONS…

- Database systems are used to manage collections of data that:
  - are highly valuable
  - are relatively large
  - are accessed by multiple users and applications, often at the same time

DATABASE SYSTEM APPLICATIONS…

- Early databases were maintained as back-office systems with which users interacted via printed reports and paper forms for input.

- End users interact with current databases via user interfaces.
  - ✓ This has enabled both the client and the enterprise to interact much more easier.

  - ✓Example: ATMs

DATABASE SYSTEM APPLICATIONS…

Modes in which databases can be used.

- support online transaction processing

- support data analytics

DATABASE SYSTEM APPLICATIONS…

Supporting online transaction processing

- In this mode, users retrieve relatively small amounts of data and performing small updates.

- This is the primary mode of use for the vast majority of users.

DATABASE SYSTEM APPLICATIONS…

Supporting data analytics

- In this mode, a database is used in processing of data to draw conclusions.

- The obtained conclusions can be used to make business decisions.

DBMS USERS

- End users
  - ✓Deal with the database at the terminal end
- Application programmers
  - ✓Develop the applications in different languages to interact with database
- System Analysts
  - ✓Responsible for overall technical, economical and feasibility aspects of the DBMS.

DBMS USERS

- Database administrator
  - ✓Takes care of DBMS policies and strategies.

- Sophisticated Users
  - ✓SQL programmers, who deal directly with the database.
  - ✓They write queries to delete/select/insert and update the database.

The best way to predict your future is to create it –

Abraham Lincoln