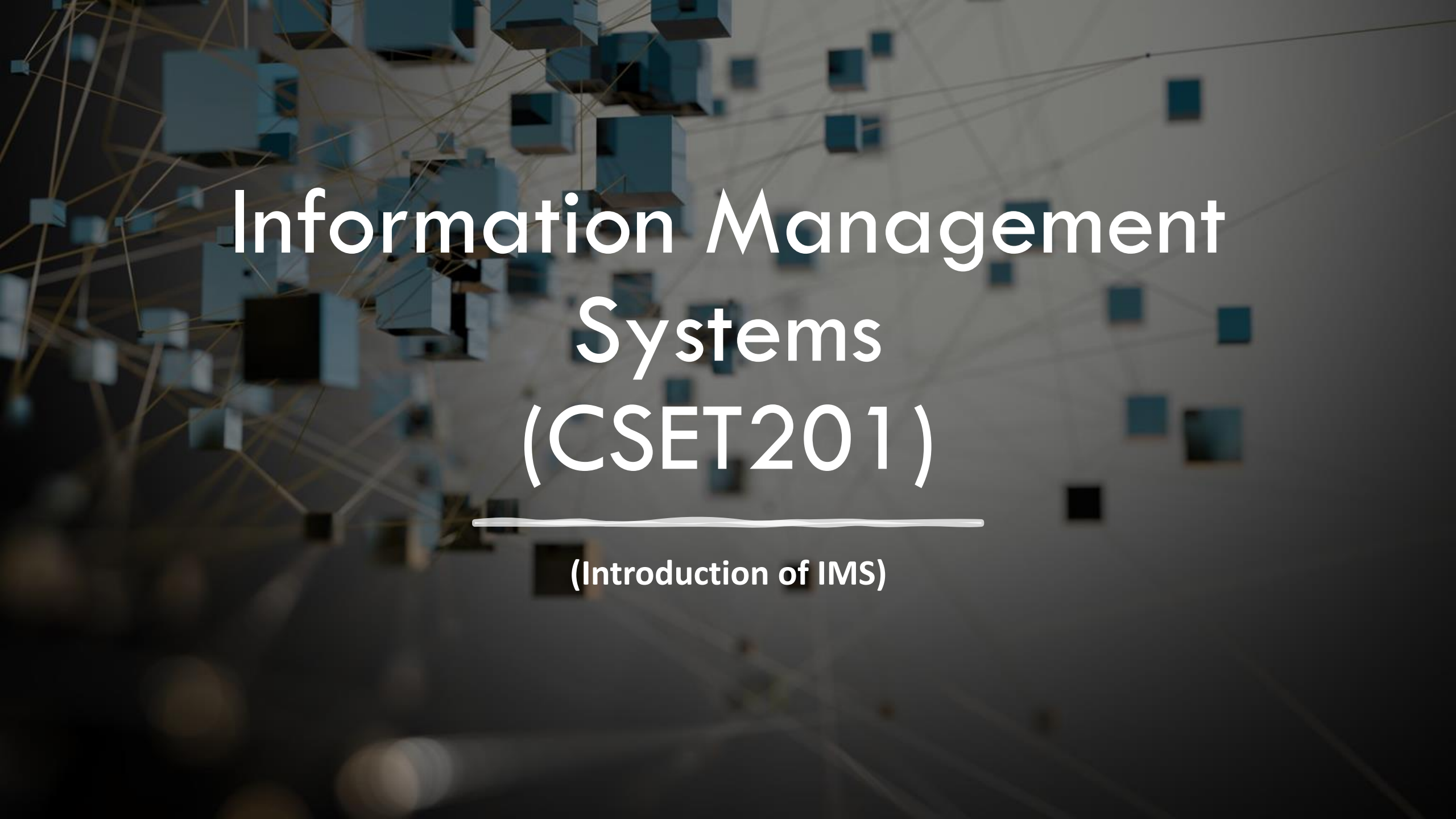


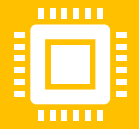
Information Management Systems (CSET201)

(Introduction of IMS)

Course Learning Outcomes:

CLO1: Articulate the competent understanding of database systems design and ER Modelling

CLO2: Build database systems and understand new developments and trends in databases.



CLO3: Construct databases and make use of efficient SQL queries to retrieve and manipulate data as required.

Reference Books

RAMEZ ELMASRI AND SHAM NAVATHE, FUNDAMENTALS OF DATABASE SYSTEMS (7 ED.), PEARSON , 2016. ISBN 9780133970779.

ABRAHAM SILBERSCHATZ, HENRY F. KORTH, S. SUDARSHAN, “DATABASE SYSTEM CONCEPTS”, 7TH EDITION, MCGRAW-HILL 2019, ISBN 9780078022159

Online Courses

- Introduction to Modern Database Systems: Saylor(https://learn.saylor.org/course/CS403)
- Database Management Essentials: Coursera (https://www.coursera.org/learn/database-management)
- Databases and SQL for Data Science with Python (https://www.coursera.org/learn/sql-data-science)

Evaluation Components

Components of Course Evaluation	Percentage
Mid Term Examination	15
Quiz	10
Continuous Lab Evaluation	30
Hackathon	15
End Term Examination	30

Why Databases?

Database Management System(DBMS)

- DBMS contains information about a particular enterprise
  - Collection of Interrelated data
  - Set of programs to access the data
  - An environment that is both convenient and efficient to use
- Databases can be large
- Databases touches all aspects of our life

Which Database Have You Experienced or Interacted Today?

Where is Database?

- You cannot avoid it and it's everywhere!
- You can say it actually makes the current society and your life work!
- Banking/Credit card /Social Security Info…
- Airlines: reservations, schedules
- Universities: registration, grades
- Sales: customers, products, purchases
- Online retailers: order tracking, customized recommendations
- Manufacturing: production, inventory, orders, supply chain
- Human resources: employee records, salaries, tax deductions
- So many fields….

DBMS Marketplace

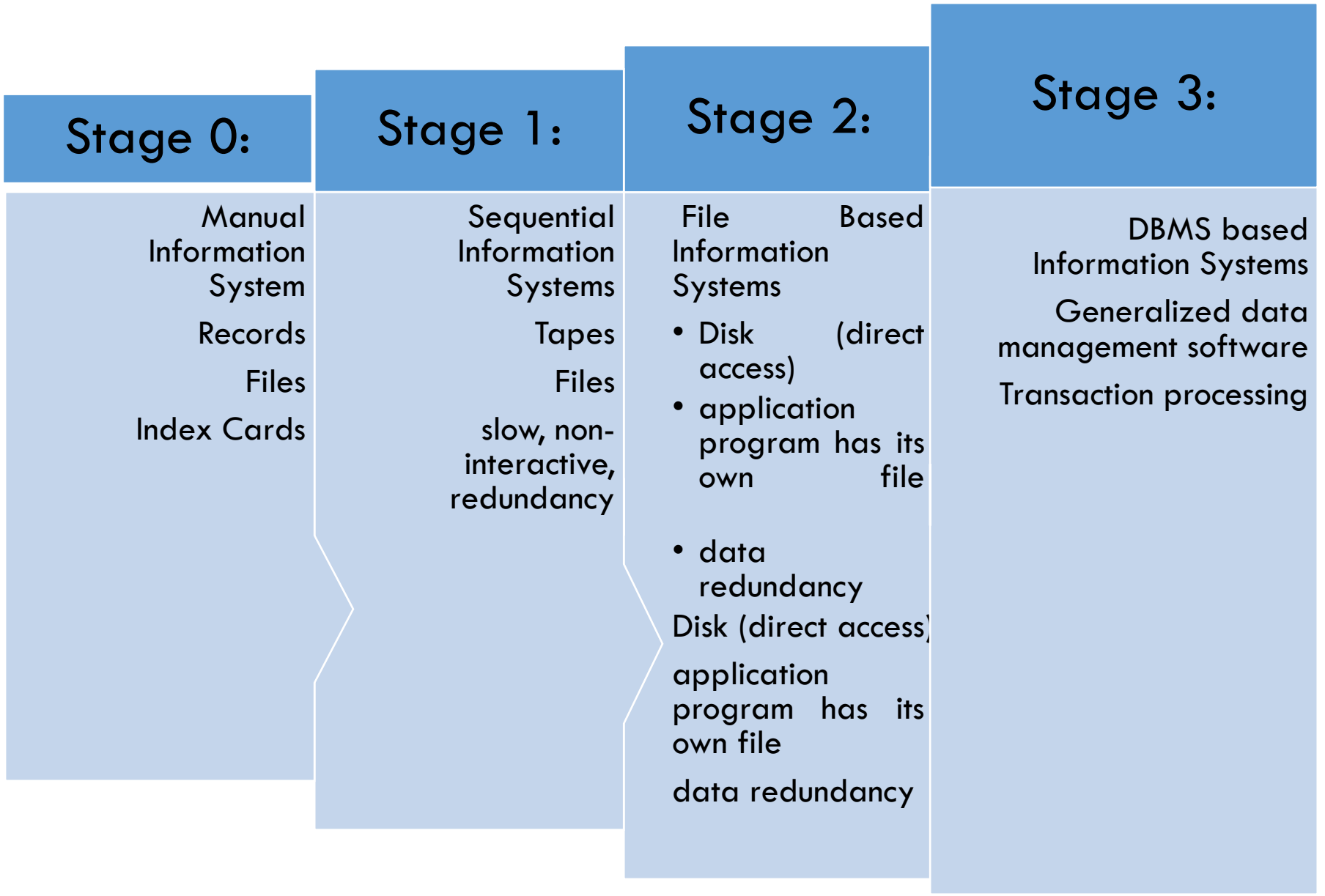
Relational DBMS companies – Oracle, Sybase – are among the largest software companies in the world.

IBM offers its relational DB2 system. With IMS, a nonrelational system, IBM is by some accounts the largest DBMS vendor in the world.

Microsoft offers SQL-Server, plus Microsoft Access for the cheap

OpenSource: MySQL, postgreSQL

Stages of Information System

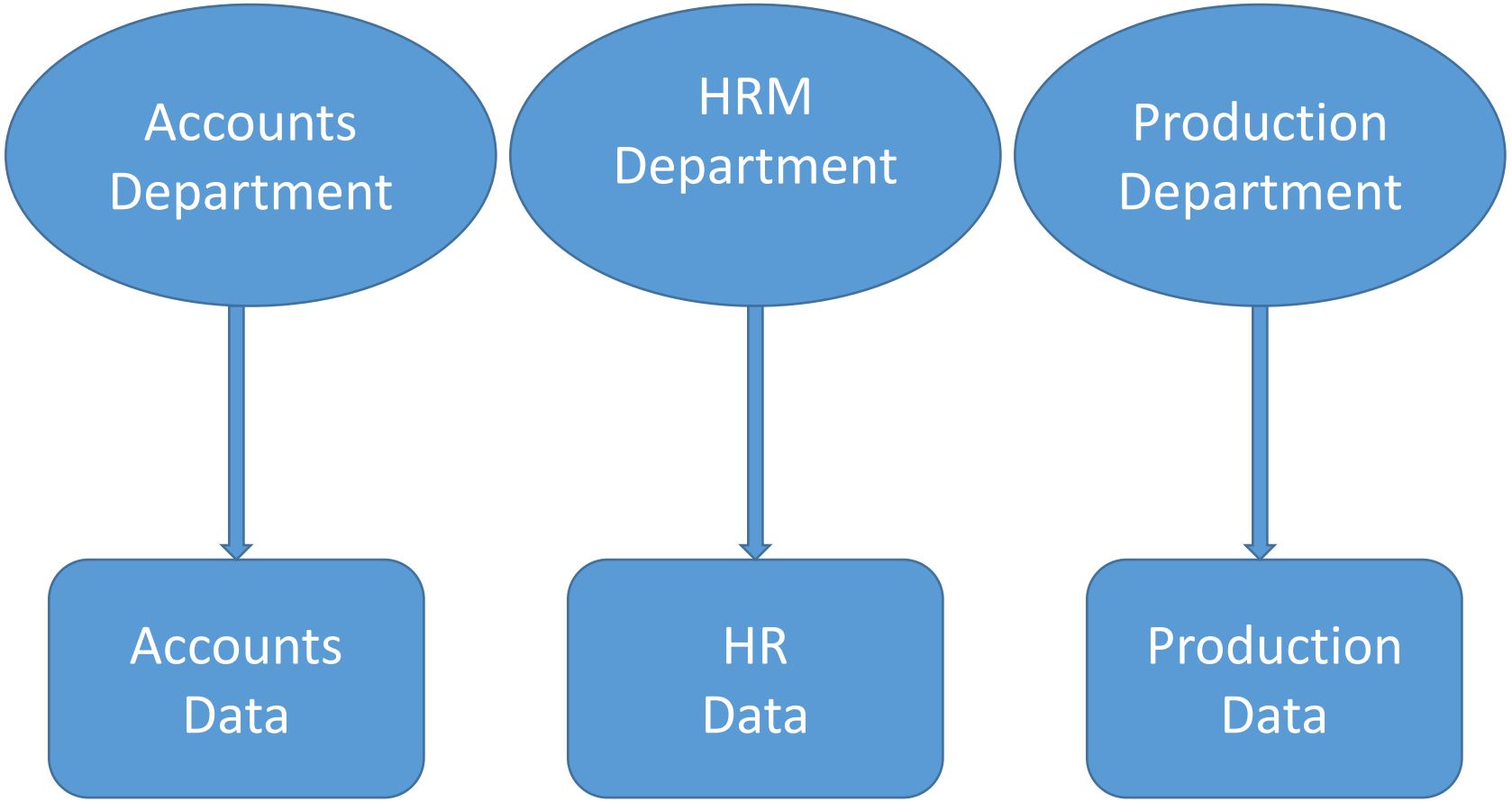


What is file based system?

A FILE BASED SYSTEM IS A COLLECTION OF APPLICATION PROGRAMS THAT PERFORM SERVICES FOR THE USER.

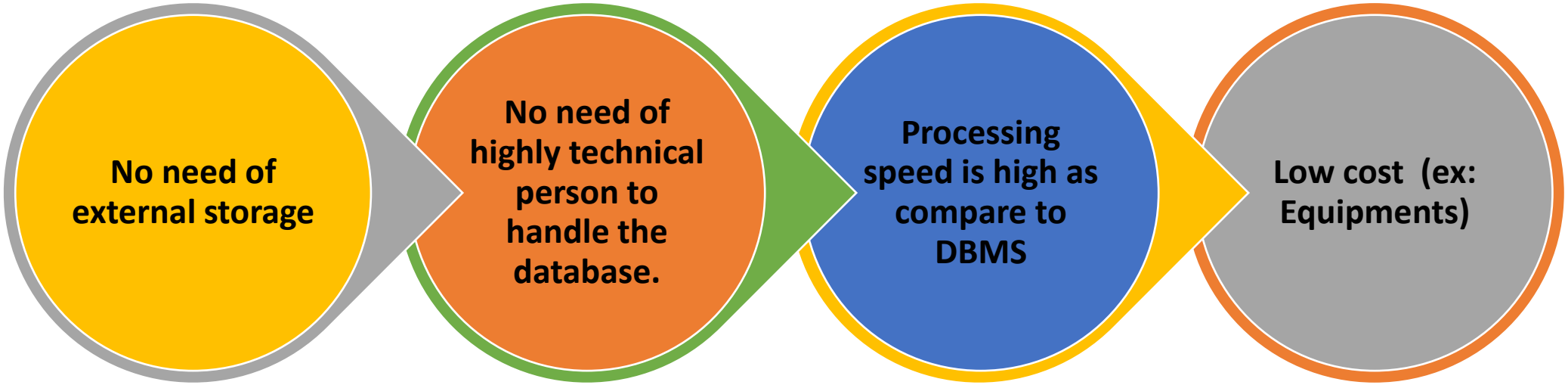
EACH PROGRAM WITHIN A FILE BASED SYSTEM DEFINES AND MANAGES ITS OWN DATA.

How it works?



Each department maintain their own set of data. There is no link between those data pools.

Advantages of file based system



Disadvantages of File based system

Data redundancy and inconsistency

- Multiple file formats, duplication of information in different files

Difficulty in accessing data

- Need to write a new program to carry out each new task

Data Isolation

- Multiple files and formats

Integrity problems

- Integrity constraints (e.g., account balance > 0) become "buried" in program code rather than being stated explicitly
- Hard to add new constraints or change existing ones

Atomicity of updates

- Failures may leave database in an inconsistent state with partial updates carried out
- Example: Transfer of funds from one account to another should either complete or not happen at all

Concurrent access by multiple users

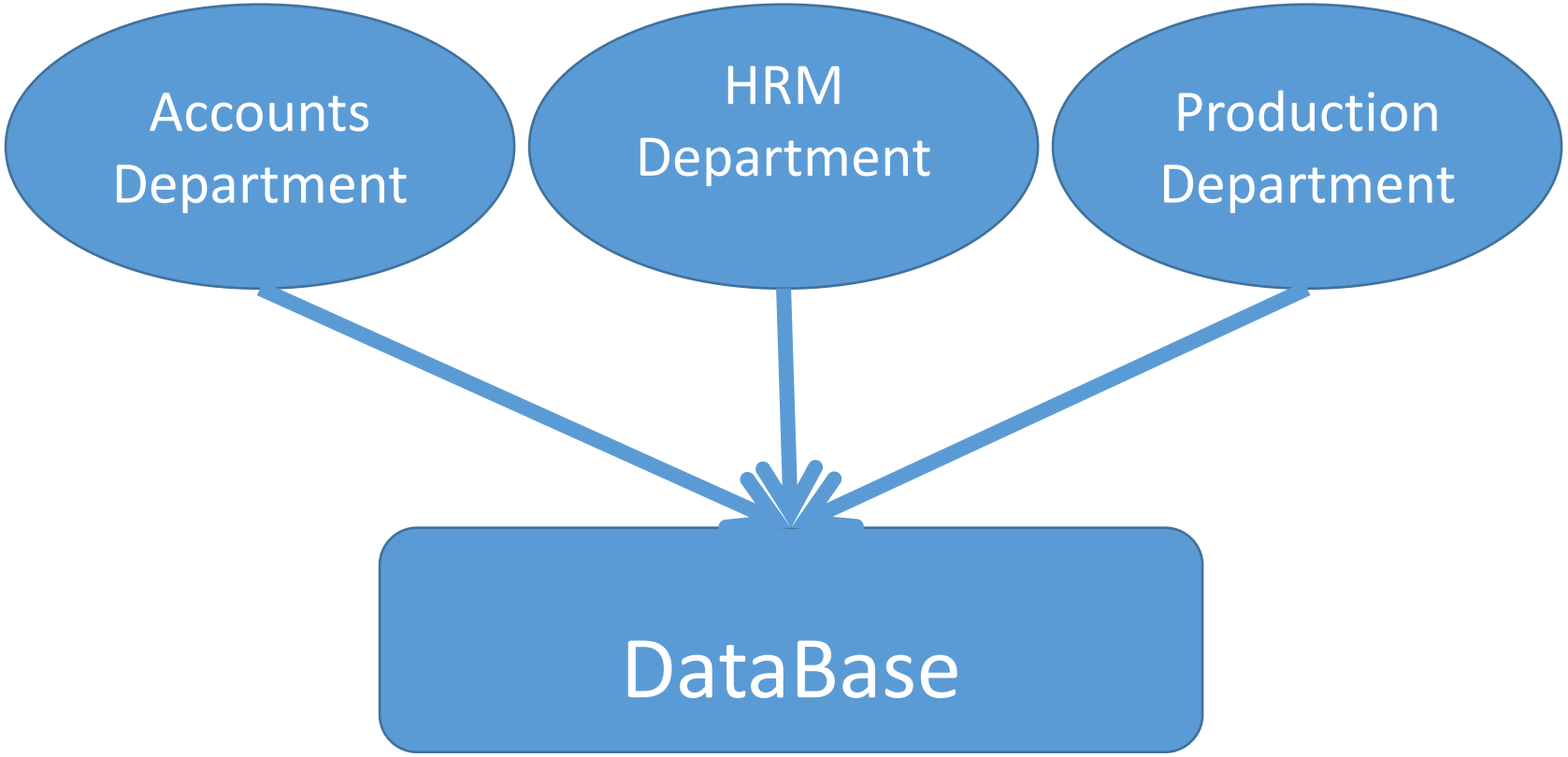
- Concurrent access needed for performance
- Uncontrolled concurrent accesses can lead to inconsistencies
- Example: Two people reading a balance (say 100) and updating it by withdrawing money (say 50 each) at the same time

Security Problems

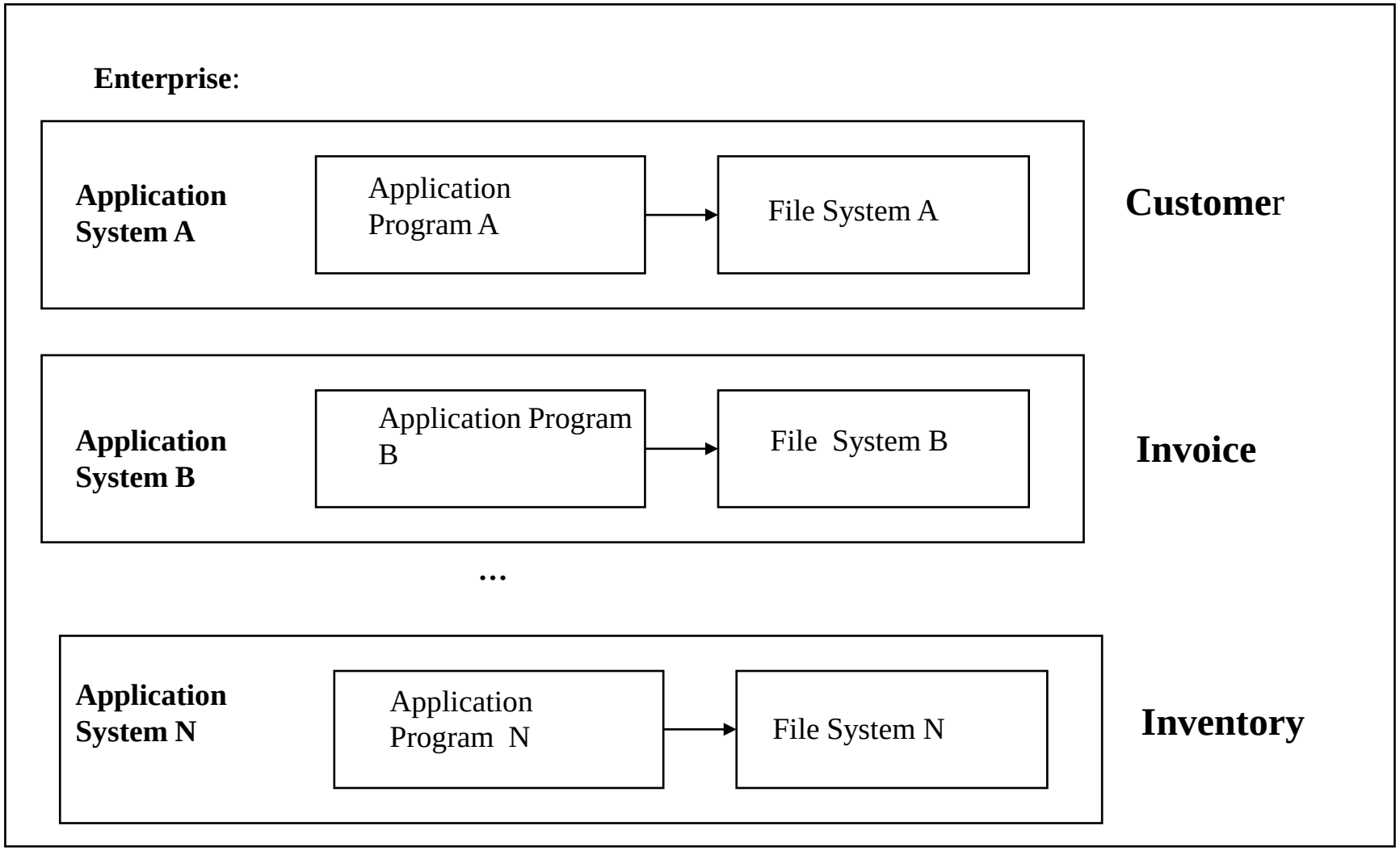
- Hard to provide user access to some, but not at all data.

Data based system offer solutions to all the above problems

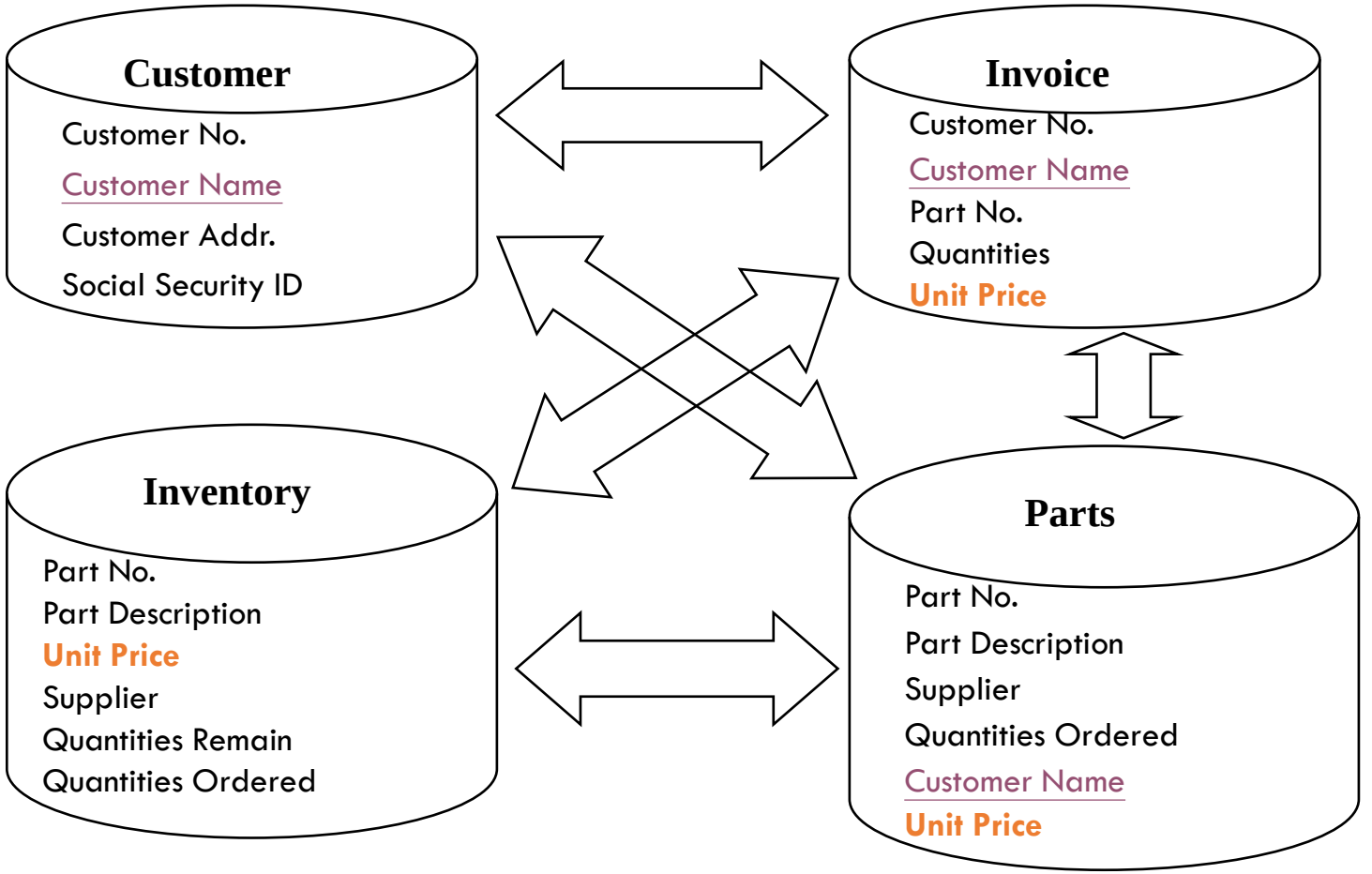
How DBMS works



File Based Information Systems : Example



File Based Information Systems (cont.)



Case 1: Amazon Database

Amazon uses their own proprietary NoSQL database for their humongous product and marketplace info which is scaled horizontally and renders many pages, and is dynamic.

However, Amazon does use Relational Databases for their own human resources management. For instance, Amazon is a major Oracle client, spending some 50 million dollars on RDMS.

The databases presented my AWS is to be used by AWS clients and is for hosting and that includes DynamoDB which is a relational database.

Case 2: Google Database

- Although Google uses BigTable for all their main applications, they also use MySQL for other (perhaps minor) apps. And it's maybe also handy to know that BigTable is not a relational database (like MySQL) but a huge (distributed) hash table which has very different characteristics.

Three Aspects to Studying DBMS

1. Modelling and design of databases.

- • Allows exploration of issues before committing to an implementation.

2. Programming: queries and DB operations like update.

3. DBMS implementation.

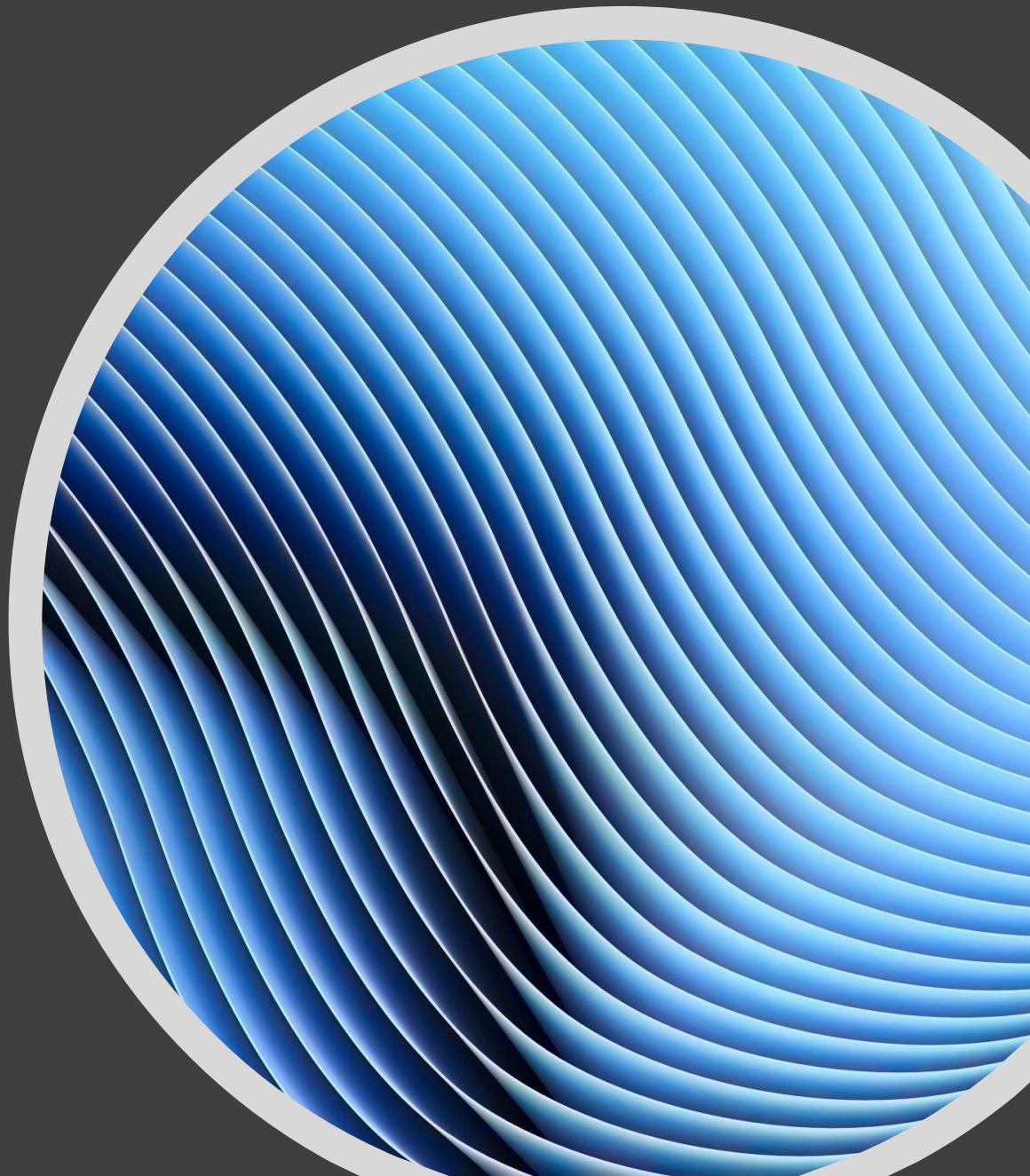
Task for Students

1) Does Facebook use the RDBMS?

2) Does Salesforce use RDBMS?

3) Does Microsoft use RDBMS?

4) Enlist the name of anyone big IT Company which use RDBMS frequently .



Thank you