SPREADSHEETS

INTRODUCTION

Spreadsheets are a popular way to store and explore data due to their ease of setup and use.

SPREADSHEET BASICS

Workbook

- Definition: A file containing one or more worksheets in Excel.

Worksheet

- Definition: A single sheet within a workbook, labeled by tabs.

Cell

- Definition: The intersection of a row and a column where data is entered.

Columns and Rows

- Definition: Columns are labeled with alphabetical characters, and rows are labeled numerically.

Headers

- Definition: The first few rows describing the data in each column.

NoSQL Databases

INTRODUCTION

Non-relational databases that store data in various formats such as key-value pairs, documents, graphs, or columns.

KEY FEATURES OF NOSQL DATABASES

1. **Scalability**: NoSQL databases are designed to scale horizontally by adding more servers to distribute the load.
2. **Flexibility**: They can store unstructured, semi-structured, or structured data. This allows for easy storage of data without needing a fixed schema.

3. **High Performance**: NoSQL databases are optimized for performance, handling high volumes of reads and writes with low latency.
4. **Distributed Architecture**: Data is distributed across multiple nodes, providing high availability and fault tolerance.

TYPES OF NoSQL DATABASES

1. Key-Value Stores

- **Definition**: Store data as key-value pairs. Each key is unique and maps to a value.
- **Examples**: Redis, DynamoDB
- **Use Cases**: Session storage, caching, real-time data analytics

2. Document Stores

- **Definition**: Store data as documents, often using JSON or BSON formats.
- **Examples**: MongoDB, CouchDB
- **Use Cases**: Content management systems, user profiles, e-commerce applications

3. Columnar Databases

- **Definition**: Store data in columns rather than rows, allowing for efficient retrieval of columns of data.
- **Examples**: Apache Cassandra, HBase
- **Use Cases**: Time-series data, real-time analytics, data warehousing

4. Graph Databases

- **Definition**: Use graph structures with nodes, edges, and properties to represent and store data.
- **Examples**: Neo4j, Amazon Neptune
- **Use Cases**: Social networks, recommendation engines, fraud detection

ADVANTAGES OF NoSQL DATABASES

1. **Schema Flexibility**: Unlike relational databases, NoSQL databases do not require a fixed schema, making it easier to evolve data structures over time.
2. **Big Data Handling**: NoSQL databases are designed to handle large volumes of diverse data types, making them suitable for big data applications.
3. **Real-Time Analytics**: Many NoSQL databases support real-time analytics, providing immediate insights into data.
4. **Cost Efficiency**: Horizontal scaling allows for cost-effective expansion by adding more servers rather than more powerful hardware.