

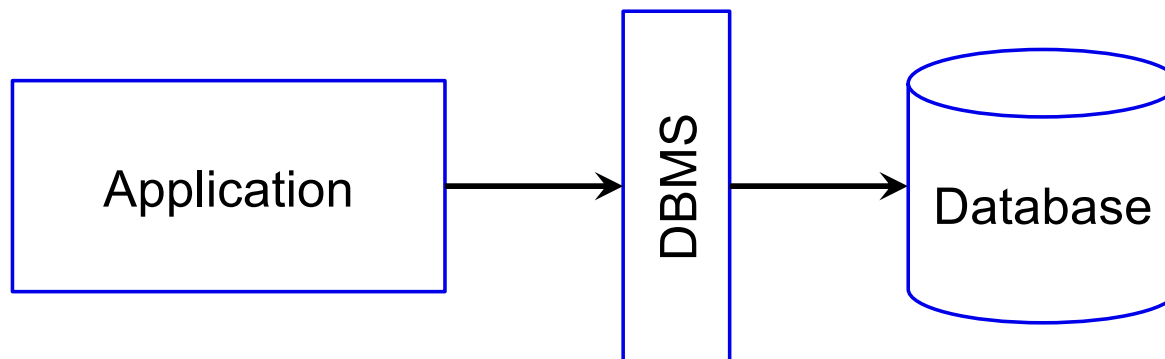
ITIS 5166

Network-Based Application Development

Database

Database

- Databases are used to store a collection of data
- All access to the database is controlled by the database management system (DBMS)



Relational Database

- Relational databases have been very popular since 1980s
 - Data is organized as a set of tables with columns and rows

id	name	major
1	John Smith	CS
2	Amy Brown	MATH
3	Jamie Jones	HISTORY

id	name
1	Calculus
2	Java Programming
3	U.S. History

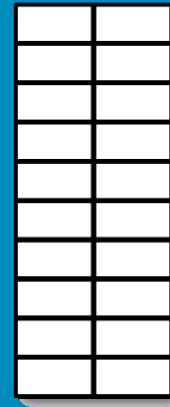
id	studentId	courseId
1	3	3
2	1	2
3	2	1

- Exponential growth of internet and web applications requires
 - Scale to store, organize and process massive amount of data
 - Data can be semi-structured or unstructured

NoSQL Database

- NoSQL (Not Only SQL) databases are developed as an alternative
- Horizontal scaling with replication and distribution over commodity servers
- Uses flexible dynamic schema to handle unstructured data

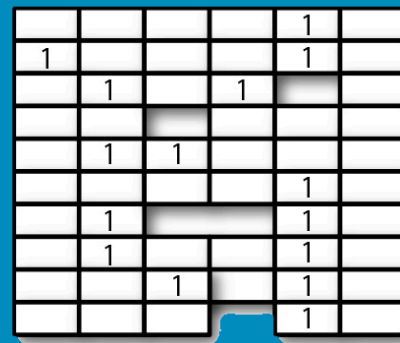
Key-Value



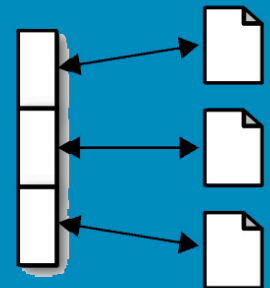
Graph DB



Column Family



Document



Database for Node/Express Apps

- Express apps can use any database supported by NodeJS
- Relational database: PostgreSQL, MySQL, SQLite
- NoSQL database: Redis, Cassandra, CouchDB, MongoDB, Neo4J
- [Complete list](#)
- In this course, we will use MongoDB, which is a document based NoSQL database