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# Introduction to Database

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# What is DB(Database)?

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- An organized collection of related information, or data
  1. Phone book
  2. Shopping List
  3. Todo list
- Databases can be stored in different ways.
  1. On paper
  2. On computer
  3. on your mind

# Computers + Databases = <3

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Comparing computer and others, computer can:

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- Can keep track of a lot of things
- Can store a lot of data
- High security

# **Database Management System(DBMS)**

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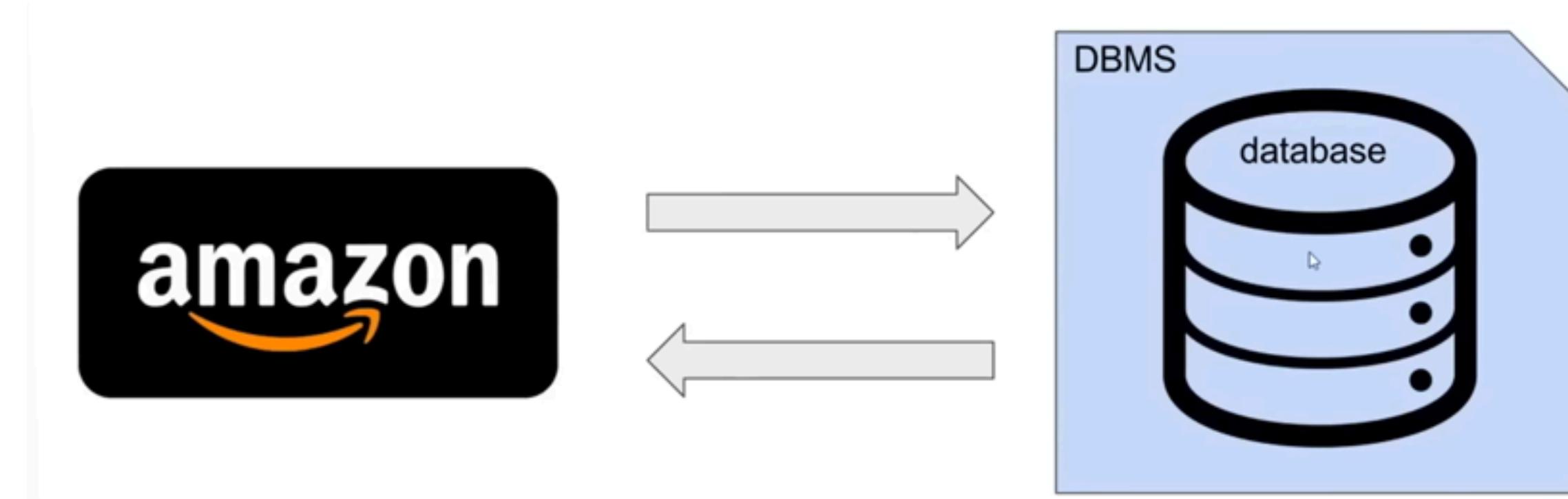
A special software program that helps users create and maintain a database.

- Makes it easy to manage large amounts of information.
- Handles security
- Backups
- Interacts with software applications(Programming Languages)





Amazon.com will interact with the DBMS  
in order to create, read, update and  
delete information.





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# C.R.U.D

Create

Read

Update

Delete

# Two types of Databases

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Relational(SQL)

VS

Non\_Relational(noSQL)

# Relational Databases(SQL)

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Organize data into one or more tables

- Each table has columns and rows.
- A unique key identifies each row.

# Relational Databases(SQL)



The diagram illustrates the structure of a relational database table. It shows a table with four columns: Name, Price, Quantity on Hand, and Quantity on Order. The first row contains the column names. The second row contains the data for 'Chocolate': Price is \$ 3.95, Quantity on Hand is 12, and Quantity on Order is 10. The third row contains the data for 'Bread': Price is \$ 4.95, Quantity on Hand is 34, and Quantity on Order is 0. The fourth row contains the data for 'Water': Price is \$ 1.95, Quantity on Hand is 10, and Quantity on Order is 0. Red annotations with curly braces identify parts of the table: 'Column' points to the top row of column names; 'Column Names' points to the first row of the table; 'Record' points to the entire row for 'Bread'; and 'Field' points to the 'Price' cell for 'Bread'.

Column				
Column Names	Name	Price	Quantity on Hand	Quantity on Order
	Chocolate	\$ 3.95	12	10
Record	Bread	\$ 4.95	34	0
	Water	\$ 1.95	10	0

Number : INT ,TINYINT , BIGINT , FLOAT

## DataTypes

String : VARCHAR, TEXT , LONGTEXT , CHAR

Date : DATE, DATETIME , TIMESTAMP

Others : BINARY , JSON

# Relational Databases(SQL)

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- Relational Database Management Systems (RDBMS)
  - Help users create and maintain a relational database
    - mySQL, Oracle, postgreSQL, mariaDB, etc.
- Structured Query Language (SQL)
  - Standardized language for interacting with RDBMS
  - Used to perform C.R.U.D operations, as well as other administrative tasks (user management, security, backup, etc).
  - Used to define tables and structures

# Non-Relational(noSQL/ not just SQL)

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Organize data is anything but traditional table.

- Key-value stores
- Documents(JSON,XML)
- Graphs

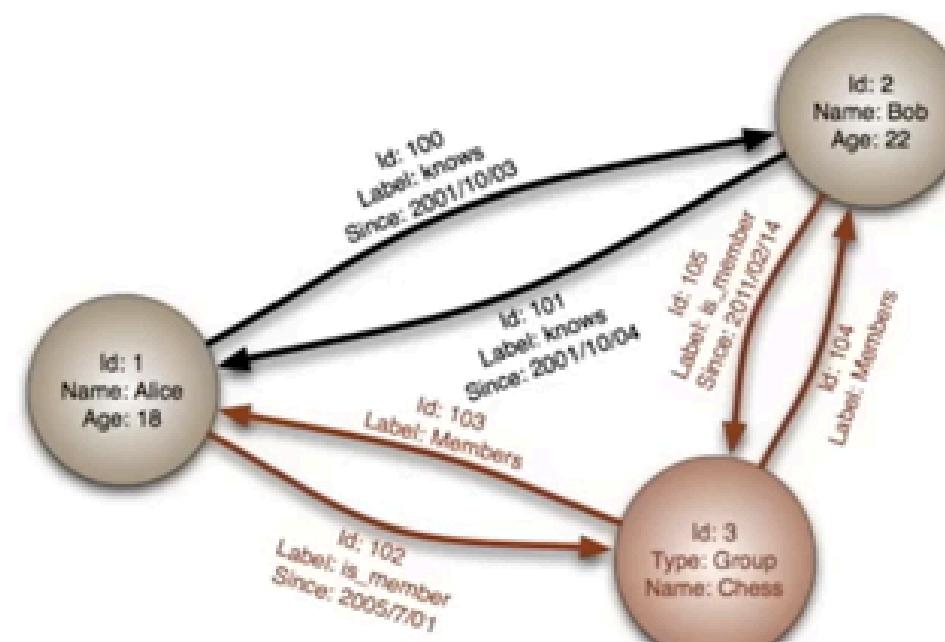
# Non-Relational(noSQL/ not just SQL)



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```
[  
  {  
    "_id": 1345,  
    "name": "Jack",  
    "major": "Biology"  
  }, {  
    "_id": 2267,  
    "name": "Kate",  
    "major": "Sociology"  
  }, {  
    "_id": 2453,  
    "name": "Claire",  
    "major": "English"  
  }, {  
    "_id": 1957,  
    "name": "John",  
    "major": "Chemistry"  
  }]
```

Document



Graph

Key	Value
"xyz"	string
"abc"	JSON
"pqr"	BLOB
"Imno"	etc...

Key-Value Hash  
Keys are mapped to values

# Non-Relational(noSQL/ not just SQL)

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- Non-Relational Database Management Systems (NRDBMS)
  - Help users create and maintain a non-relational database
    - mongoDB, dynamoDB, apache cassandra, firebase, etc
- Implementation Specific
  - Any non-relational database falls under this category, so there's no set language standard.
  - Most NRDBMS will implement their own language for performing C.R.U.D and administrative operations on the database.

# Database Query

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Queries are requests made to the database management system for specific information

As the database's structure become more and more complex, it becomes more difficult to get the specific pieces of information we want.

A google search is a query

