Creating Databases

Why can’t your nose be 12 inches long?

Why can’t your nose be 12 inches long?

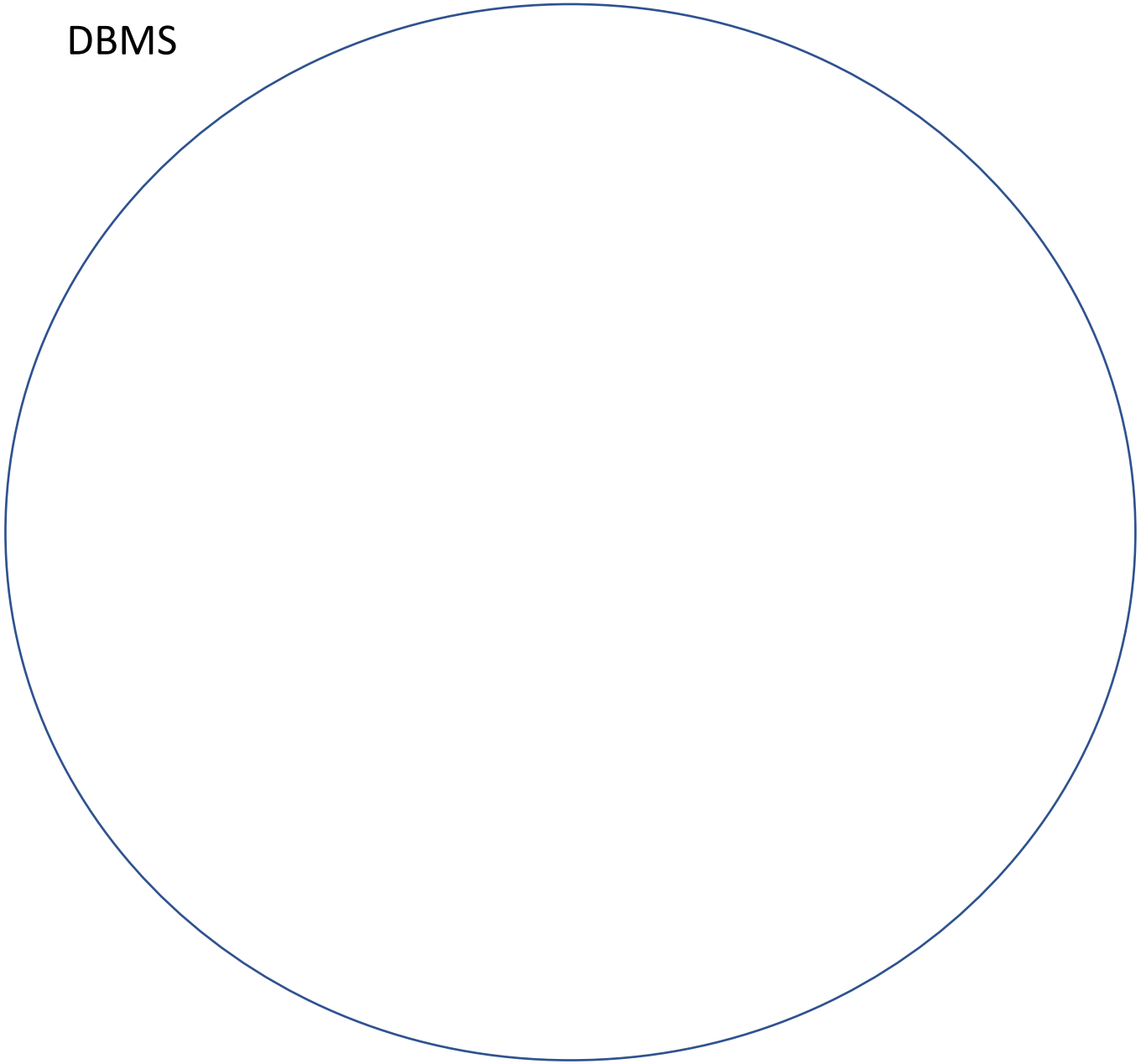
Because then it would be a foot

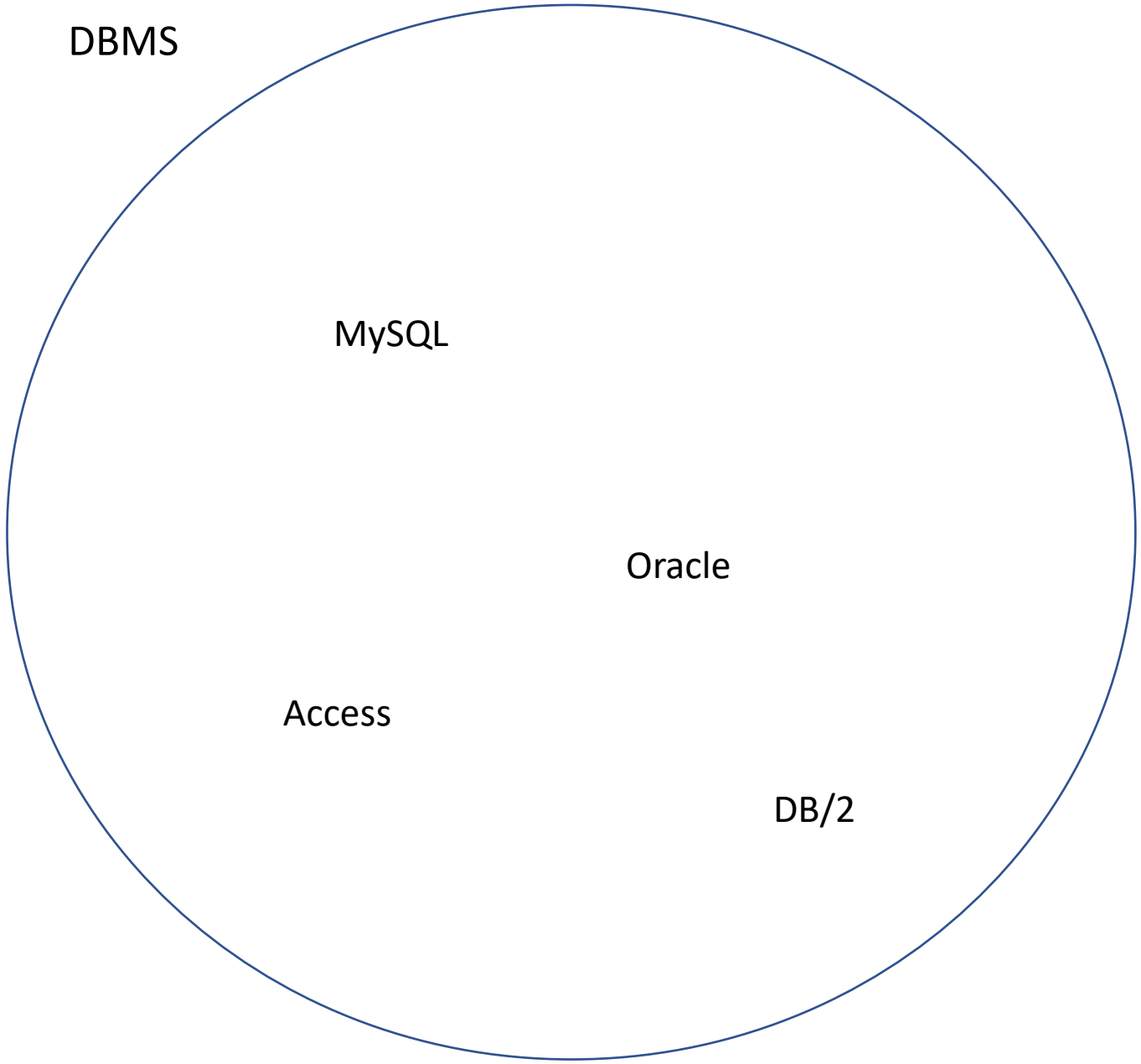
What do the Greek use to cut their pizzas?

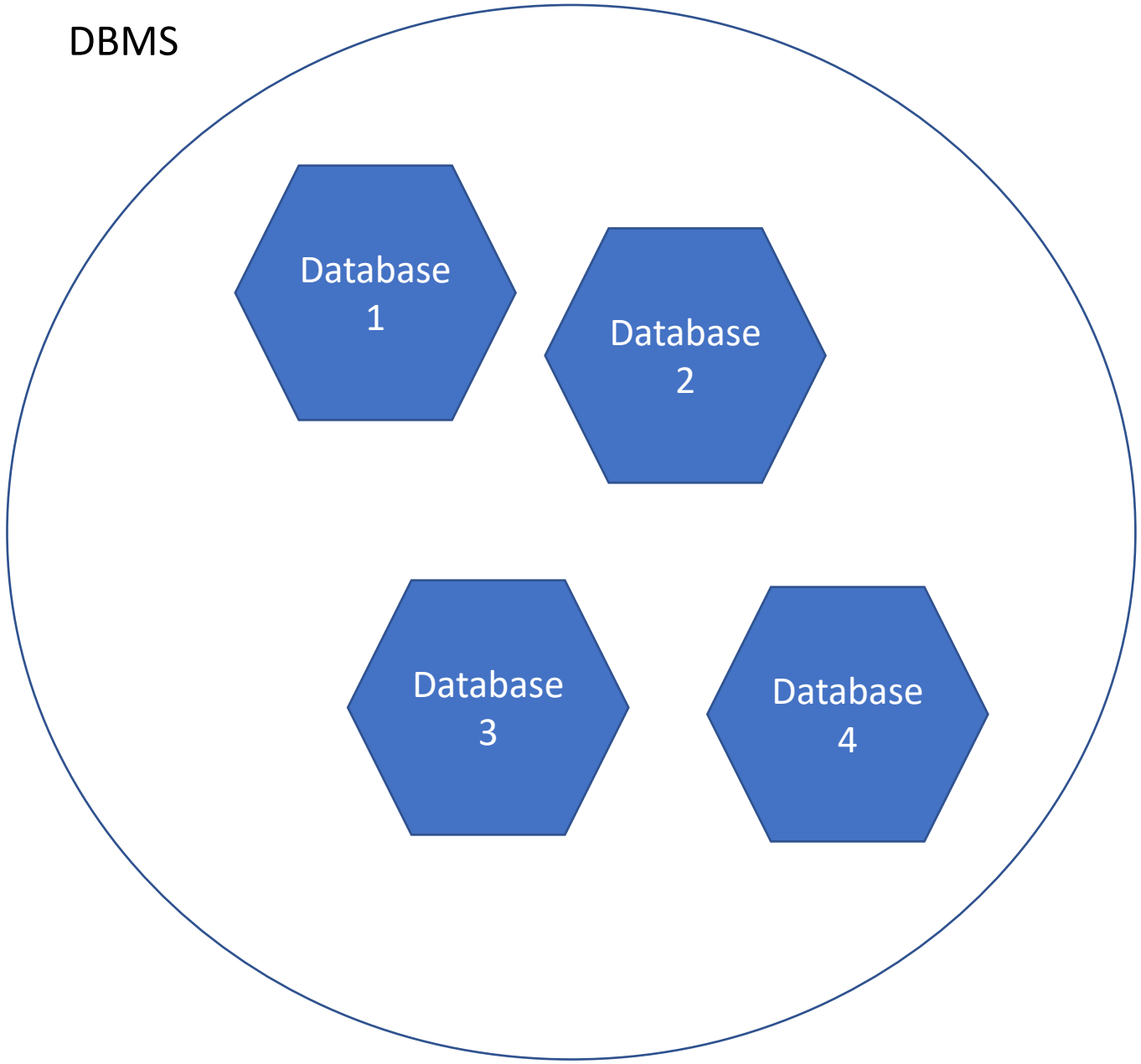
What do the Greek use to cut their pizzas?

little caesars

DBMS

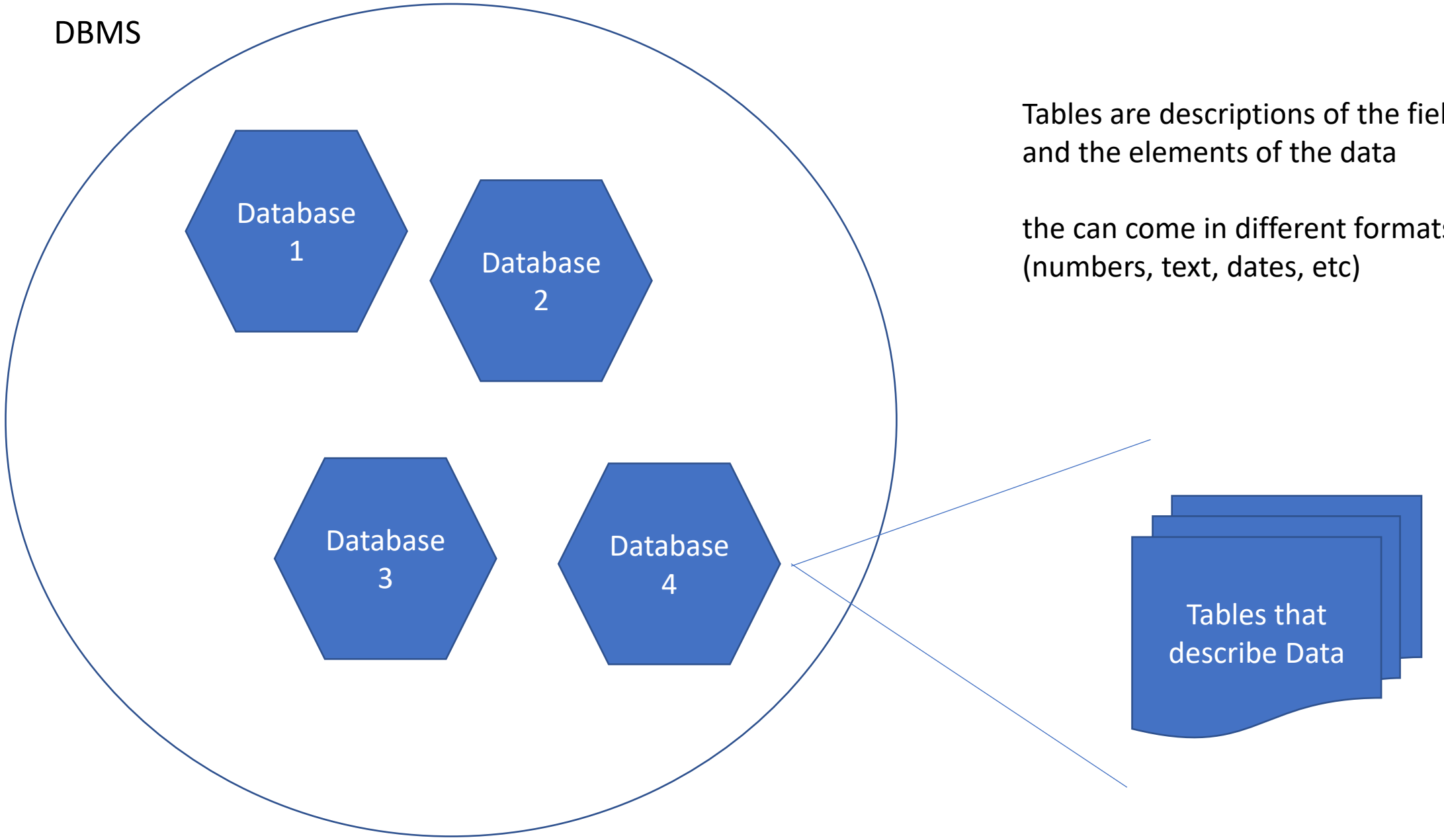



DBMS
MySQL
Oracle
Access
DB/2



A database management system can manage any number of databases

Note, that a database is comprised of a a number of related tables that define the composition of the data



Tables are descriptions of the fields and the elements of the data

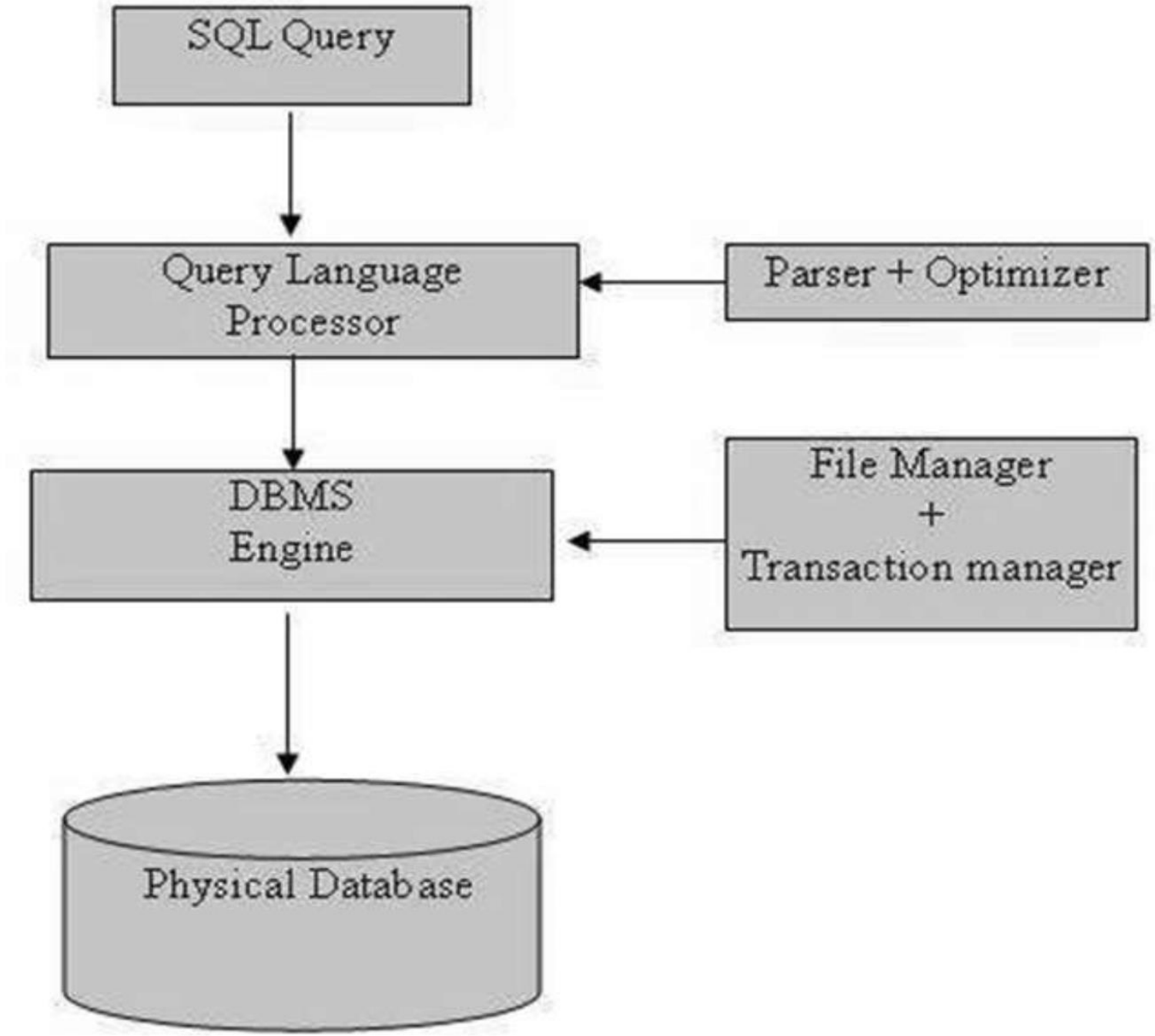
the can come in different formats (numbers, text, dates, etc)

Structured Query Language

- Structured Query Language:
  - acronym: SQL
  - pronounced as “S-Q-L”
  - originally developed by IBM as the SEQUEL language in the 1970s
  - SQL-92 is an ANSI national standard adopted in 1992
  - SQL:2011 is the current standard

SQL Defined

- SQL is not a full programming language, but rather a data sublanguage.
- SQL is comprised of:
  - data definition language (DDL)
    - used to define database structures
  - data manipulation language (DML)
    - data definition and updating
    - data retrieval (Queries)
  - SQL/Persistent Stored Modules (SQL/PSM)
    - procedural programming capabilities [See Appendix E]
  - transaction control language (TCL)
    - control transaction behavior [See Chapter 6]
  - Data control language (DLC)
    - grant and revoke database permissions [See Chapter 6]


SQL Query
Query Language Processor
Parser + Optimizer
DBMS Engine
File Manager + Transaction manager
Physical Database

In order to work with SQL databases we
must issues SQL “commands” or statements – these
commands can create, update and alter databases
Or the privileges we grant them

DDL - Data Definition Language

Command	Description
CREATE	Creates a new table, a view of a table, or other object in the database.
ALTER	Modifies an existing database object, such as a table.
DROP	Deletes an entire table, a view of a table or other objects in the database.

DML - Data Manipulation Language

Command	Description
SELECT	Retrieves certain records from one or more tables.
INSERT	Creates a record.
UPDATE	Modifies records.
DELETE	Deletes records.

DCL - Data Control Language

Command	Description
GRANT	Gives a privilege to user.
REVOKE	Takes back privileges granted from user.

What is a table?

The data in an RDBMS is stored in database objects which are called as **tables**. This table is basically a collection of related data entries and it consists of numerous columns and rows.

Remember, a table is the most common and simplest form of data storage in a relational database. The following program is an example of a CUSTOMERS table:

```
+----+----------+-----+-----------+----------+
| ID | NAME     | AGE | ADDRESS   | SALARY   |
+----+----------+-----+-----------+----------+
|  1 | Ramesh   |  32 | Ahmedabad |  2000.00 |
|  2 | Khilan   |  25 | Delhi     |  1500.00 |
|  3 | kaushik  |  23 | Kota      |  2000.00 |
|  4 | Chaitali |  25 | Mumbai    |  6500.00 |
|  5 | Hardik   |  27 | Bhopal    |  8500.00 |
|  6 | Komal    |  22 | MP        |  4500.00 |
|  7 | Muffy    |  24 | Indore    | 10000.00 |
+----+----------+-----+-----------+----------+
```

What is a field?

Every table is broken up into smaller entities called fields. The fields in the CUSTOMERS table consist of ID, NAME, AGE, ADDRESS and SALARY.

A field is a column in a table that is designed to maintain specific information about every record in the table.

What is a Record or a Row?

A record is also called as a row of data is each individual entry that exists in a table. For example, there are 7 records in the above CUSTOMERS table. Following is a single row of data or record in the CUSTOMERS table:

```
+----+----------+-----+-----------+----------+
|  1 | Ramesh   |  32 | Ahmedabad |  2000.00 |
+----+----------+-----+-----------+----------+
```

A record is a horizontal entity in a table.

Exact Numeric Data Types

DATA TYPE	FROM	TO
bigint	-9,223,372,036,854,775,808	9,223,372,036,854,775,807
int	-2,147,483,648	2,147,483,647
smallint	-32,768	32,767
tinyint	0	255
bit	0	1
decimal	-10^38 +1	10^38 -1
numeric	-10^38 +1	10^38 -1
money	-922,337,203,685,477.5808	+922,337,203,685,477.5807
smallmoney	-214,748.3648	+214,748.3647

Approximate Numeric Data Types

DATA TYPE	FROM	TO
float	-1.79E + 308	1.79E + 308
real	-3.40E + 38	3.40E + 38

Date and Time Data Types

DATA TYPE	FROM	TO
datetime	Jan 1, 1753	Dec 31, 9999
smalldatetime	Jan 1, 1900	Jun 6, 2079
date	Stores a date like June 30, 1991	
time	Stores a time of day like 12:30 P.M.	

Note – Here, datetime has 3.33 milliseconds accuracy where as smalldatetime has 1 minute accuracy.

Character Strings Data Types

DATA TYPE	Description
char	Maximum length of 8,000 characters.(Fixed length non-Unicode characters)
varchar	Maximum of 8,000 characters.(Variable-length non-Unicode data).
varchar(max)	Maximum length of 231characters, Variable-length non-Unicode data (SQL Server 2005 only).
text	Variable-length non-Unicode data with a maximum length of 2,147,483,647 characters.

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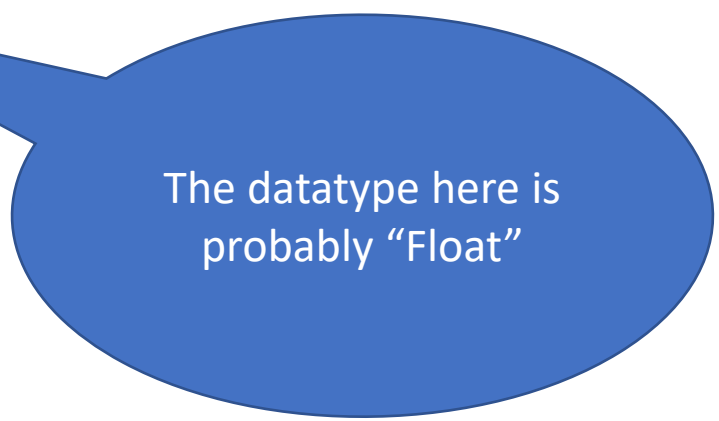

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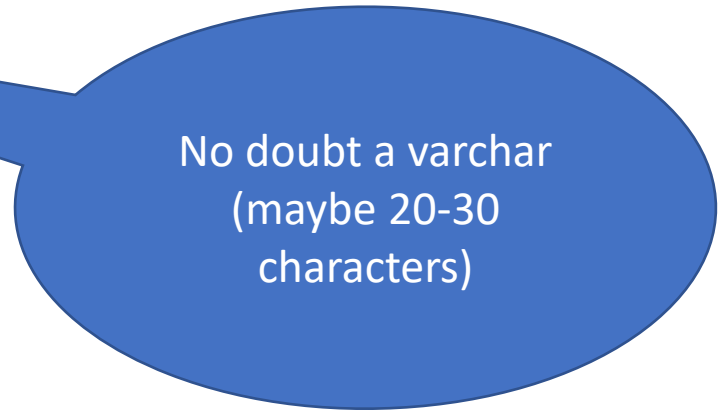

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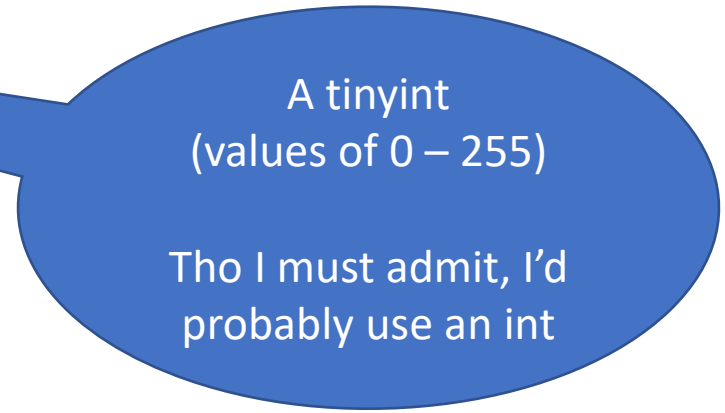

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|  3 | kaushik  |  23 | Kota      |  2000.00 |
|  4 | Chaitali |  25 | Mumbai    |  6500.00 |
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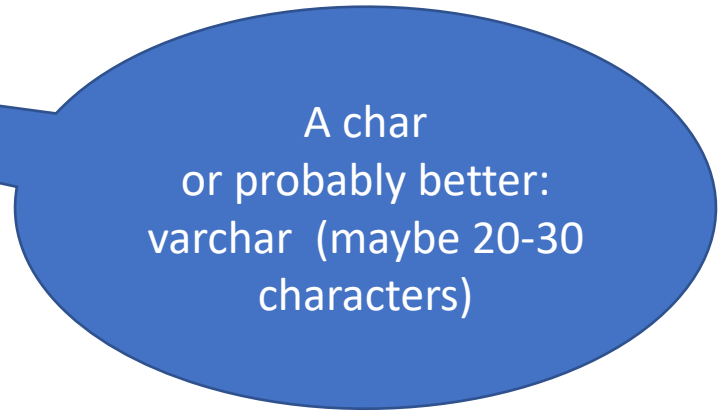
```



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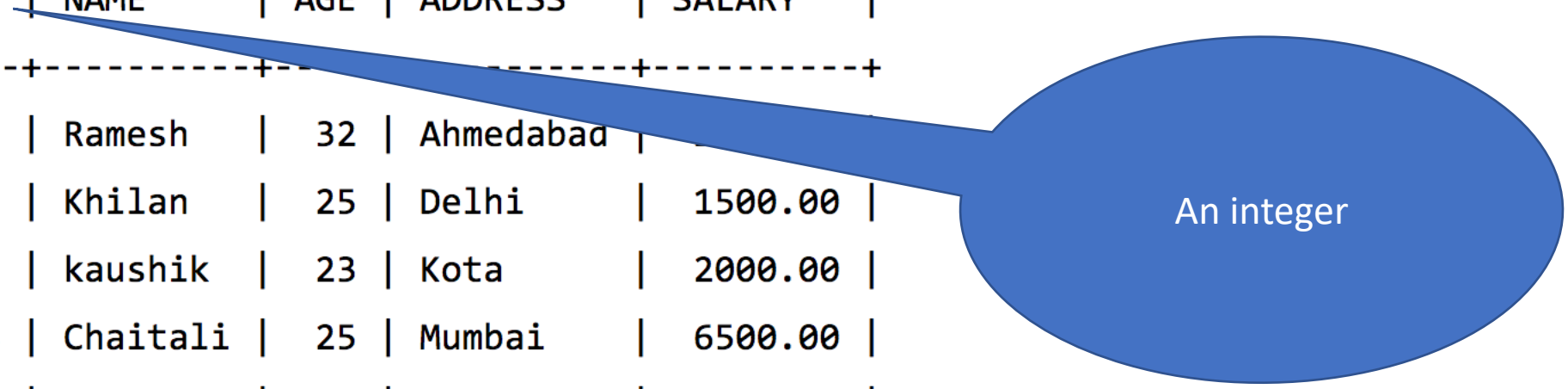
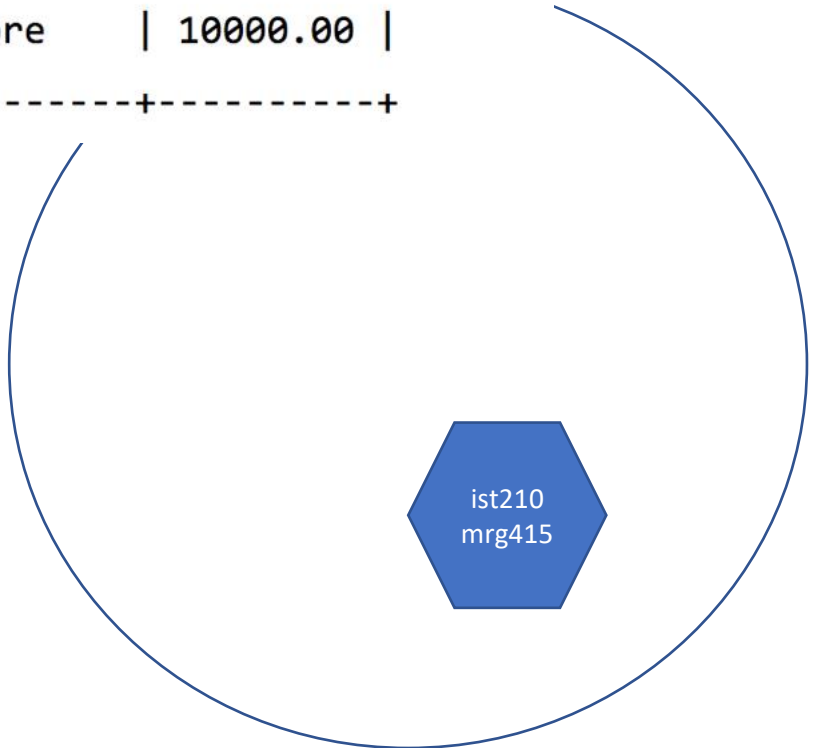


Let’s look at the SQL statements we’d use to create this database and table

ID	NAME	AGE	ADDRESS	SALARY
1	Ramesh	32	Ahmedabad	2000.00
2	Khilan	25	Delhi	1500.00
3	kaushik	23	Kota	2000.00
4	Chaitali	25	Mumbai	6500.00
5	Hardik	27	Bhopal	8500.00
6	Komal	22	MP	4500.00
7	Muffy	24	Indore	10000.00

create database ist210mrg415;



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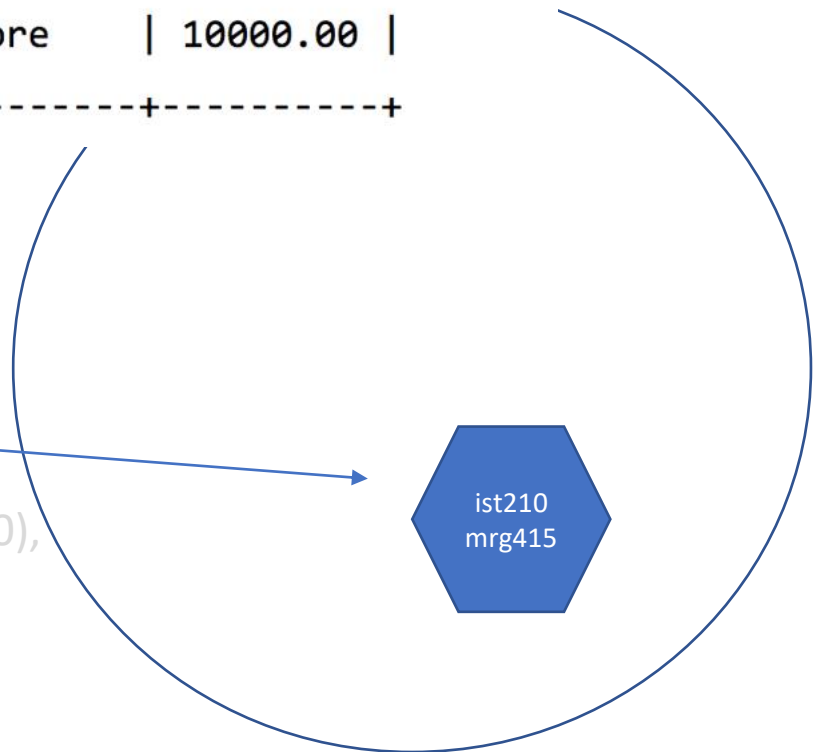
5	Hardik	27	Bhopal	8500.00
6	Komal	22	MP	4500.00
7	Muffy	24	Indore	10000.00

MYSQL DBMS

create database ist210mrg415;

use ist210mrg415;

create table emp (id int, name varchar(50),
age tinyint, address varchar(30),
salary float);



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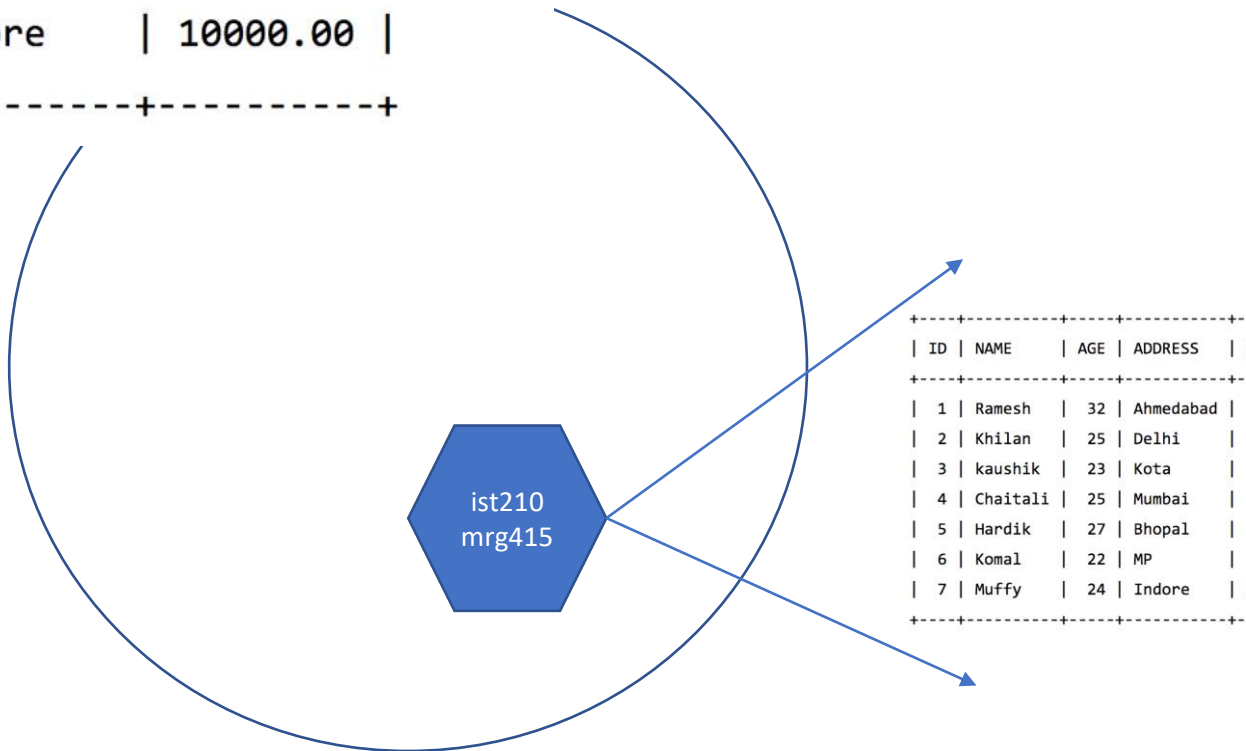
4	Chaitali	25	Mumbai	6500.00
5	Hardik	27	Bhopal	8500.00
6	Komal	22	MP	4500.00
7	Muffy	24	Indore	10000.00

create database ist210mrg415;

use ist210mrg415;

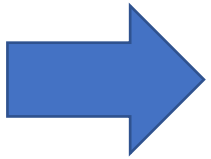
create table emp (id int, name varchar(50),
age tinyint, address varchar(30),
salary float);



Checking that your database is created correctly

```
use ist210mrg415;

describe emp;
```



+ Options

Field	Type	Null	Key	Default	Extra
id	int(11)	YES		*NULL*	
name	varchar(50)	YES		*NULL*	
age	tinyint(4)	YES		*NULL*	
address	varchar(30)	YES		*NULL*	
salary	float	YES		*NULL*	

Let’s try it for real

Go to http://sl-lamp.sl.psu.edu/phpmyadmin

User id should be your email mine is: mrg415)
(Password was sent to you)

What good is a Database with no data ????

The SQL INSERT INTO syntax

The general syntax is:

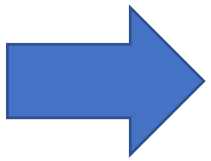
```
INSERT INTO table-name (column-names)
VALUES (values)
```

```
Use ist210mrg415;

Insert into emp (id, name, age, address, salary) values (1,'matt',55,'brian ct',1000);
Insert into emp (id, name, age, address, salary) values (2,'jane',43,'main st',500);
Insert into emp (id, name, age, address, salary) values (3,'Sue',50,'walsh st',1100);
```

```
use ist210mrg415;

select * from emp;
```

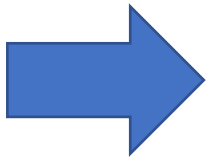


+ Options

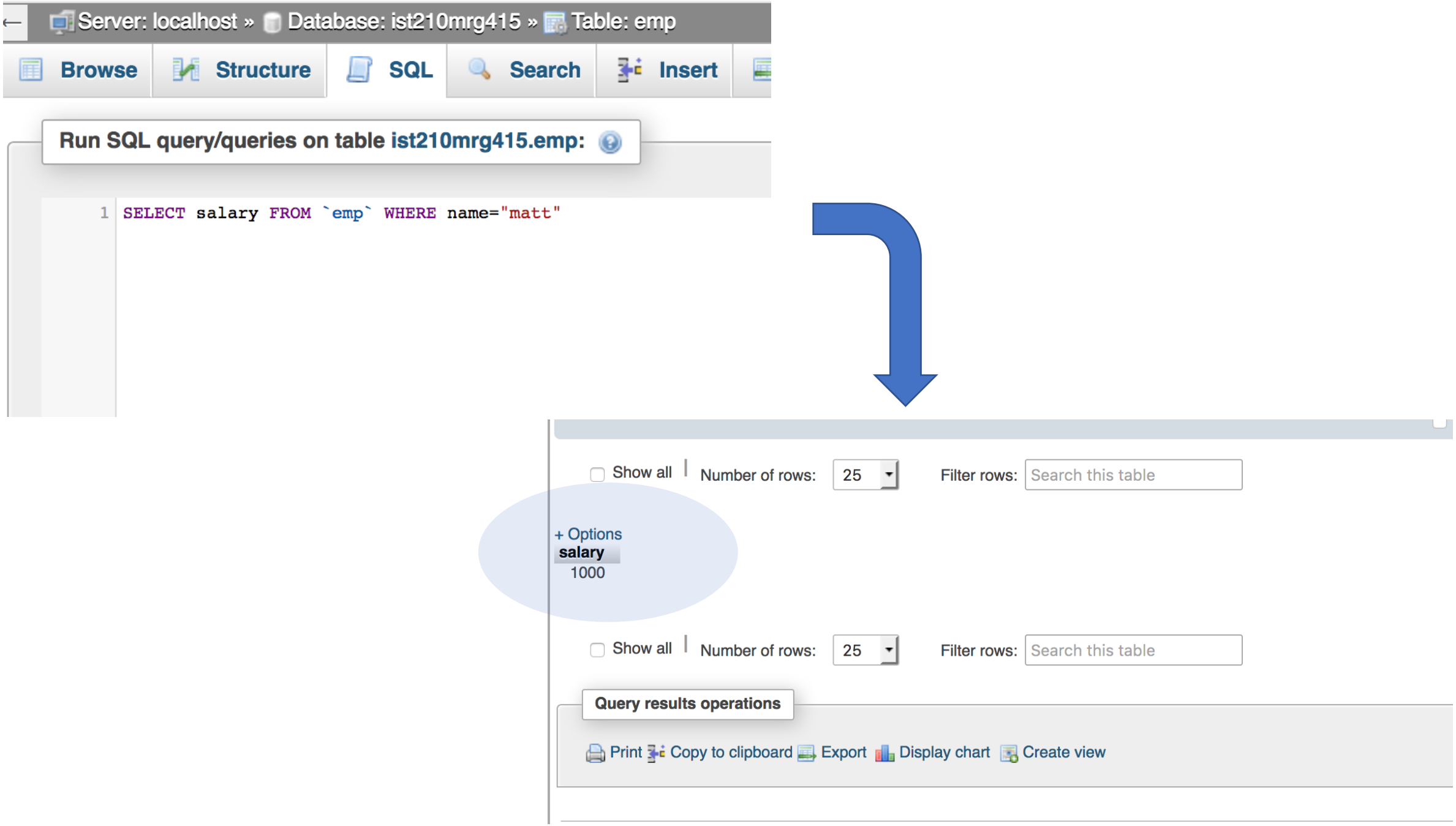
id	name	age	address	salary
1	matt	55	brian ct	1000
2	jane	43	main st	500
3	Sue	50	walsh st	1100

```
use ist210mrg415;

select name,age  from emp;
```



name	age
matt	55
jane	43
Sue	50


Server: localhost » Database: ist210mrg415 » Table: emp
Browse
Structure
SQL
Search
Insert
Run SQL query/queries on table ist210mrg415.emp:
1 SELECT salary FROM `emp` WHERE name="matt"
Show all
Number of rows: 25
Filter rows: Search this table
+ Options
salary
1000
Show all
Number of rows: 25
Filter rows: Search this table
Query results operations
Print
Copy to clipboard
Export
Display chart
Create view

That's it for this part of the lecture.....
Let's go create some of your own DB's

Collation refers to a set of rules that determine how data is sorted and compared. Character data is sorted using rules that define the correct character sequence, with options for specifying case-sensitivity, accent marks, kana character types and character width. Jan 28, 2004