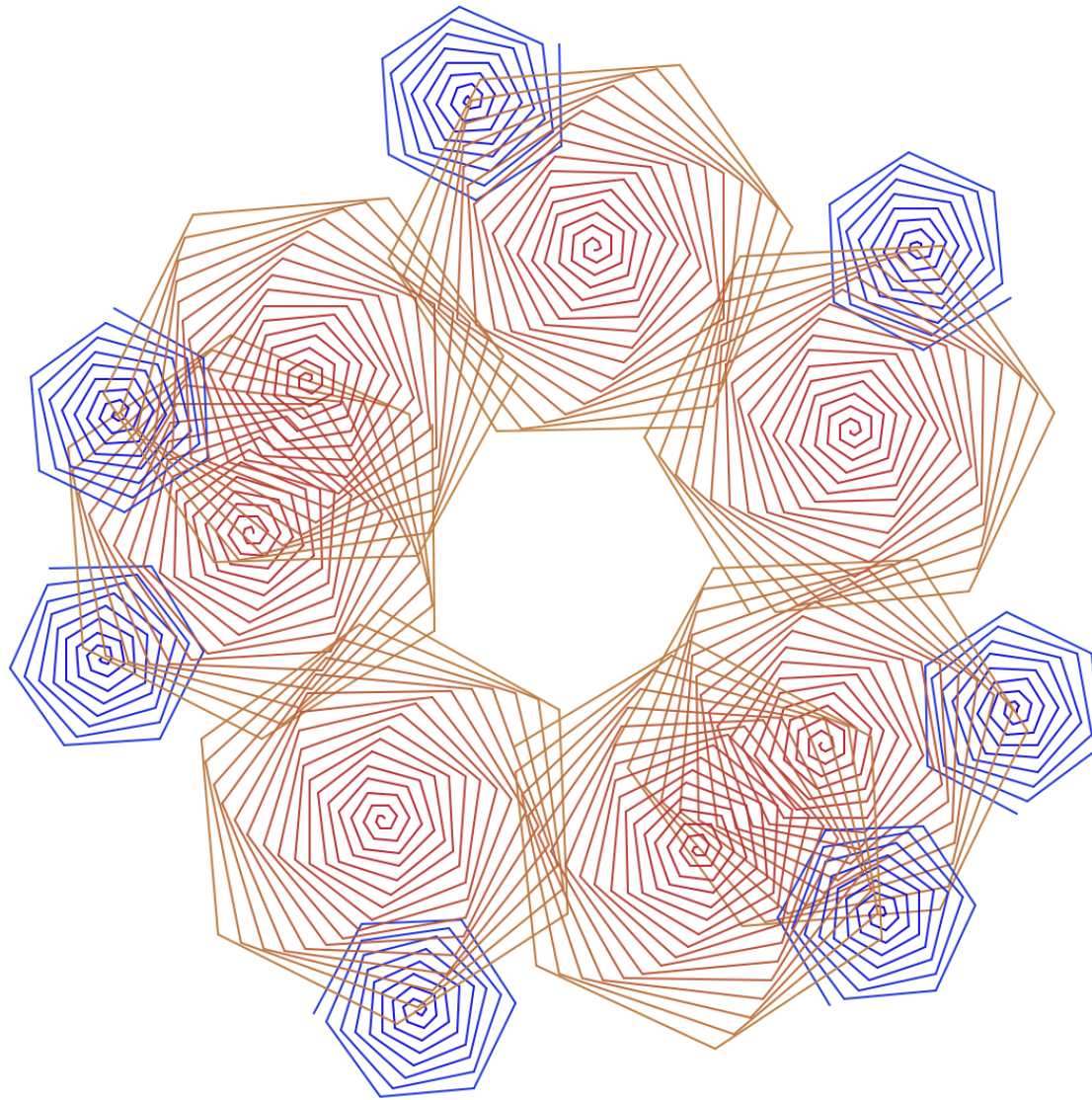
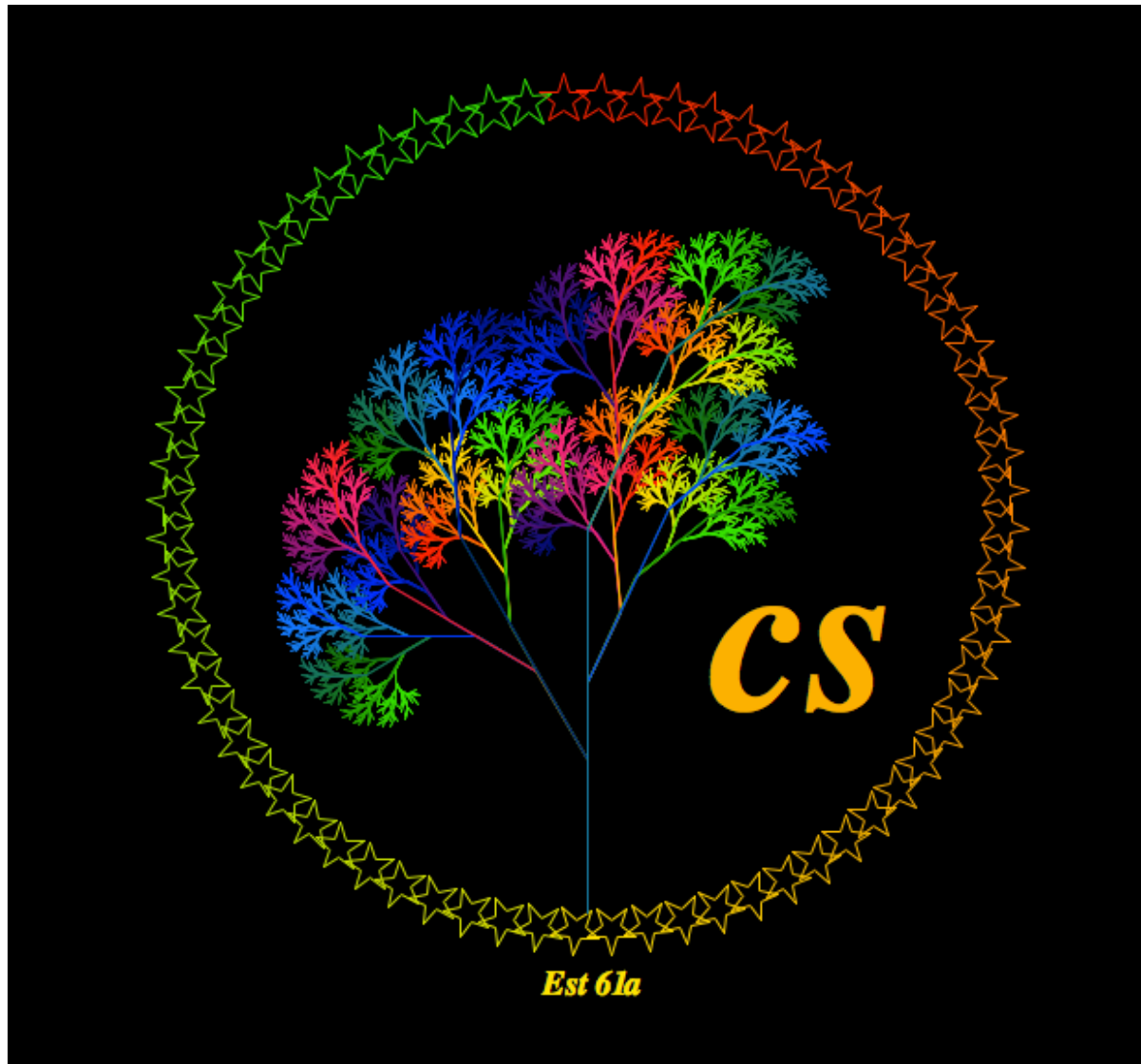


SQL

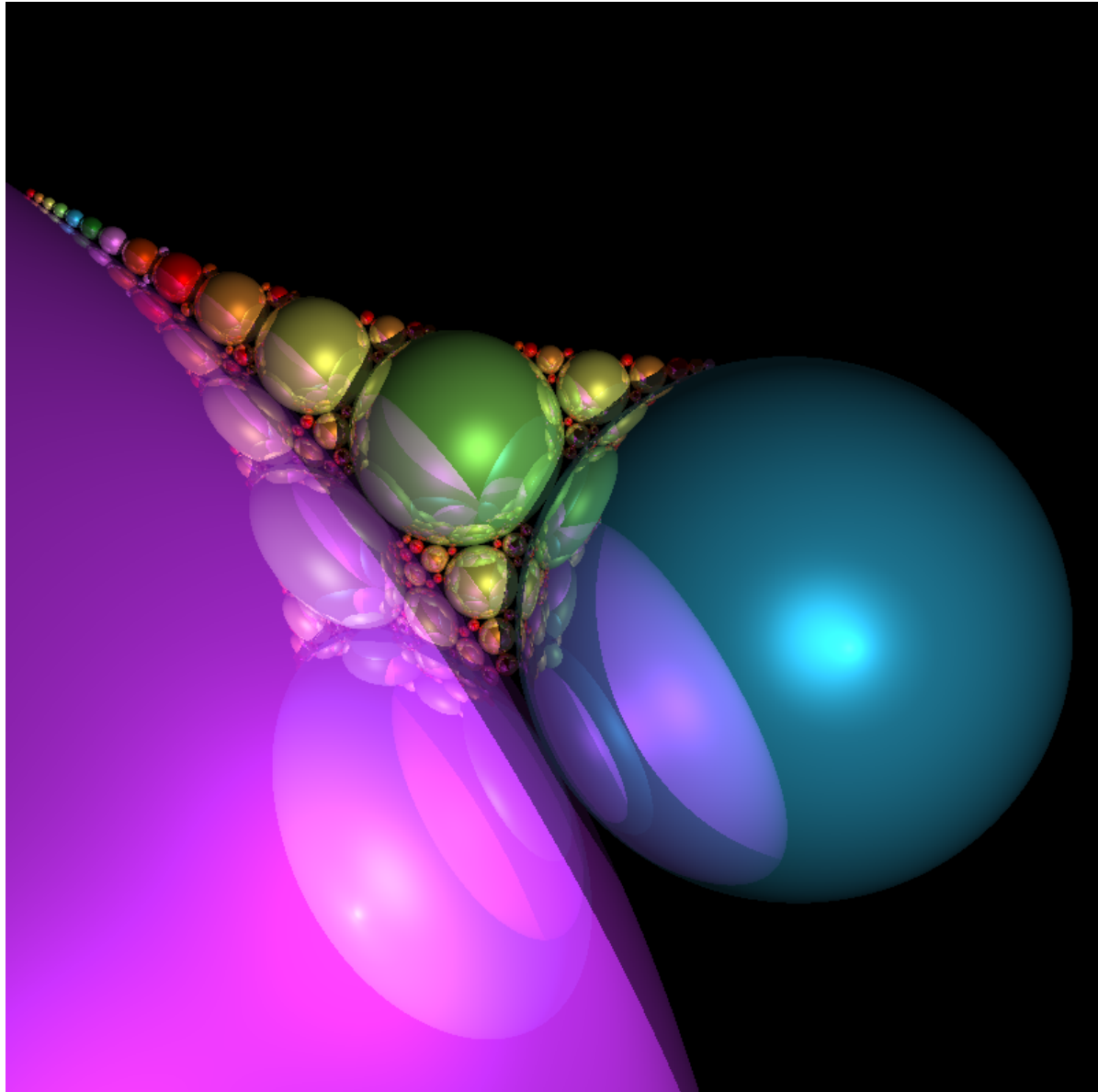
Announcements



Fall 2023
Featherweight



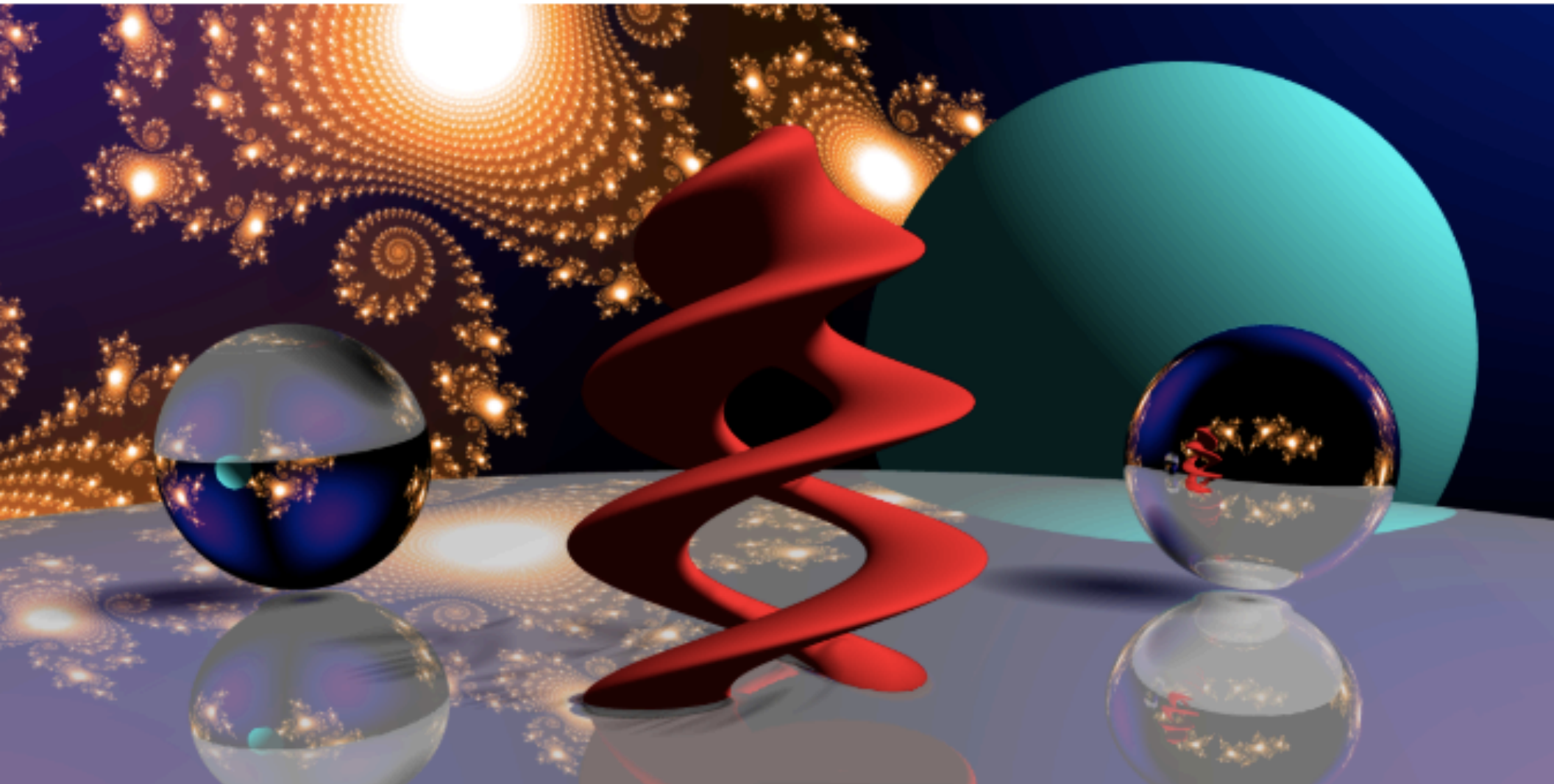
Fall 2012



Fall 2013



Fall 2015



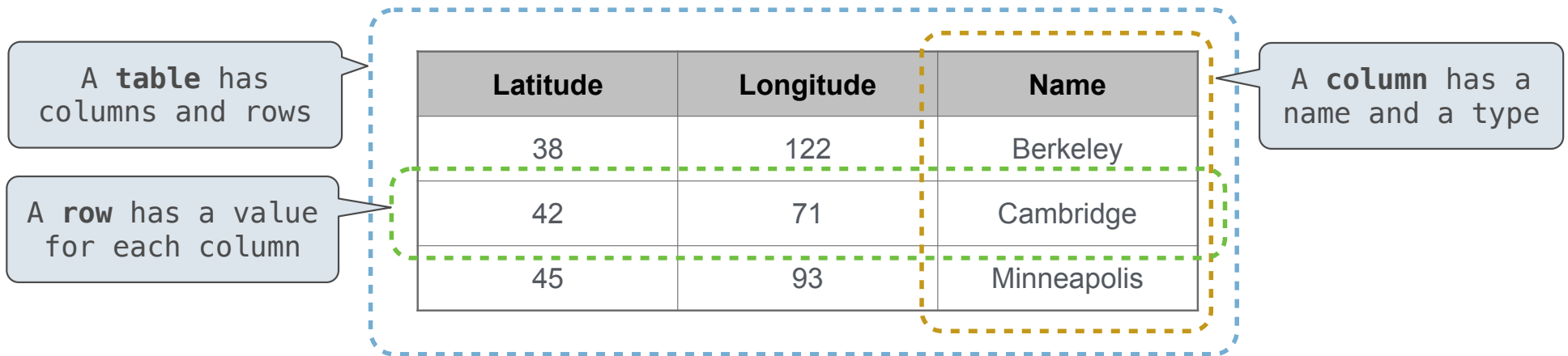
Fall 2018

Databases

Database Management Systems

Database management systems (DBMS) are important, heavily used, and interesting!

A table is a collection of records, which are rows that have a value for each column



The Structured Query Language (SQL) is perhaps the most widely used programming language

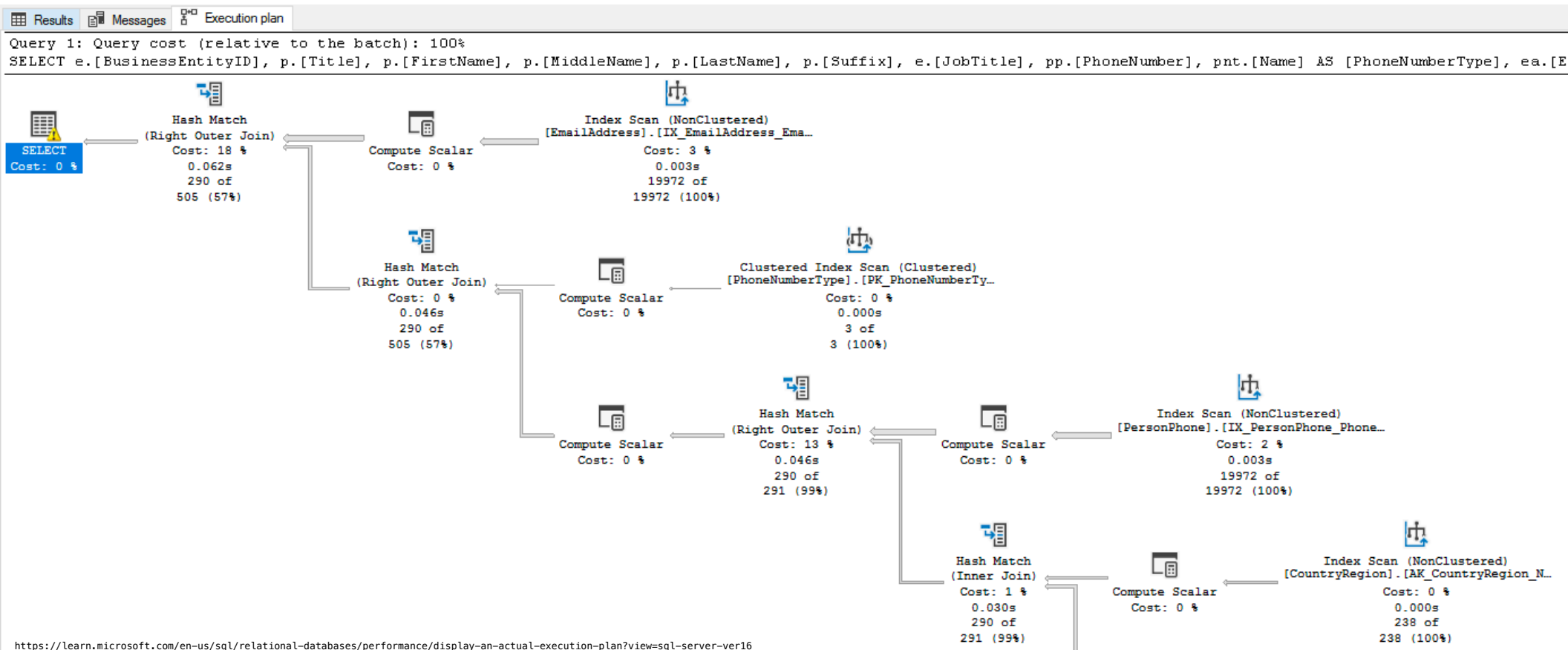
SQL is a *declarative* programming language

Declarative Programming

In declarative programming:

- A "program" is a description of the desired result
- The interpreter figures out how to generate the result

SQL Server Query Plan:



Structured Query Language (SQL)

Naming Tables

A **select** statement creates a new table and displays it.

A **create table** statement names the result of a **select** statement.

```
create table [name] as [select statement];
```

```
create table parents as
select "d" as parent, "h" as child union
select "a"          , "b"          union
select "a"          , "c"          union
select "f"          , "a"          union
select "f"          , "d"          union
select "f"          , "g"          union
select "e"          , "f";
```

Parents:

parent	child
a	b
a	c
d	h
f	a
f	d
f	g
e	f

Select Statements Project Existing Tables

A **select** statement can specify an input table using a **from** clause

A subset of the rows of the input table can be selected using a **where** clause

An ordering over the remaining rows can be declared using an **order by** clause

Column descriptions determine how each input row is projected to a result row

```
select [expression] as [name], [expression] as [name], ... ;  
select [columns] from [table] where [condition] order by [order];  
select child from parents where parent = "a";  
select parent from parents where parent > child;
```

Parents:

parent	child
a	b
a	c
d	h
f	a
f	d
f	g
e	f

child
b
c

parent
f
f

Example: UC Berkeley

The University is a public institution, so it is supported to an extent by California taxpayers through an allocation by the state government. In the past, generous state support allowed UC Berkeley to operate while keeping costs to students low. While still an important revenue source, the state's financial support of the university has diminished significantly. Thirty years ago, 50 percent of the university's revenue came from the state, but today, the state provides just 14 percent of the university's revenue.

