Relational Databases

- tables are containers for data
- 'nearly' all data can be tabulated

eg: a bitmap graphic

x	y	colour
1	1	red
2	756	red
94	16	blue

← row order is irrelevent

← col order is irrelevent

SQL works with tabulated data

SQL function → DDL – making/breaking/populating tables + dbs

DML – manipulate data in tables

DML Commands/concepts

① Projection → column subsetting

```
select *
from albums
```

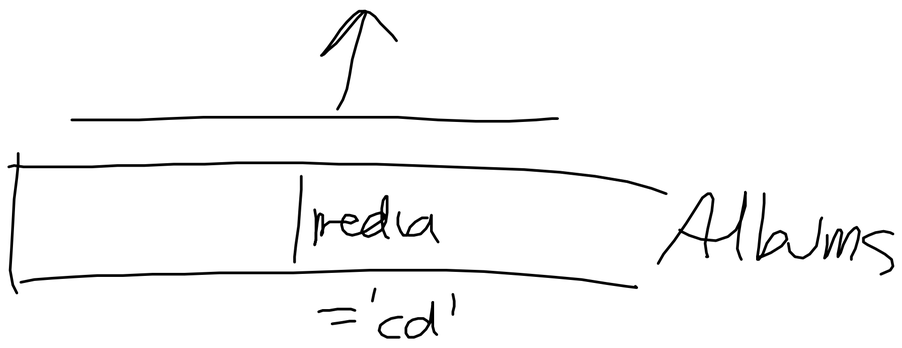
everything

```
Select artst, pdate, albname
 from albums
```

Field delimeter

321 rows = every one

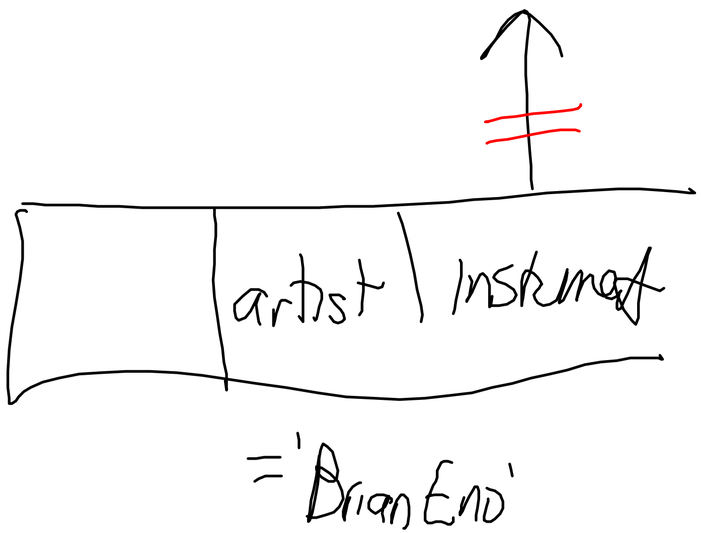
② Selection — row subsetting




```
select *
from albums
where media='cd'
```

198

Show me all instruments Brian Eno plays [performers]




```
select distinct instrument
from performers
where artist='Brian Eno'
```

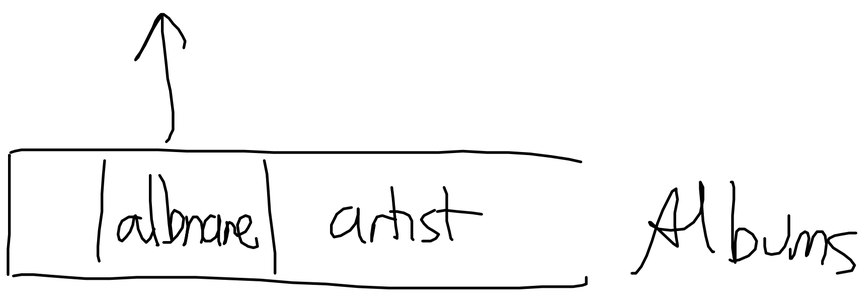
36

23

Set upcase off

list albums by U2

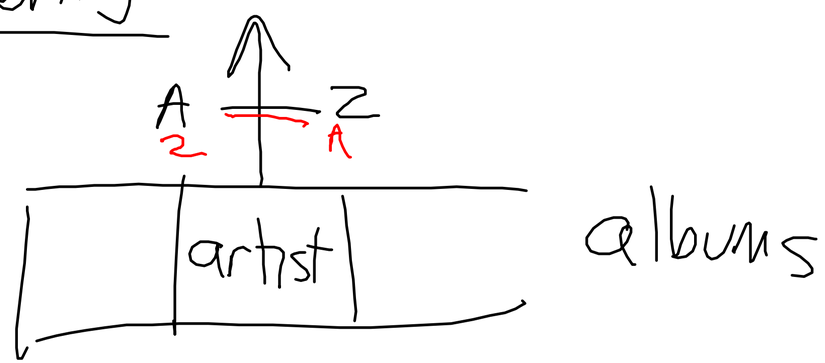
(name of)




```
Select albname
from albums
where artist = 'U2'
```

---

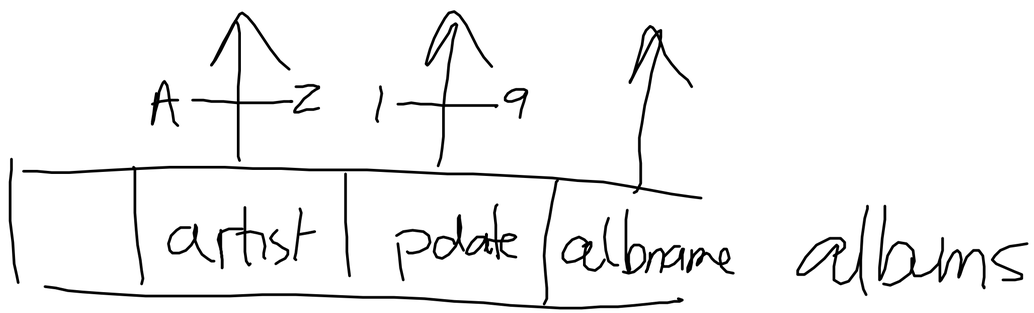
③ Ordering



distinct

```
select artist
from albums
Order by artist desc
```

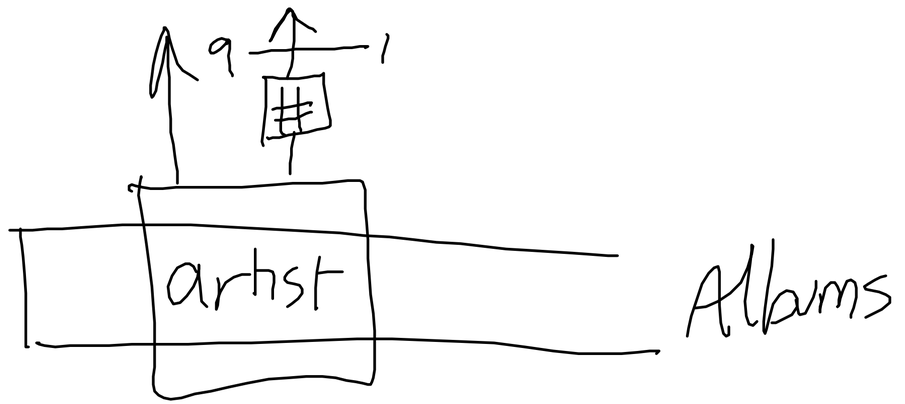
list albums + groups chronologically → artists together, within artist most ancient to most recent




```
Select artist, albname, pdate
from albums
Order by artist, pdate
```

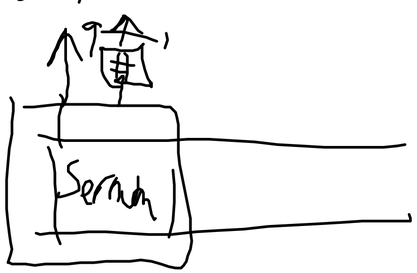
④ Grouping — row accumulation

```
select artist, count(*)
from albums
group by artist
order by 2 desc
limit 1
```



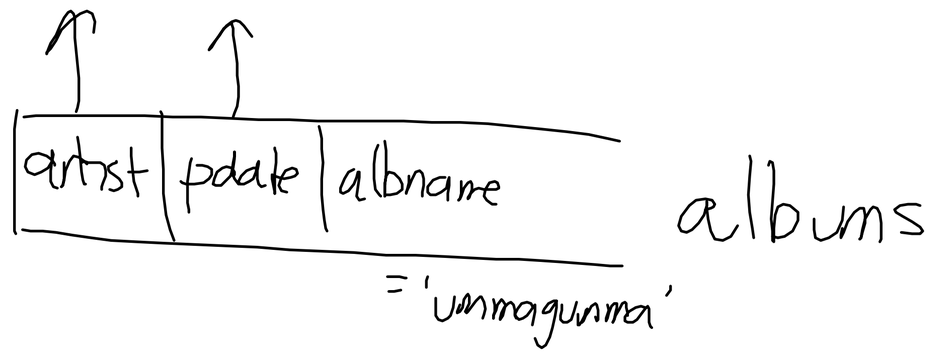
---

list serial num of album with the most songs on it



(5) Derivation — working things out that is not directly stored

how old is the album called 'ummagumma' and who is it by?




```
Select artist, 2018-pdate as age
from albums
where albname='ummagumma'
```

as group Year(now())

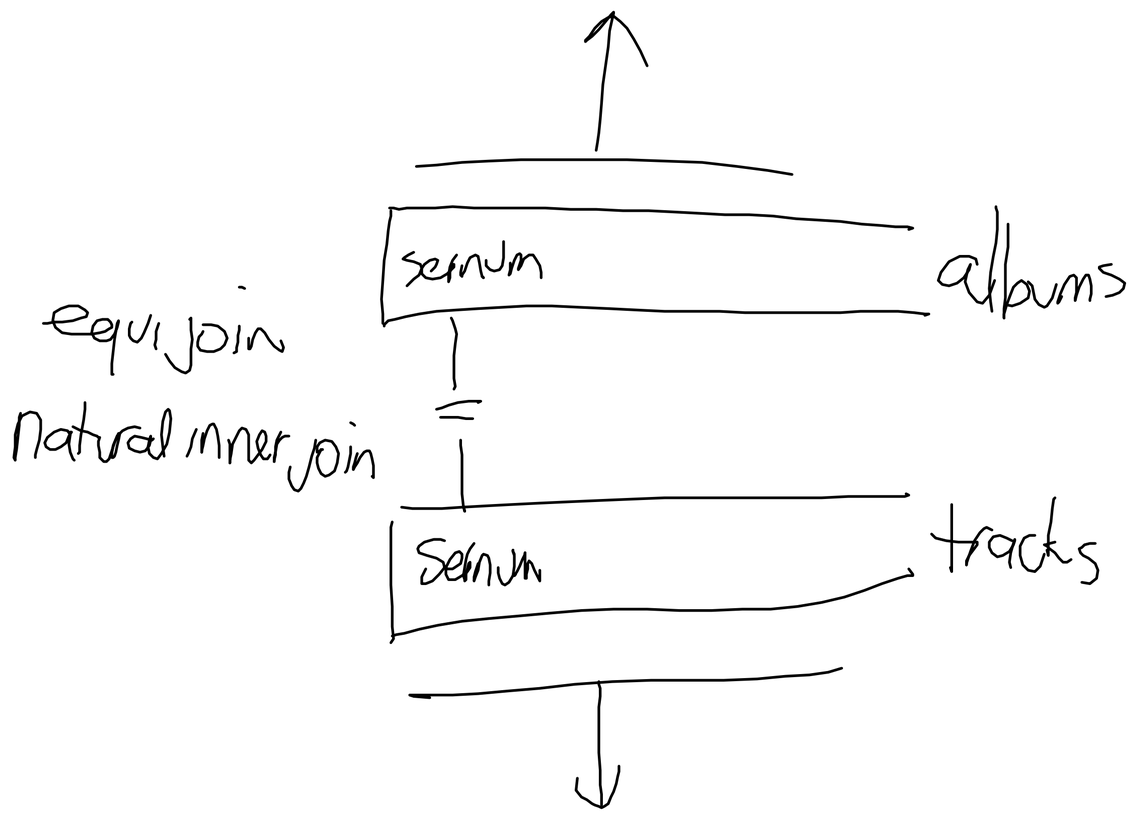
1..5 → single table queries

⑥ Joining

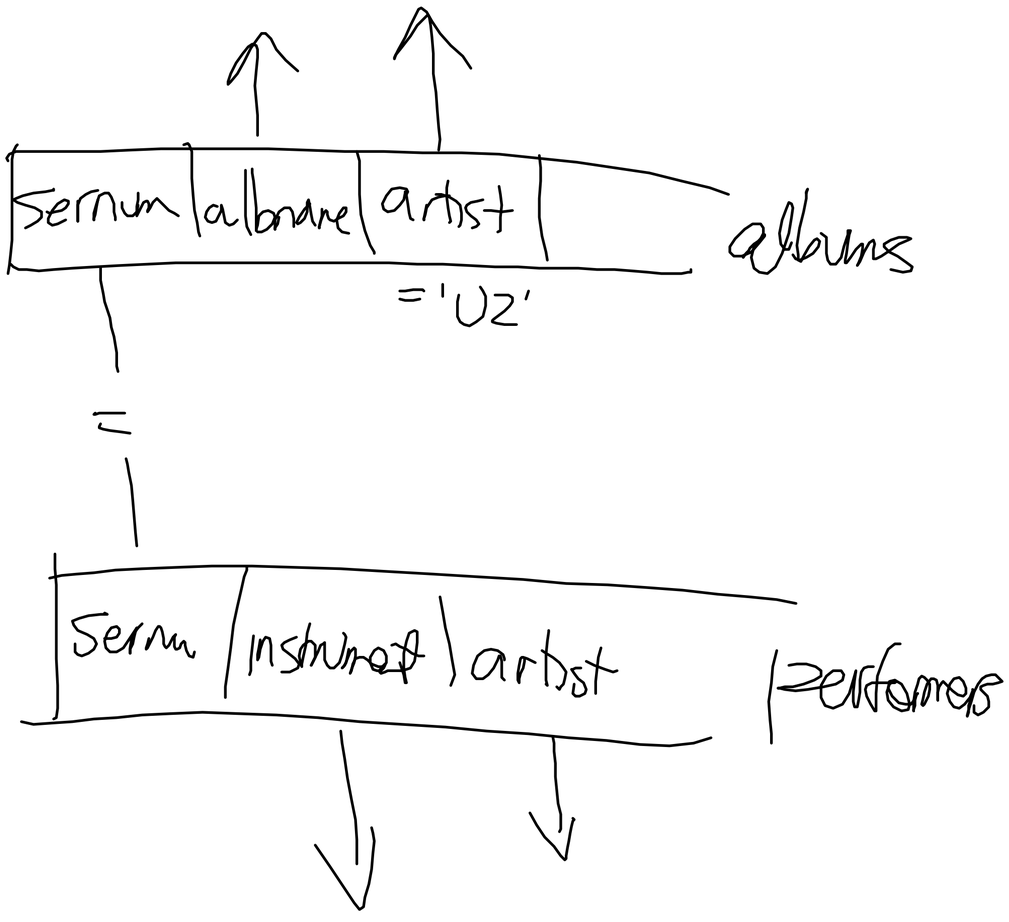
1,218,195 rows

321 × 3795

```
select *
from albums, tracks
where albums.sernum = tracks.sernum
```



list name of album, group, instrument + person who played it for all 'U2' albums




```
Select albname, albums.artist, instrument,
       tracks.artist
from albums, performers
where albums.sernum = performers.sernum
and albums.artist = 'U2'
```