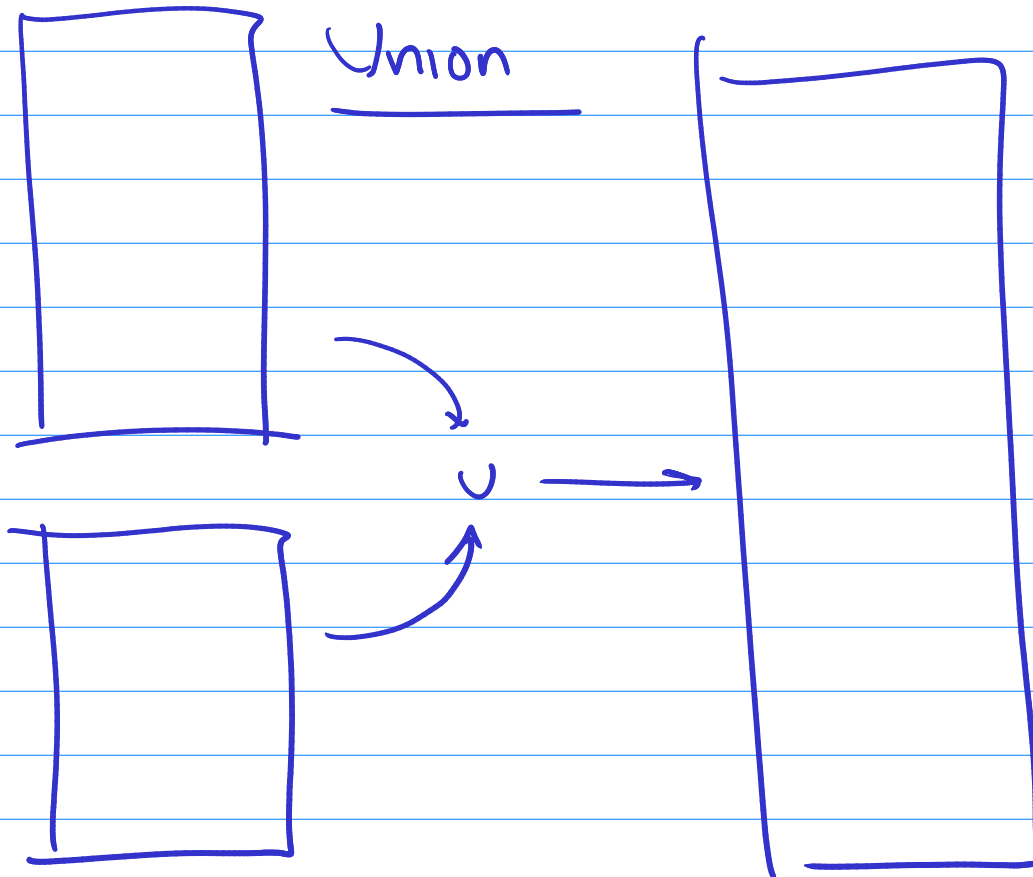
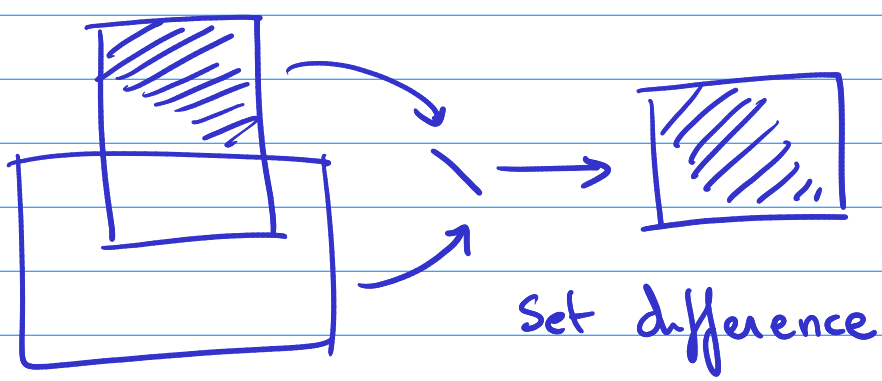
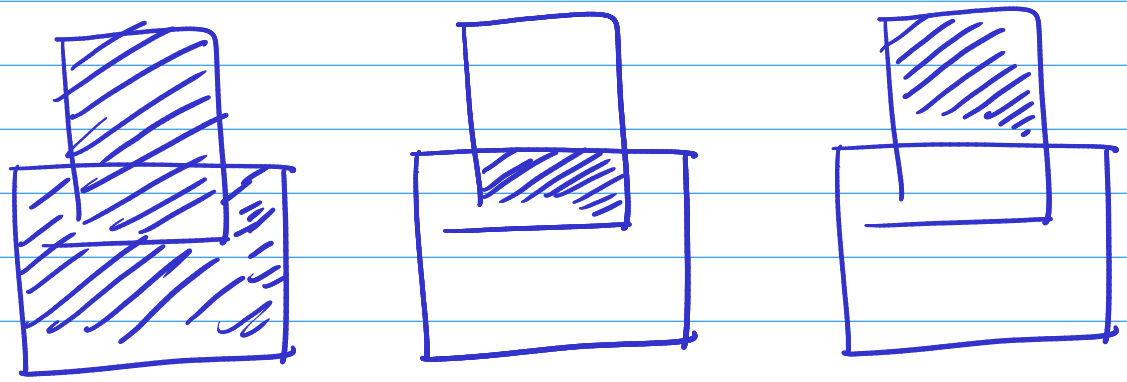
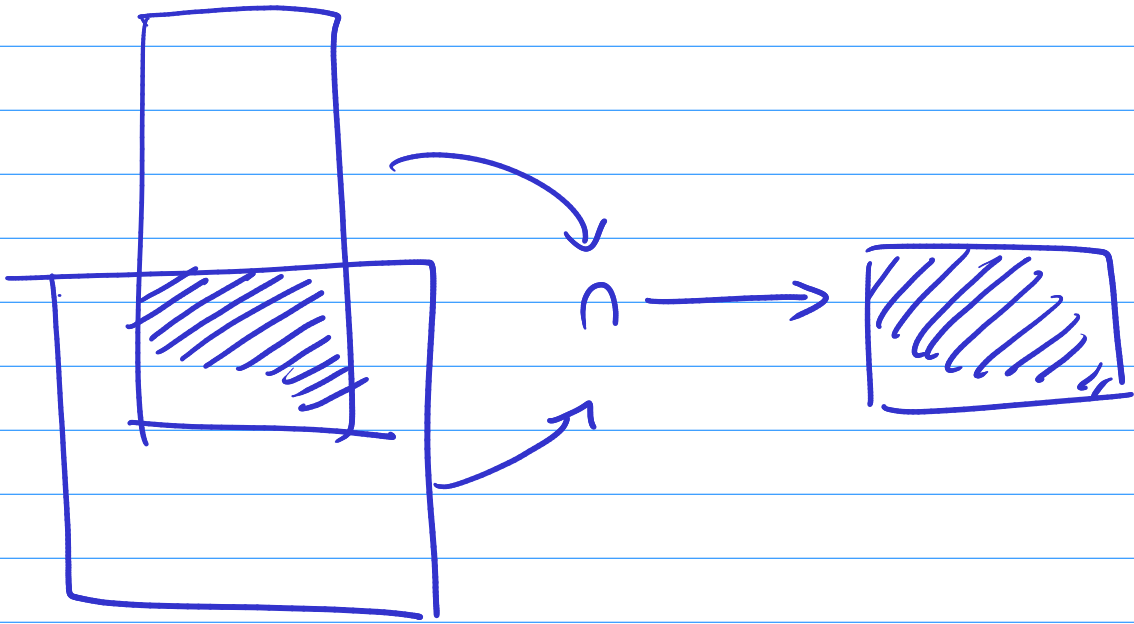


	Sun	Mon	Tue
apple	(apple, Sun)	(apple, Mon)	(apple, Tue)
ball	:	:	:
cat	:	:	:



Intersection



Artists	Royalty
—	—
—	—
—	—

T

Select (where clauses)

$$p = \text{Royalty} > 10^6$$

$\sigma_p T$

—	—	—
---	---	---

T

Project (select clause)

$\pi_{1,2,6} T$

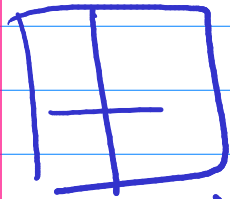
"Project out columns 1, 2, 6 of table T"

Join / Cartesian product

	1	2	3
a	(a,1)	(a,2)	(a,3)
b	(b,1)	(b,2)	(b,3)
c	(c,1)	(c,2)	(c,3)

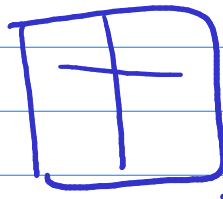
Inner join

Album



AlbumId

Track



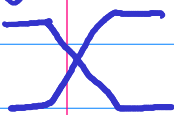
AlbumId

347

3503 = 1.2 million



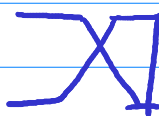
Outer join



AlbumId



AlbumId



Album \bowtie Track
 AlbumId

$$= \overline{\text{AlbumId}} \left(\text{Album} * \text{Track} \right)$$
$$= \text{Track} \cdot \text{AlbumId}$$