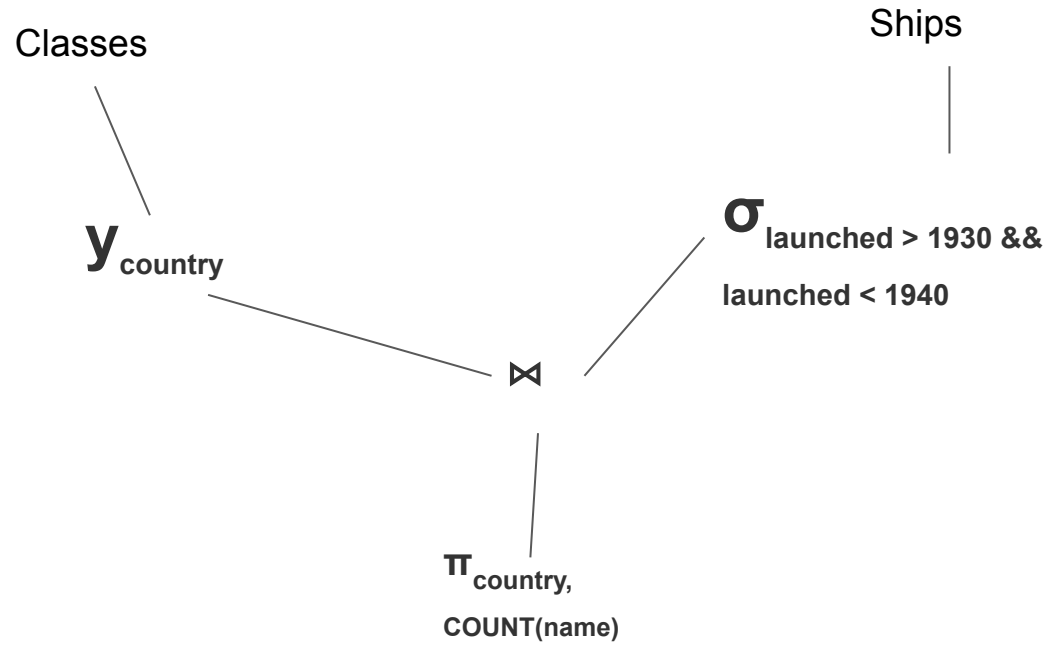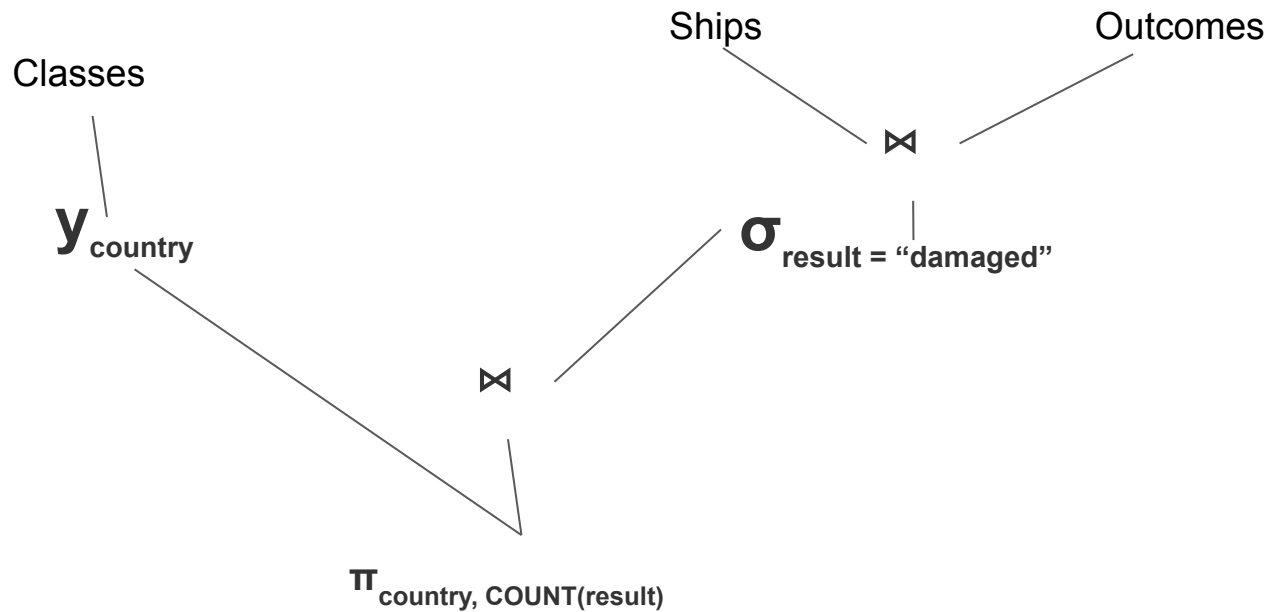3

```sql
SELECT Classes.country, COUNT(Ships.name)
FROM Classes, Ships
WHERE Classes.class = Ships.class
AND Ships.launched BETWEEN "1930" AND
"1940"
GROUP BY Classes.country;
```
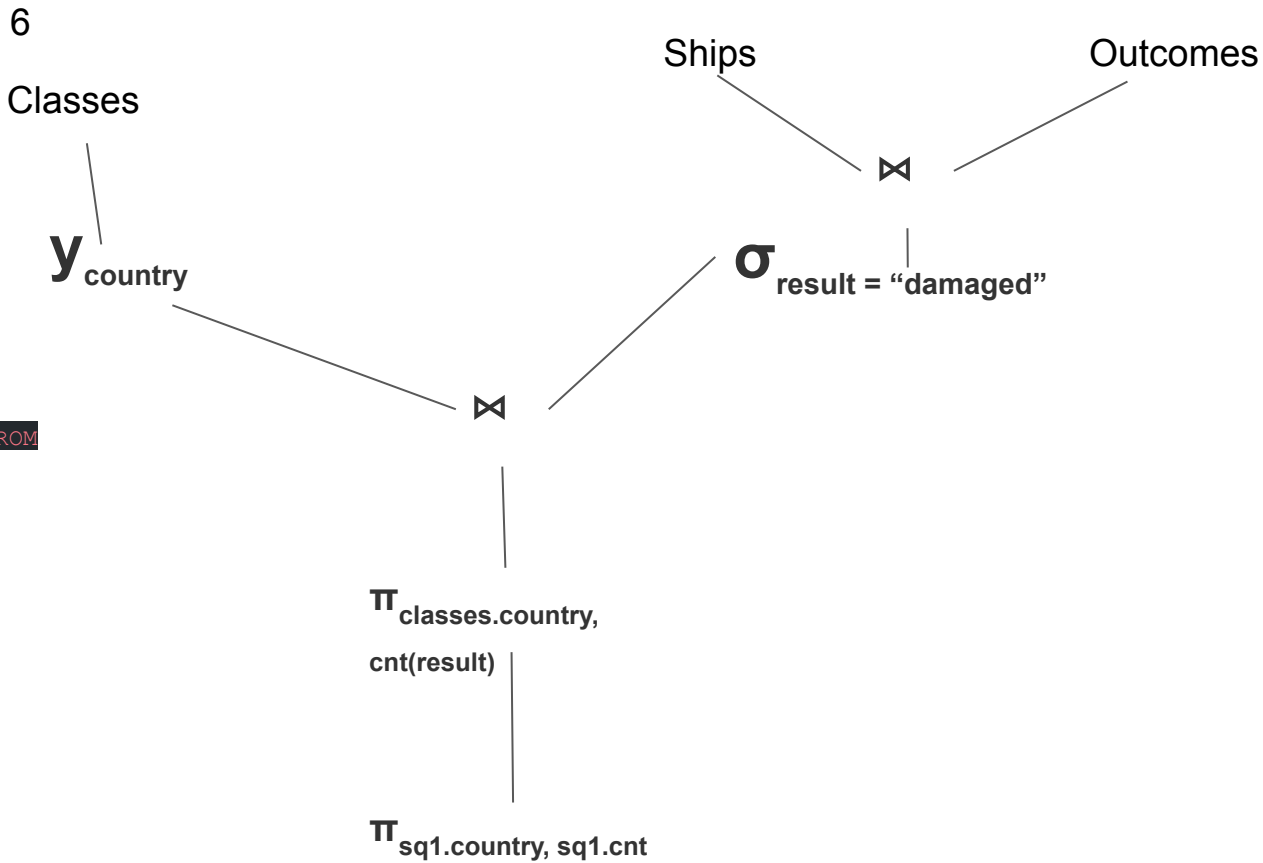
Classes

Ships

$\gamma_{country}$

$\sigma_{launched > 1930\ \&\&\ launched < 1940}$

⋈

$\pi_{country,\ COUNT(name)}$

5

```sql
SELECT Classes.country as cntry,
COUNT(Outcomes.result) as cnt
FROM Outcomes, Classes, Ships
WHERE Classes.class = Ships.class
AND Ships.name = Outcomes.ship
AND Outcomes.result = "damaged"
GROUP BY Classes.country;
```

Ships

Outcomes

⋈

Classes

γ_{country}

$\sigma_{\text{result = "damaged"}}$

⋈

$\pi_{\text{country, COUNT(result)}}$

```
SELECT sq1.cntry, sq1.cnt
FROM (
    SELECT Classes.country as cntry,
COUNT(Outcomes.result) as cnt
    FROM Outcomes, Classes, Ships
    WHERE Classes.class = Ships.class
    AND Ships.name = Outcomes.ship
    AND Outcomes.result = "damaged"
    GROUP BY Classes.country
) sq1
WHERE sq1.cnt = (SELECT MIN(sq2.cnt) FROM
(
    SELECT Classes.country as cntry,
COUNT(Outcomes.result) as cnt
    FROM Outcomes, Classes, Ships
    WHERE Classes.class = Ships.class
    AND Ships.name = Outcomes.ship
    AND Outcomes.result = "damaged"
    GROUP BY Classes.country
) sq2)
GROUP BY sq1.cntry;
```

6

Classes

Ships   Outcomes

$\gamma_{country}$ $\bowtie$

$\sigma_{result = \text{"damaged"}}$

$\bowtie$

$\pi_{classes.country,}$
$_{cnt(result)}$

$\pi_{sq1.country, sq1.cnt}$

8

```sql
SELECT DISTINCT Outcomes.ship
FROM outcomes, ships, classes
WHERE Ships.class = Classes.class
AND Ships.name = Outcomes.ship
and Outcomes.result = "damaged"
GROUP BY Outcomes.ship
HAVING COUNT(Outcomes.result = "damaged")
> 1;
```

Ships   Outcomes

Classes

$\bowtie$

$\sigma_{result = \text{"damaged"}}$
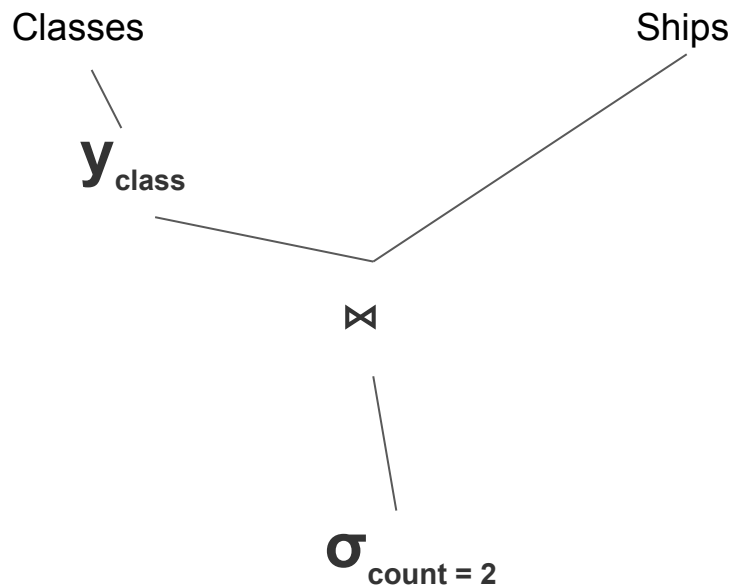
γ_{ship}

$\bowtie$

$\pi_{DISTINCT}$

Outcome.ship

```
SELECT Classes.class
FROM Ships, Classes
WHERE Ships.class = Classes.class
GROUP BY Classes.class
HAVING COUNT(Classes.class) = 2;
```

Classes

Ships

γ_{class}

⋈

$\sigma_{count\,=\,2}$

```sql
SELECT Classes.Country, TOTAL(numGuns)
FROM Ships, Classes
WHERE Ships.class = Classes.class
GROUP BY Classes.country;
```

Classes

Ships

γ_{ship}

⋈

$\pi_{DISTINCT}$

Outcome.ship