

SQL Home Work 4

Relational data model

Task description

Write request to find out which C and D class cars are available for reservations from January 8, 2018 for 5 days (i.e. for the period January 8, 2018 through January 12, 2018 inclusive). The car is available if there are no reservations that start, end, or last at that time in the specified period. To develop the final expression, write several queries, each of which is in addition to the previous one:

- **Find existing reservations in the period:**

```
σ(start ≥ date('2018-01-08') ∧ start ≤ date('2018-01-12'))  
∨ (finish ≥ date('2018-01-08') ∧ finish ≤  
date('2018-01-12')) ∨ (start ≤ date('2018-01-08') ∧ finish  
≥ date('2018-01-12'))(Res)
```

- **Find booked cars:**

```
π cid(σ(start ≥ date('2018-01-08') ∧ start ≤  
date('2018-01-12')) ∨ (finish ≥ date('2018-01-08') ∧  
finish ≤ date('2018-01-12')) ∨ (start ≤ date('2018-01-08')  
∧ finish ≥ date('2018-01-12'))(Res))
```

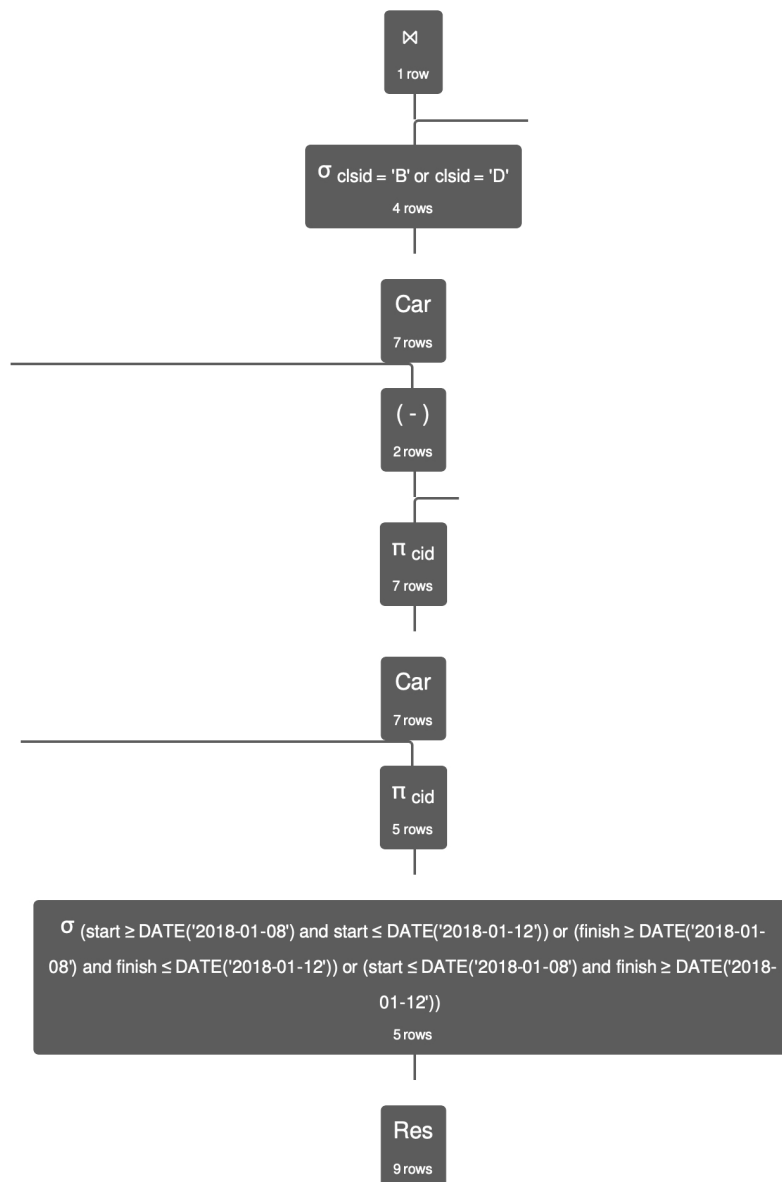
- **Find available cars:**

```
π cid(Car) - π cid(σ(start ≥ date('2018-01-08') ∧ start  
≤ date('2018-01-12')) ∨ (finish ≥ date('2018-01-08') ∧  
finish ≤ date('2018-01-12')) ∨ (start ≤ date('2018-01-08')  
∧ finish ≥ date('2018-01-12'))(Res))
```

- Select only the required classes:

```
(sigma clsid = 'C' ∨ clsid = 'D' (Car)) ⋈ (pi cid (Car) - pi
cid(σ (start ≥ date('2018-01-08') ∧ start ≤
date('2018-01-12')) ∨ (finish ≥ date('2018-01-08') ∧
finish ≤ date('2018-01-12')) ∨ (start ≤ date('2018-01-08')
∧ finish ≥ date('2018-01-12')) (Res)))
```

Relational Diagram:



Result:

$$\left(\sigma_{\text{clsid} = 'C' \text{ or } \text{clsid} = 'D'} (\text{Car}) \right) \bowtie \left(\pi_{\text{cid}} (\text{Car}) - \pi_{\text{cid}} \left(\sigma_{\text{start} \geq \text{DATE}('2018-01-08') \text{ and } \text{start} \leq \text{DATE}('2018-01-12')} \right) \text{ or } (\text{finish} \geq \text{DATE}('2018-01-08') \text{ and } \text{finish} \leq \text{DATE}('2018-01-12')) \right) (\text{Res}) \right)$$

Execution time: 10 ms

Car.cid	Car.make	Car.year	Car.mileage	Car.clsid
6	'peugeot'	2019	2000	'D'