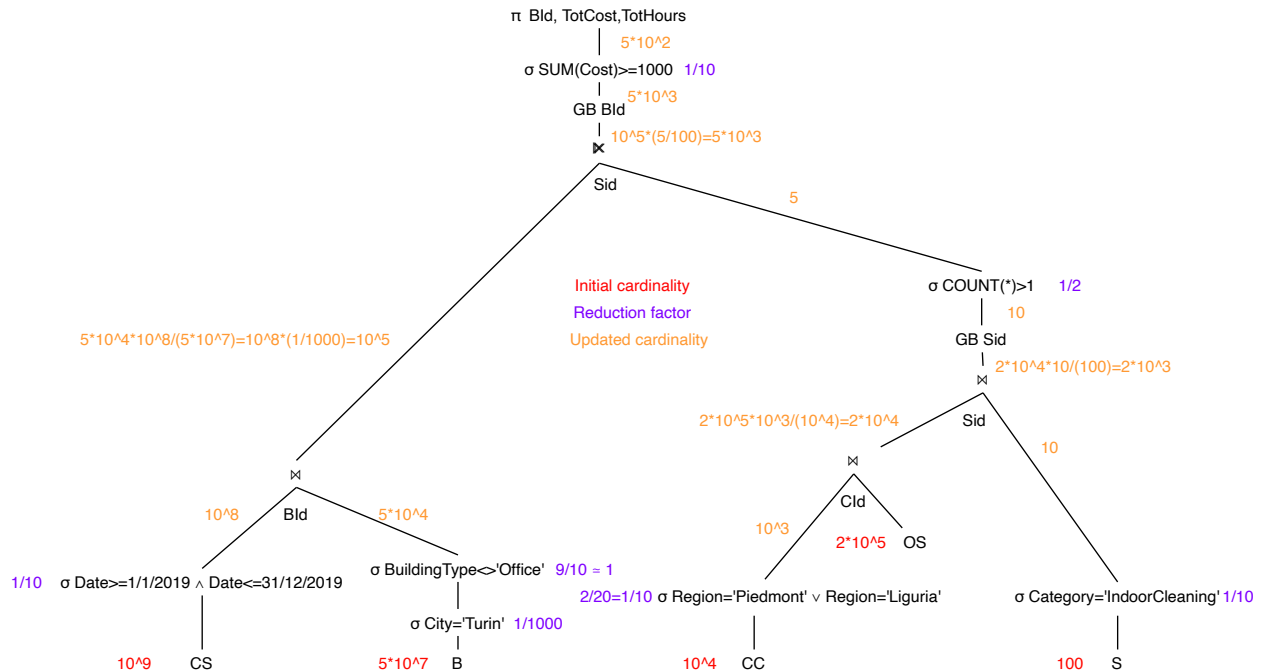


Homework 4 - Enrico Castelli s280124

Optimizer

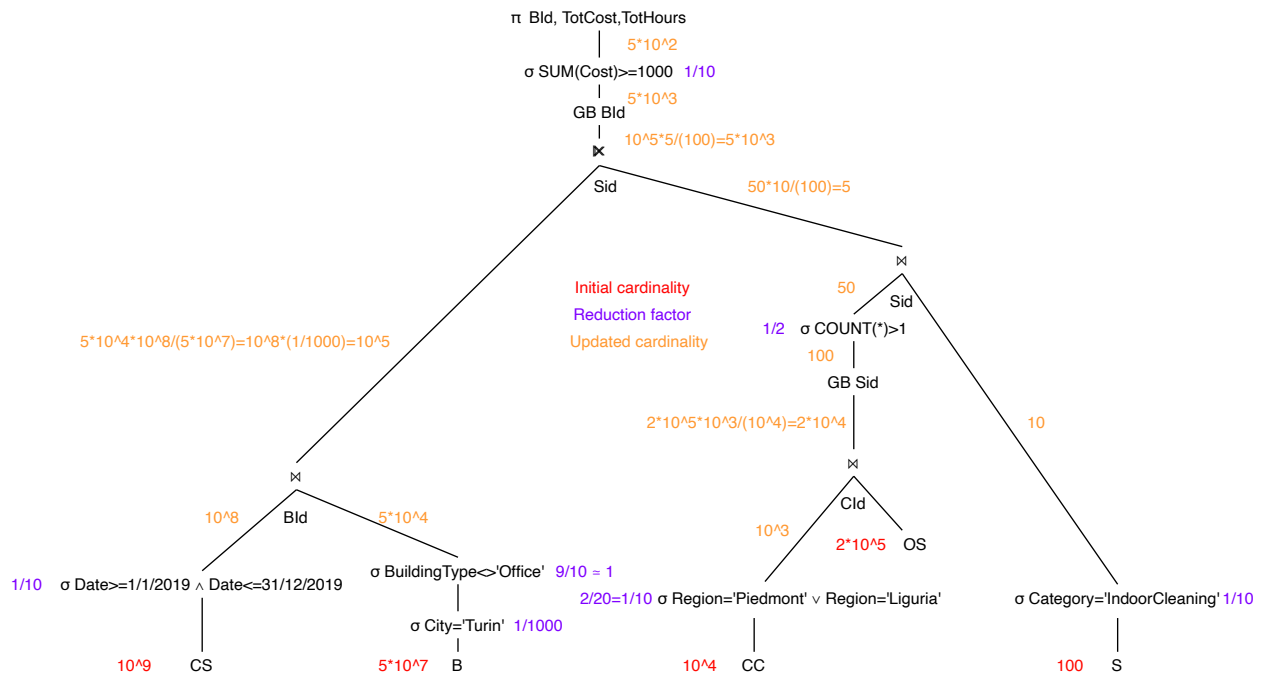
1. Relational algebra



Type of	CS-B	CC-OS	[CC-OS]-S	Antisemijoin	GB SId	GB Bld
JOIN	hash join	hash join	merge join	nested loop, inner table on the right		
GROUP BY					no sort	hash

The GROUP BY anticipation of GB Bld is not possible, since the antisemijoin below it requires the SId attribute in the tuples of the joined tables.

The GROUP BY anticipation of GB SId, as seen in the figure below, aims to reduce the cardinality of the result set of the right branch as soon as possible (from $2 \cdot 10^4$ to 50).



After this GROUP BY anticipation, the JOIN and GROUP BY types change as following:

Type of	CS-B	CC-OS	[CC-OS]-S	Antisemijoin	GB Sid	GB Bld
JOIN	hash join	hash join	merge join	nested loop, inner table on the right		
GROUP BY					sort	hash

2. Physical structures

Table	Index	Access Path	Access Path Without Index
CS	primary B+tree on date	index range scan	table access full + filter
B	secondary hash on (Bld, city)	fast full index scan	table access full + filter
CC	secondary hash on region	full index scan + access by row id	table access full + filter
OS	no index because selectivity is low		table access full
S	no index because table is small		table access full + filter