Architektur und Implementierung von Datenbanksystemen

Task 9

Team 3 - Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias
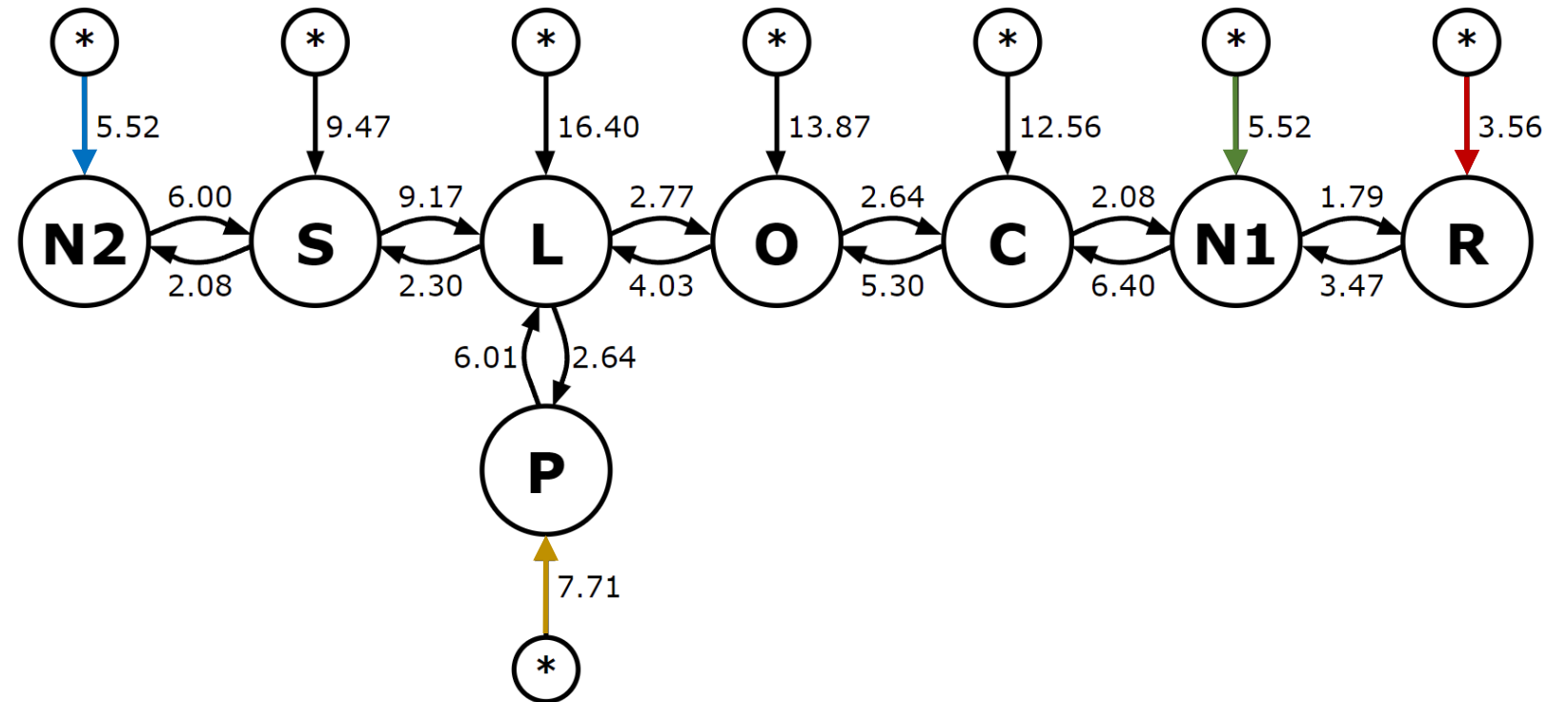
Legacy Query Planner

- Joins are represented in a weighted, directed graph

- Nearest Neighbors

  - find the cheapest path to node

  - find cheapest path to another node

  - repeat until all nodes visited

- may find very inefficient execution plans

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

universität
innsbruck

Next-Generation Query Planner

- Joins are represented in a weighted, directed graph

- N Nearest Neighbors (N3)

  - looks for N shortest paths (in each step)

  - choosing N

    - N = 1; for simple queries

    - N = 5; for two-way joins
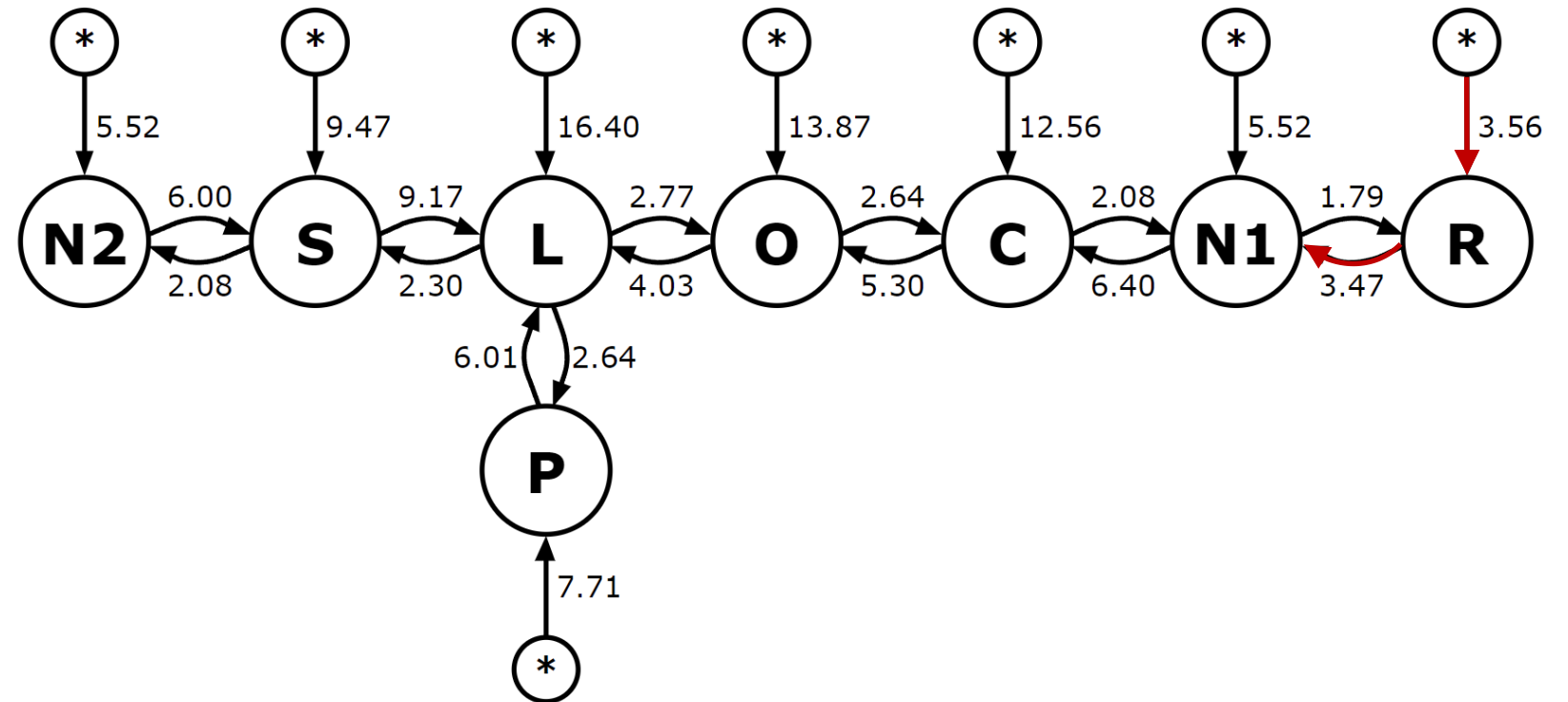
    - N = 10; for joins with three or more tables

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

Example (N = 4), first step

Path	Cost
R	3.56
N1	5.52
N2	5.52
P	7.71

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

Example (N = 4), second step

Path	Cost
R-N1	7.03
R-N2	9.08
N2-N1	11.04
R-P	11.27

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

Example (N = 4), second step

Path	Cost
R-N1	7.03
R-N2	9.08
N2-N1	11.04
R-P	11.27

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

Example (N = 4), second step

Path	Cost
R-N1	7.03
R-N2	9.08
N2-N1	11.04
R-P	11.27

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

universität
innsbruck

Example (N = 4), second step

Path	Cost
R-N1	7.03
R-N2	9.08
N2-N1	11.04
R-P	11.27

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

universität innsbruck
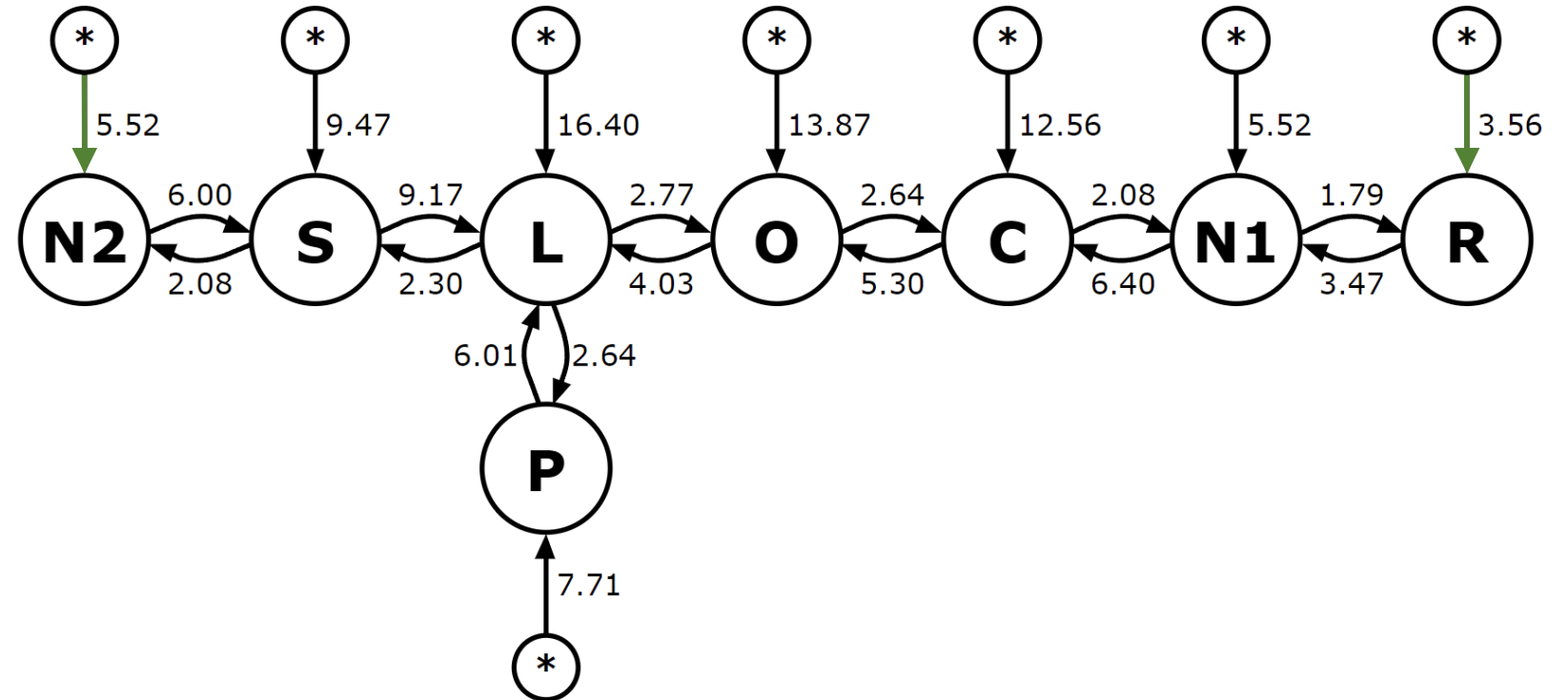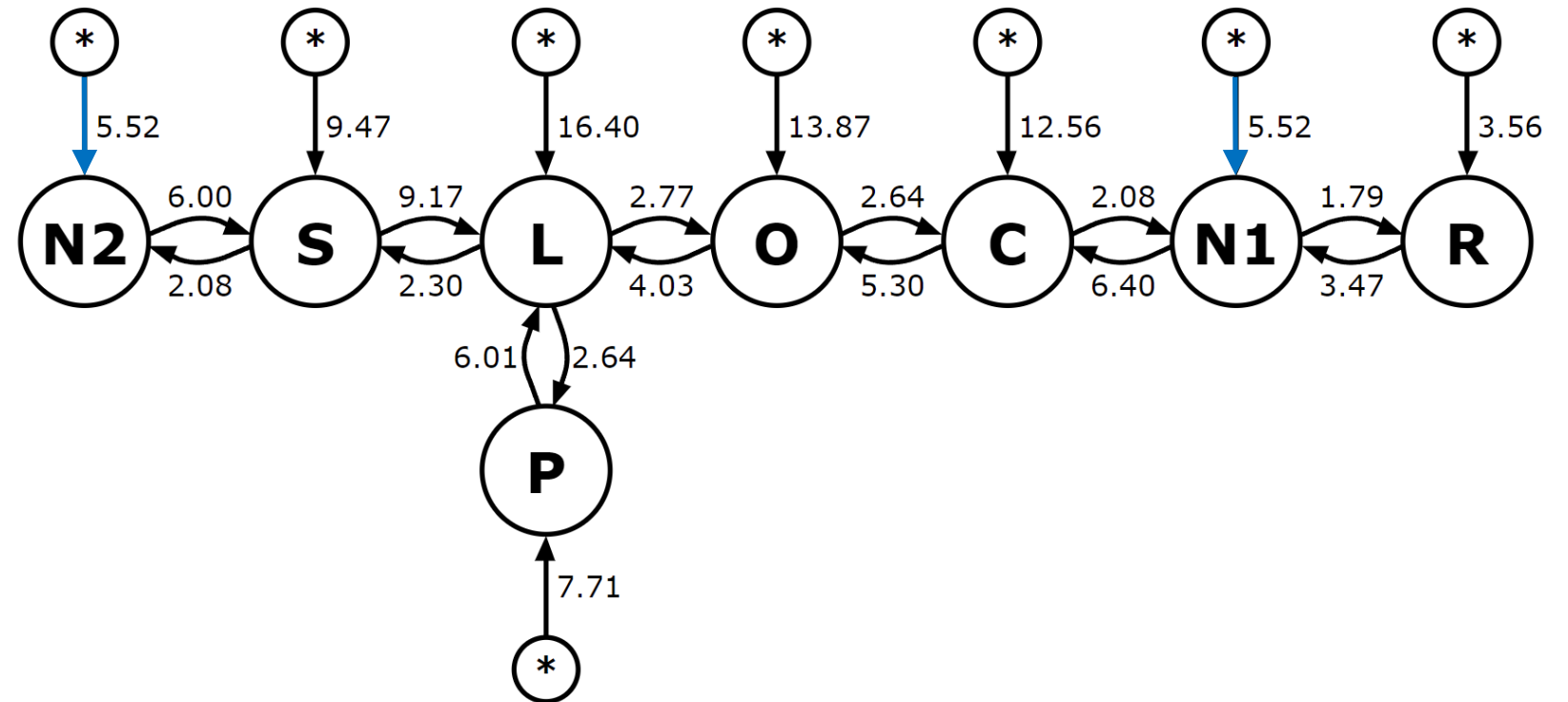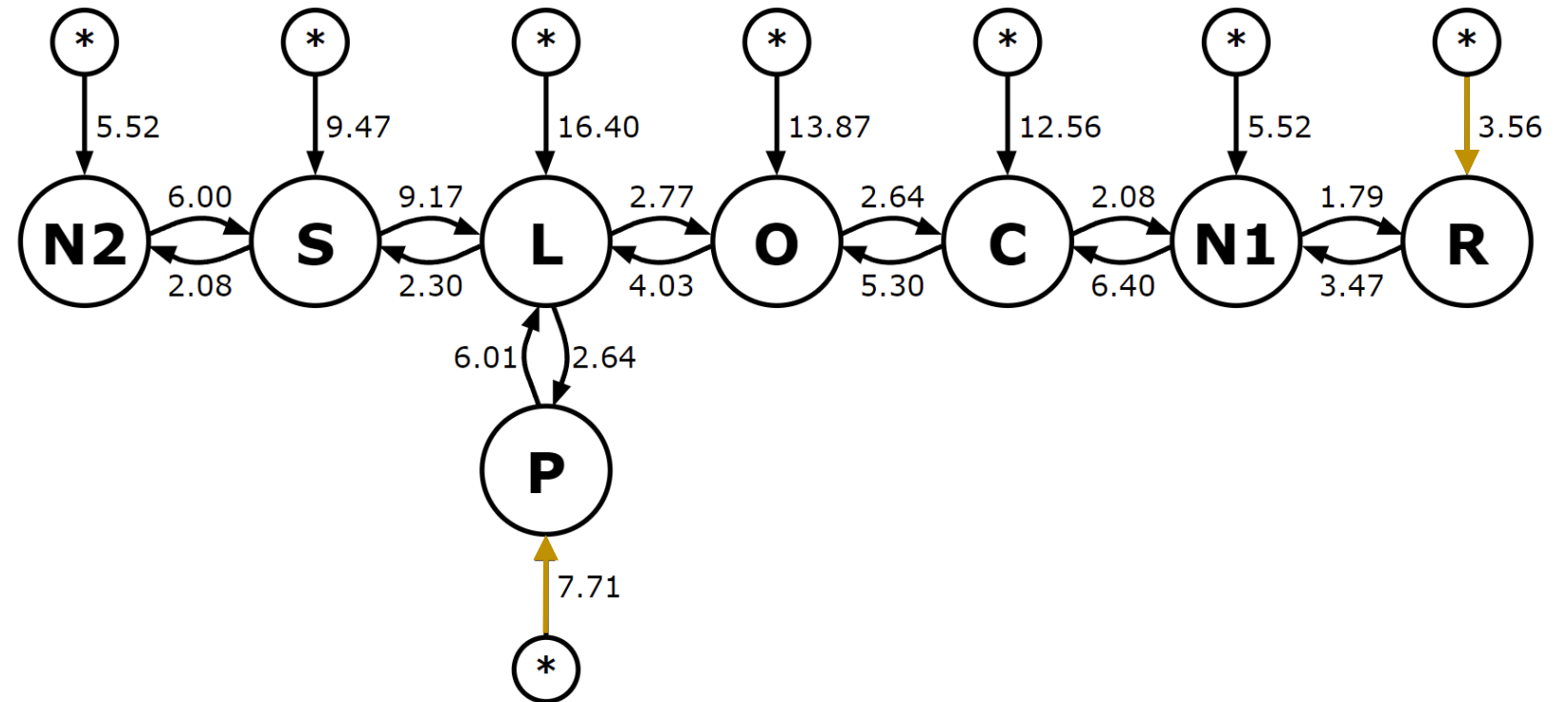
Example (N = 4), third step

Path	Cost
R-N1-N2	12.55
R-N1-C	13.43
R-N1-P	14.74
R-N2-S	15.08

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias
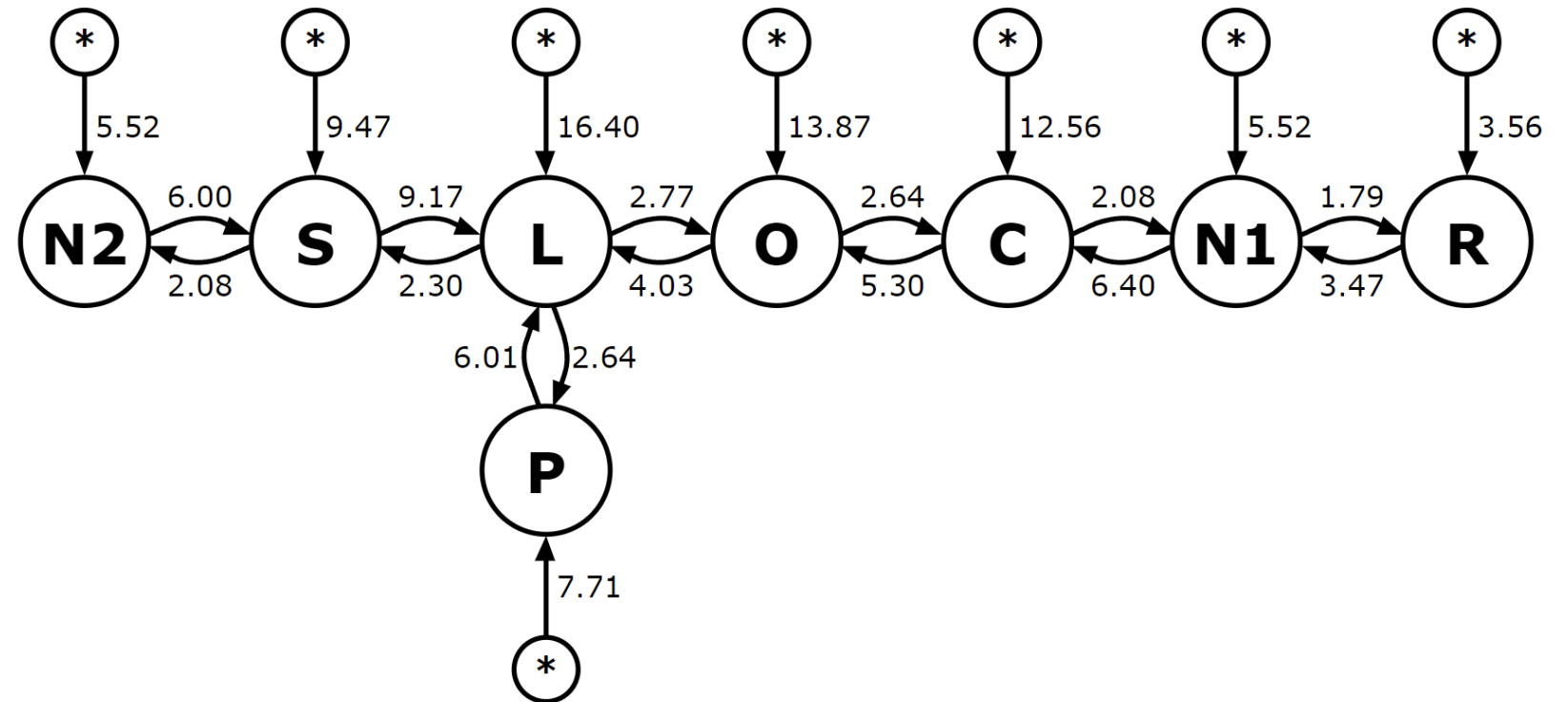
Next-Generation Query Planner

- algorithm continues until all nodes were visited in one path

  - -> 8 iterations

- path cost found with different Planners:

  - LQP: 36.92

  - NGQP: 29.78

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias

universität
innsbruck
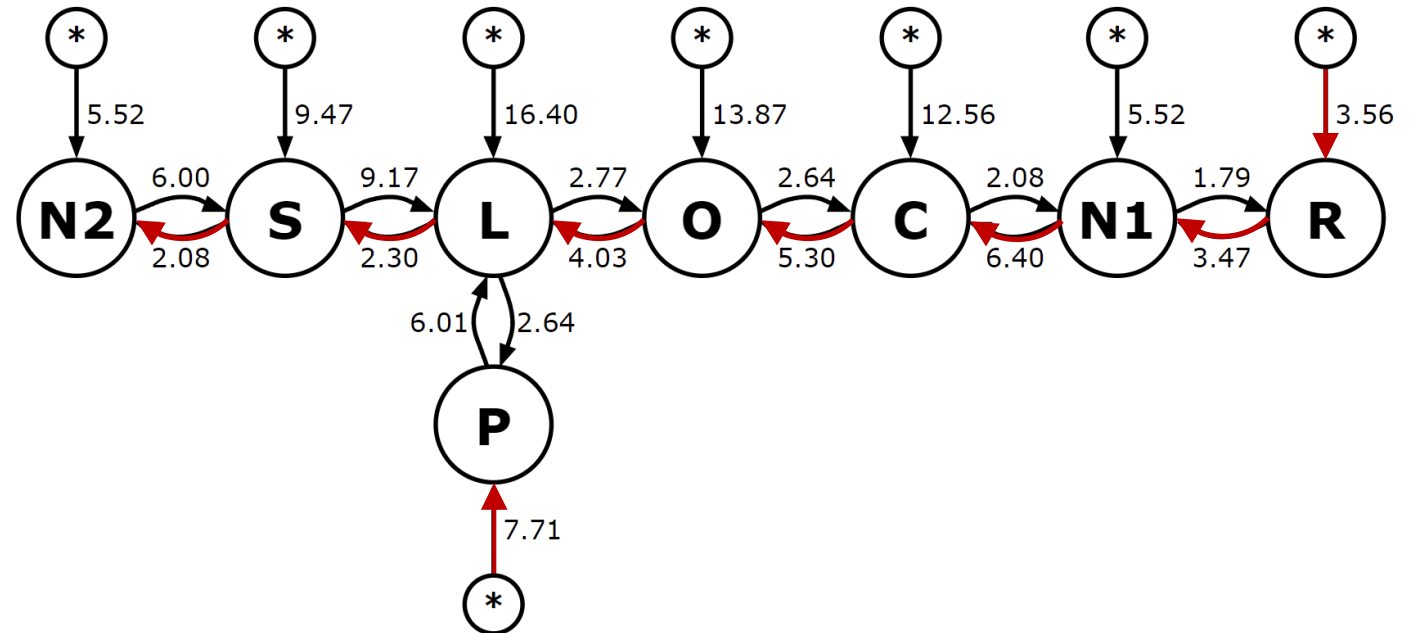
Advantages & Disadvantages

- Pro:

  - finds better optimizations than legacy planner

  - especially for complex queries

- Contra

  - plans are still not optimal

  - cost guesses rely on accurate ANALYZE data

  - problems when schema contains indices that have more than about 10 or 20

    rows with the same value in the left-most column of index

References

- https://sqlite.org/queryplanner-ng.html

Team 3
Gründlinger Diana, Huber Marcel, Klotz Thomas, Targa Aaron, Thalmann Matthias