

Exercises for the book

Semantic Web Databases

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Solutions

Chapter 5 – Logical Optimization

1. $SORT_{ASC(?name)} DISTINCT \Pi_{\{?name\}}$
 $((?article \text{ rdf:type } \text{bench:Article}) \quad AND$
 $(?article \text{ dc:creator } ?person) \quad AND$
 $(?inproc \text{ dc:creator } ?person) \quad AND$
 $(?person \text{ foaf:name } ?name))$
2. $((((?article \text{ dc:creator } ?person) AND$
 $((?person \text{ foaf:name } ?name) FILTER(?name <= "M"))))$
 $BIND(?person2 = ?person)$
3. The following tables are computed for query optimization using dynamic programming:

Join between	t_1, t_2	t_1, t_3	t_1, t_4	t_2, t_3	t_2, t_4	t_3, t_4
Best plan:	$t_1 \bowtie t_2$	$t_1 \bowtie t_3$	$t_1 \bowtie t_4$	$t_2 \bowtie t_3$	$t_2 \bowtie t_4$	$t_3 \bowtie t_4$
Costs:	1	2	2	2	3	1

Join between	t_1, t_2, t_3	t_1, t_3, t_4	t_2, t_3, t_4
Best plan:	$\min(\{t_1, t_2\}) \bowtie t_3$	$\min(\{t_3, t_4\}) \bowtie t_1$	$\min(\{t_3, t_4\}) \bowtie t_2$
Costs:	$1 + 1 = 2$	$1 + 1 = 2$	$1 + 1 = 2$

Join between	t_1, t_2, t_3, t_4
Best plan:	$\min(\{t_1, t_2\}) \bowtie \min(\{t_3, t_4\})$
Costs:	$1 + 1 + 1 = 3$

Thus, $(t_1 \bowtie t_2) \bowtie (t_3 \bowtie t_4)$ is an optimal plan. However, the plans $((t_1 \bowtie t_2) \bowtie t_3) \bowtie t_4$, $((t_3 \bowtie t_4) \bowtie t_1) \bowtie t_2$ and $((t_3 \bowtie t_4) \bowtie t_2) \bowtie t_1$ have the same optimal costs.