

Datenbanken Vertiefung

Übungsblatt 5 - Lösung

1. a) $E \bowtie D$, $k = 1$, $b_E = 2000$, $b_D = 10$, $M = 6$

$$\begin{aligned} \text{cost} &= b_E + k + \left\lceil \frac{b_E}{M - k} \right\rceil (b_D - k) \\ &= 2000 + 1 + \left\lceil \frac{2000}{5} \right\rceil (10 - 1) = 2000 + 400 \cdot 9 = 5601 \end{aligned}$$

- b) $E \bowtie D$, $k = 5$

$$\begin{aligned} \text{cost} &= b_E + k + \left\lceil \frac{b_E}{M - k} \right\rceil (b_D - k) \\ &= 2000 + 5 + \left\lceil \frac{2000}{1} \right\rceil (10 - 5) = 12005 \end{aligned}$$

- c) $D \bowtie E$, $k = 5$

$$\begin{aligned} \text{cost} &= b_D + k + \left\lceil \frac{b_D}{M - k} \right\rceil (b_E - k) \\ &= 10 + 5 + \left\lceil \frac{10}{1} \right\rceil (2000 - 5) = 19965 \end{aligned}$$

- d) $\text{cost} = 3(b_E + b_D) = 3(2000 + 10) = 6030$
D ist Building Input.

- e) Merge-Join mit Clustering Index: $\text{cost} = b_E + b_D = 2010$
Merge-Join ohne Clustering Index:

$$\begin{aligned} \text{cost} &= b_E \left(2 \left\lceil \log_{(M-1)} \left(\frac{b_E}{M} \right) \right\rceil + 1 \right) + \\ &\quad b_D \left(2 \left\lceil \log_{(M-1)} \left(\frac{b_D}{M} \right) \right\rceil + 1 \right) \\ &= 2000 \left(2 \left\lceil \log_5 \left(\frac{2000}{6} \right) \right\rceil + 1 \right) + \\ &\quad 10 \left(2 \left\lceil \log_5 \left(\frac{10}{6} \right) \right\rceil + 1 \right) \\ &= 2000 \cdot 9 + 10 \cdot 3 = 18030 \end{aligned}$$

(Lesen von b_E und b_D muss nicht doppelt gezählt werden.)

- f) Größe der Buckets $c = \lceil \frac{b_E}{256} \rceil = 8$
 D ist äußere Relation, $n_D = 50$
 $cost = b_D + n_D \cdot c = 10 + 50 \cdot 8 = 410$

2. a) R ist Build Input (kleinere Relation)
 b) $c = 4$, damit ergeben sich folgende Partition für R:

$$R_0 = \{28\}$$

$$R_1 = \{1, 25\}$$

$$R_2 = \{6, 18\}$$

$$R_3 = \{11, 31\}$$

Damit passt jede Partition des Build Input in M-1 Blöcke des Puffers.

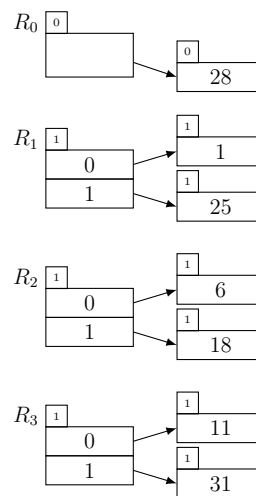
c)

$$s_0 = \{8\}$$

$$s_1 = \{1, 9, 25, 17\}$$

$$s_2 = \{6, 30\}$$

$$s_3 = \{3, 7, 11, 23, 27, 19\}$$



$$R \bowtie S = \{1, 25, 6, 11\}$$