Dresden Database Systems Group

2. Übung – Schattenspeicherkonzept

Architektur von Datenbanksysteme I

Indirekte Seitenadressierung

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Indirect Page Allocation, Shadow Page Mechanism, and Differential File Method

Assume that a database consists of two segments, each having 8 pages, and that 32 blocks are available for storing it. On this database, two interfering transactions manipulate these pages according to the following sequence:

T1:	P12	P15	P24	P17	EOT
T2:	P21	P25	P16	P27	EOT

Pij	Page j in segment i
EOT	End of Transaction

For *Indirect Page Allocation*, we assume the following mapping of pages (P) to blocks (B):

P11	P12	P13	P14	P15	P16	P17	P18	P21	P22	P23	P24	P25	P26	P27	P28
B1	B3	B6	B5	B7	B13	B9	B10	B15	B18	B19	B17	B21	B28	B24	B26

a) Please describe the construction principle of the page tables regarding *Indirect Page Allocation*.

b) Which additional data structures are needed for the *Shadow Page Mechanism*? Please illustrate their modifications during transaction processing.

c) After EOT of T1, please apply the *Shadow Page Mechanism* and create a checkpoint for both segments. When EOT of T2 is reached, use the *Shadow Page Mechanism* and create a checkpoint for segment 2.

d) How must the *Shadow Page Mechanism* be modified to allow for an implementation of transaction-oriented checkpoints? Please comprehend such a checkpoint at EOT of T1 using our example.