Implementation of DBMS
Exercise Sheet 2
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1) Suppose you use the Two-Phase Multiway Merge Sort in the scenario described in the lecture slides. Tell how many I/O's are needed for the sort if the following changes are applied. Assume that we still execute the algorithm with two phases.
a) The number of records of the file is doubled.
b) The size of blocks is doubled, to 8192 bytes.

2) You want to use the Two-Phase Multiway Merge Sort (or its extension to a different number of phases as appropriate) to sort a file. The file consists of 119,985 records. Each block can contain 20 records. We have 10 main memory blocks available.
a) How many blocks do we need to store the file if each block is as full as possible?
b) How many sorted sublists do we have after each phase?
c) How many phases do we need?
d) What is the required number of I/O's?

3) Consider the following relations:

R:

A	**B**
a	b
c	b
d	e

S:

B	**C**
b	c
f	a
b	d

Calculate the following relations:

a) $R \bowtie S$

b) $R \bowtie_{A=C} S$

c) $\pi_A(R \bowtie S)$

d) $\pi_A(R) \bowtie S$