INFSCI 1022: Database Management Systems,

Fall 2012

HW 5: Storage and Indexing [100 pts]

You are running a DBMS on a file system with 3 kByte disk block size.

Reminder: 1kByte=1024bytes, 1 MByte = 1024 kBytes.

Q1 [15 pts]

The size of each tuple is 133 Bytes. There are 100 000 tuples in table T. Column Id stores sequential tuple numbers starting from 1 (e.g. : 1,2,3,4,5,...). The last value of Id is 100 000. How much of disk space you will need to store this table? Show your calculations.

You answer (just one number in Mbyes):

You calculations:

Q2 [15 pts]

Assume that table T defined in question 1 has a dense primary index on column Id. The size of the index record is 2 bytes + 3 bytes for the pointer. How much disk space you will need to store the information of the table T (including both data and index)? Show your calculations.

You answer (just one number in Mbyes):

You calculations:

Q3 [15 pts]

Assume that table T is defined in the same way as in question 1. You execute a query: “select * from T where Id=54321”. How many blocks and how many bytes will be read from the disk? Show your calculations.

You answer (just two numbers: # of blocks; # of Mbytes):

You calculations:

Q4 [15 pts]

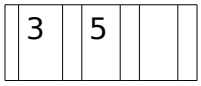
Assume that table T is defined in the same way as in question 2. You execute a query: “select * from T where Id=54321”. How many blocks and how many bytes will be read from the disk? Show your calculations.

You answer (just two numbers: # of blocks; # of Mbytes):

You calculations:

Q5 [10 pts]

Is this a valid B+ tree?



Q6 [15 pts]

Construct (draw a final result) a B+ tree for n=2 and for the following set of key values {1,3,5,6,7,8,9,13,14,15,16}

Assume that the keys are inserted one by one in the order of their appearance in the list.

Q7 [15 pts]

Construct (draw a final result) a B+ tree for n=5 and for the following set of key values

{3, 7, 8, 9, 10, 12, 15, 19, 21, 23, 24, 26, 27, 29, 32, 35, 40, 50, 51, 52}.

Assume that the keys are inserted one by one in the order of their appearance in the list.