Datenbanken II (SS 2015)
Exercise 5

1. B-Tree
   (a) Insert the access attribute values 20, 40, 10, 30, 15, 35, 7, 26, 18, 22, 5, 42, 13, 46, 27, 8, 32, 38, 24, 45, 25 into a B-Tree of order 2!
   (b) Delete the following access attribute values from a B-Tree: 25, 45, 24, 38, 32, 8, 27, 46, 13, 42, 5, 22, 26, 7, 35, 15
   (c) Bulk-Loading: Insert the characters of the word ALGORITHMUS
      i. in the given order
      ii. in reverse order
      iii. in alphabetical order
      iv. in reverse alphabetical order
      in an empty B-Tree of the order 2. How do the constructed trees differ? Discuss the effect of inserting sorted data in the B-Tree.
   (d) What are the differences between a B-Tree and a B+-Tree?

Statistical Hashing

1. Which characteristics should a good hash function exhibit? How can collisions be handled?
2. The following students (MatrNr, Name) have to be inserted into a hash table of size 4, bucket size 2 with overflow buckets: 24002 Xenokrates, 25403 Jonas, 26120 Fichte, 26830 Aristoxenos, 27550 Schopenhauer, 28106 Carnap, 29120 Theophrastos, 29555 Feuerbach
   (a) Make use of a simple modulo function for this task.
   (b) Add a digit sum function in advance of the computation of the modulo function. How does the distribution change?
   (c) Try to execute a further improvement step!
3. What are suitable hash functions for names, years of the Olympics, dates, ISBN-No.?

Good Luck!