

I/O-Efficient Algorithms

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<http://algo2.iti.uka.de/dementiev/courses/ioeff06/>

Assignment 2

Deadline: August 10, 2006

Exercise 1: 5 Points

Argue that certain insertions and deletions will require $\lceil N/B \rceil$ I/Os if we insist on exactly B consecutive elements in every block (except possibly the last). (Exercise 2.3 from the book)

Exercise 2: 7 Points

Show that insertions of N consecutive elements in a linked list can be done in $\mathcal{O}(1 + N/B)$ I/Os. (Exercise 2.4 from the book)

Exercise 3: 5 Points

Show how to implement concatenation of two lists and splitting of a list into two parts in $\mathcal{O}(1)$ I/Os. (Exercise 2.5 from the book)

Exercise 4: 15 Points

Given B-Tree A with $|A|$ elements and B-tree B with $|B|$ elements show how to construct B-tree C with elements including all elements of B-trees A and B ($C := A \cup B$) using $\mathcal{O}(\text{scan}(|A| + |B|))$ I/Os.