Kingston (1986); Makinen (1987); Sleator and Tarjan (1983); Sleator and Tarjan (1985a); Sleator and Tarjan (1985b); Tarjan and Van Wyk (1988); and Westbrook and Tarjan (1989).

Exercises

10.1 For the stack problem discussed in Section 10–1, prove that the upper bound is 2 without using a potential function. Give an example to show that this upper bound is also tight.

10.2 Imagine that there is a person whose sole income is his monthly salary, which is k units per month. He can, however, spend any amount of money as long as his bank account has enough such money. He puts k units of income into his bank account every month. Can you perform an amortized analysis on his behavior? (Define your own problem. Note that he cannot withdraw a large amount of money all the time.)

10.3 Amortized analysis somehow implies that the concerned data structure has a certain self-organizing mechanism. In other words, when it becomes very bad, there is a chance that it will become good afterwards. In this sense, can hashing be analyzed by using amortized analysis? Do some research on this topic. You may be able to publish some papers, perhaps.

10.4 Select any algorithm introduced in this chapter and implement it. Perform some experiments to see if the amortized analysis makes sense.

10.5 Read Sleator and Tarjan (1983) on the dynamic tree data structure.