

Infinite Automata 2025/26

Exercise Sheet 12

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Exercise 12.1. Show that a triplet of counters, initialised to the values (m, s, ms) can be used to simulate $\frac{m}{2}$ zero tests on an s -bounded counter.

Exercise 12.2. Extend Exercise 12.1 to show that the triplet of counters can be used to simulate $\frac{m}{2}$ zero tests across multiple counters whose sum is never greater than s .

Hint. See Lecture Notes 12, in particular the text before Lemma 12.9.

Exercise 12.3. Show that a pair of counters, initialised to the values (B, B^2) can be used to simulate $\frac{B}{4}$ zero tests on $\frac{B}{2}$ -bounded counters.