Introduction to Digital Computers - Fall 1997

Assignment No. 6

Course homepage:

http://www.eng.tau.ac.il/~guy/Digital_Computers/dc_home.html

Deadline: April 26th

1. Design a Mealy implementation of the toy automaton described Assignment No. 5, Question 3.

2. A k-speedup of an automaton A with σ input signal and γ output signals, is an automaton A^k that has $k \cdot \sigma$ input signals and $k \cdot \gamma$ output signals. Every cycle in A^k corresponds to k consecutive cycles of A. For example, if the first k input strings of A are $\alpha_1, \ldots, \alpha_k$ and the corresponding outputs strings are $\beta_1, \ldots, \beta_k$, then A^k is fed the strings $\alpha_1, \ldots, \alpha_k$ at the beginning of the first cycle, and outputs $\beta_1, \ldots, \beta_k$ at the second clock cycle.

   Show how a Moore implementation of A can be transformed into a Moore implementation of A^k. Estimate the cost and delay of A^k in terms of the cost and delay of A.

3. Compare the cost and delay of Moore and Mealy implementations of an FSM. Assume that the delay of a NOR-gate is not greater than the delay of an OR-gate and assume that binary encoding of the states is used.

4. Compare the cost and delay of Moore and Mealy implementations of an FSM. Assume that unary encoding of the states is used.