

Introduction to Computer Engineering (E85)

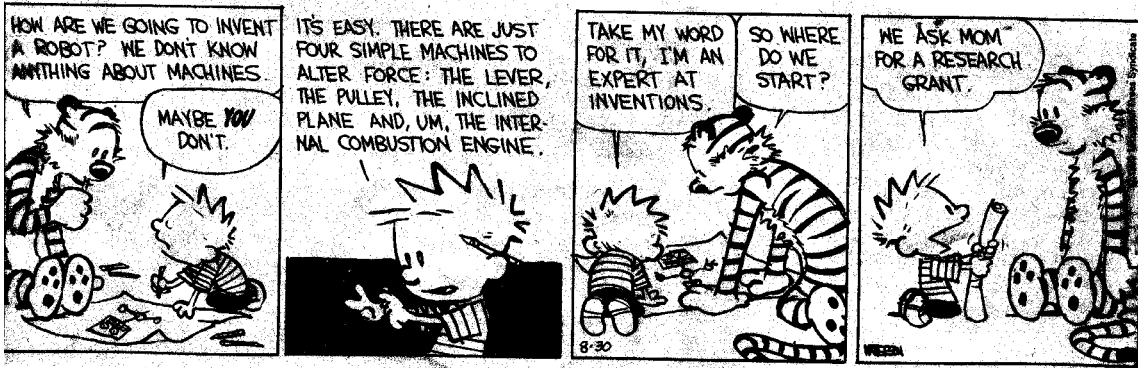
Harris

Spring 2001

Problem Set 3

Due: Friday, February 9

CALVIN AND HOBBES • Bill Watterson

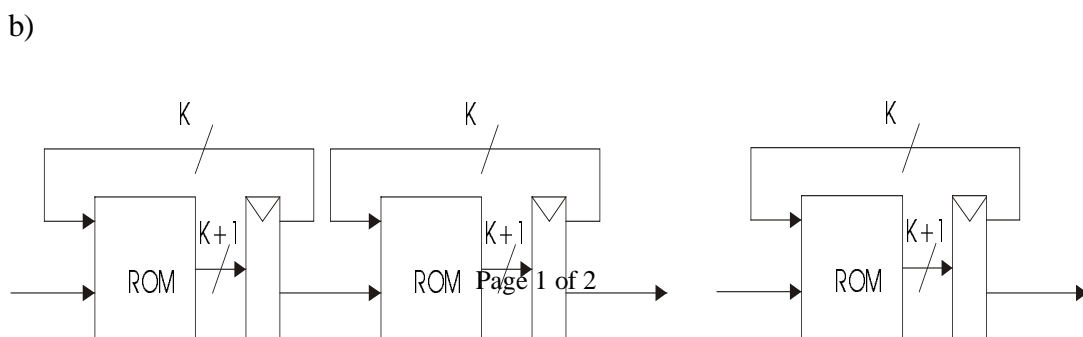
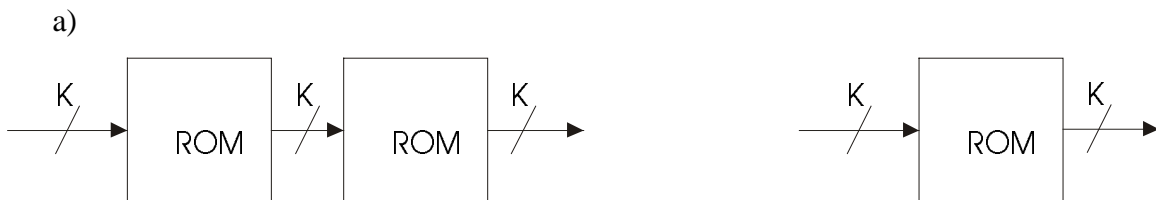


1) Numbers

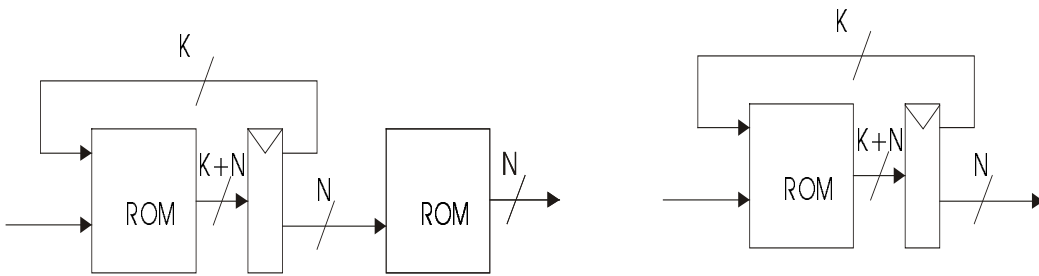
- Convert 1234_{10} to binary.
- Convert 1101010_2 to decimal.
- Convert $F00D_{16}$ to decimal.
- Convert 2345_{10} to hexadecimal.
- Convert $ED1F_{16}$ to binary.
- Convert 1100101_2 to hexadecimal.

2) FSM Equivalence

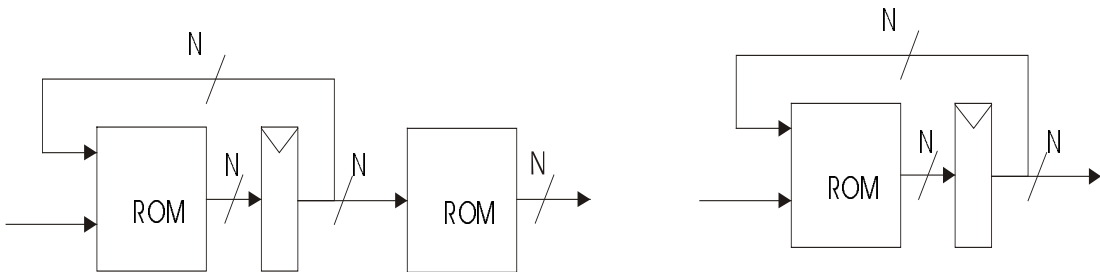
This question is from the Spring 1999 midterm. For each of the following circuits, can the circuit of the form on the left be replaced by an equivalent circuit of the form on the right, by proper programming of the later's ROM?



c)



d)



3) Multiplexer Logic

All logic functions can be implemented using only multiplexers and inverters. Design circuits using only these building blocks to perform the following functions:

a) $Y = A \cdot B \cdot C + \bar{B} \cdot C + A \cdot \bar{C}$ using three two-input multiplexers and no inverters.

b) $Z = A \text{ xor } B \text{ xor } C$ using only one four-input multiplexer and an inverter.

4) Time

Please indicate how many hours you spent on this problem set. This will not affect your grade, but will be helpful for calibrating the workload for next semester's class.