LE6.2

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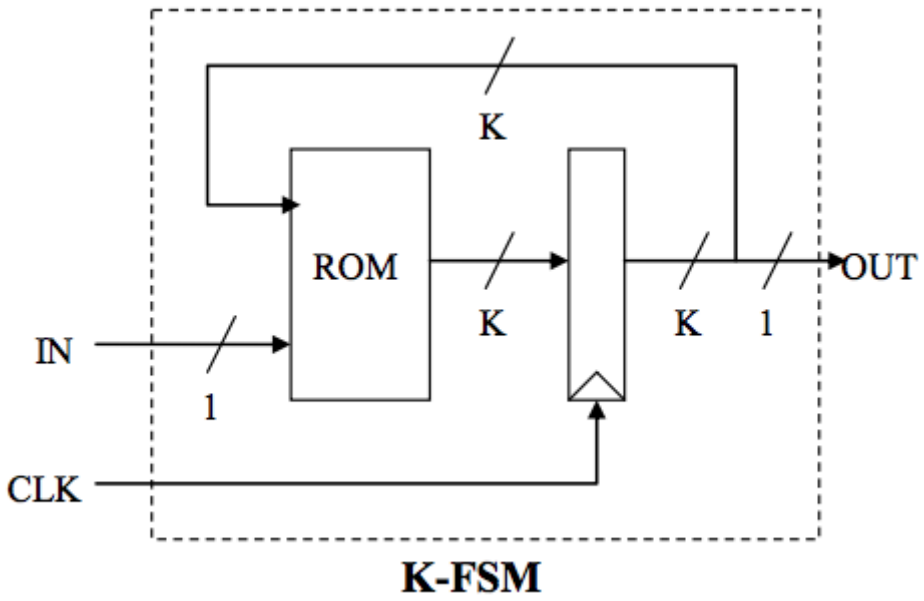
LE6.2.1 Number of states

6/6 points (ungraded)

The following is a circuit for a K-FSM, a finite state machine with a single input, a single output and K state bits (one of which is also the output):



(A) What is the maximum number of states a K-FSM may have? Please enter a formula using the variable K. The exponentiation operator is "^".

Formula in terms of K:

2^K ✔

2^K

(B) Give the number of locations in the ROM and the number of bits in each location. Please enter formulas using the variable K.

Number of locations in the ROM:

2^(k+1) ✔

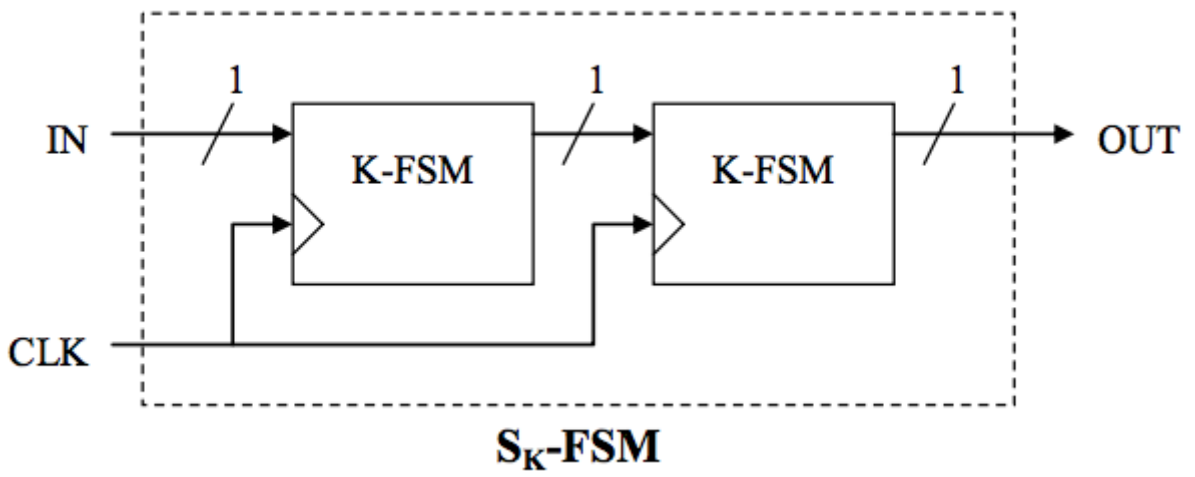
2^{k+1}

Number of bits per location:

k ✔

k

Consider the connection of two K-FSMs in series to create an S_K-FSM:



Each K-FSM in the diagram has the same size register (K bits) but their ROMs may be programmed differently.

(C) What is the maximum number of states an S_K-FSM may have? Please enter a formula using the variable K.

Formula in terms of K:

2^(2*k) ✔

$2^{2 \cdot k}$

Compare the S_K-FSM above with a (2K)-FSM, a single K-FSM with double the number of state bits.

Calculator

(D) Can every FSM that can be implemented using an S_K-FSM device also be implemented using a (2K)-FSM device?

- (●) Yes
- ( ) No

✔

(E) Can every FSM that can be implemented using a (2K)-FSM device also be implemented using an S_K-FSM device?

- (●) No
- ( ) Yes

✔

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- Number of locations in the ROM — 4
  Hello, I'm a bit confuse with the notations of "number of locations" and "number of states" in the ROM. What are the locations exactl...
- Unclear what the "state of SK-FSM" is defined to be — 20
  The expected answer implies that the combined state of all the K-FSMs is the state of the Sk-FSM. Its possible to view all the states ...
- Question D&E — 4
  Hello, Since the total ROM size of the S_K FSM is bigger than the ROM size of the 2K FSM then I would expect that every FSM imple...
- States in SkFSM — 2
  As from the question part c the maximum calculated states are : 4^K (2^K* 2^K) or some 2K bits value Normally in FSM we take no o...

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