Theory of Computation

Operations over FAs (the cartesian product)

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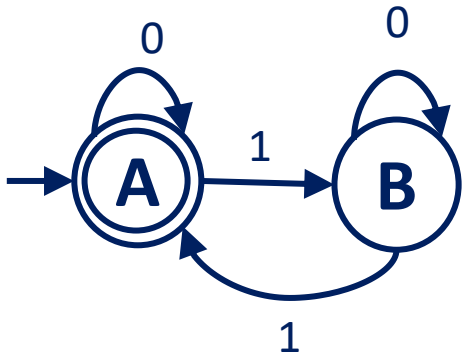
Example

- Two languages, L1 and L2, represented by DFA1 and DFA2, respectively
  - i.e., L1=L(DFA1) and L2=L(DFA2)
- Let's apply the cartesian product between the two DFAs, i.e., DFA1 x DFA2

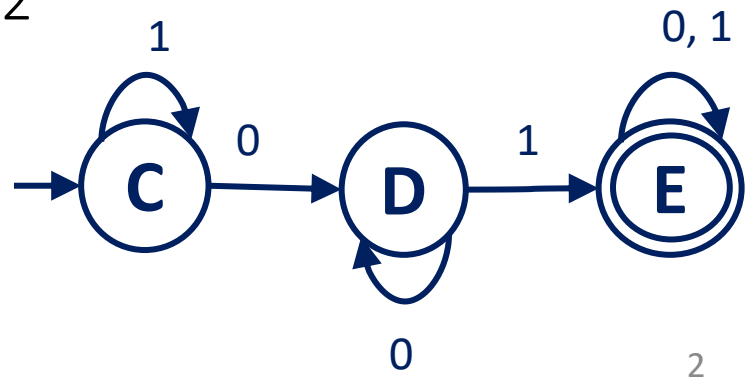
DFA1 that recognizes: L1={w ∈ {0,1}* | n_1(w) is even}

DFA1



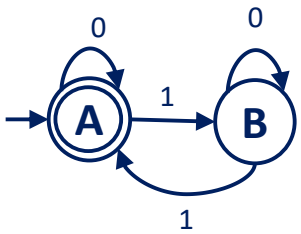
DFA2 that recognizes: L2={x01y | x and y are strings of 0's and 1's}

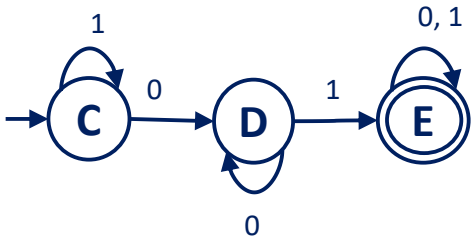
DFA2



https://en.wikipedia.org/wiki/Cartesian_product
http://mathworld.wolfram.com/CartesianProduct.html

DFA1 x DFA2





	C	D	E
A	A,C	A,D	A,E
B	B,C	B,D	B,E

Result of the Cartesian Product?

- Depends on the states of DFA1 x DFA2 selected as final states!
- Selection of Final States may conduct to:
  - L1 ∩ L2
  - L1 ∪ L2
  - L1 – L2
  - L2 – L1