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
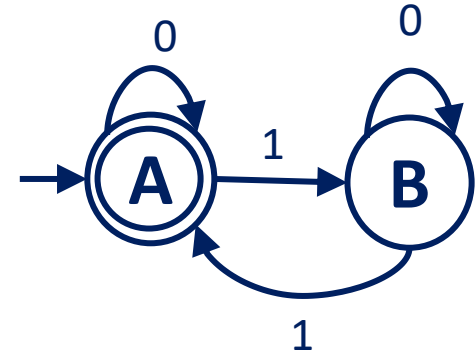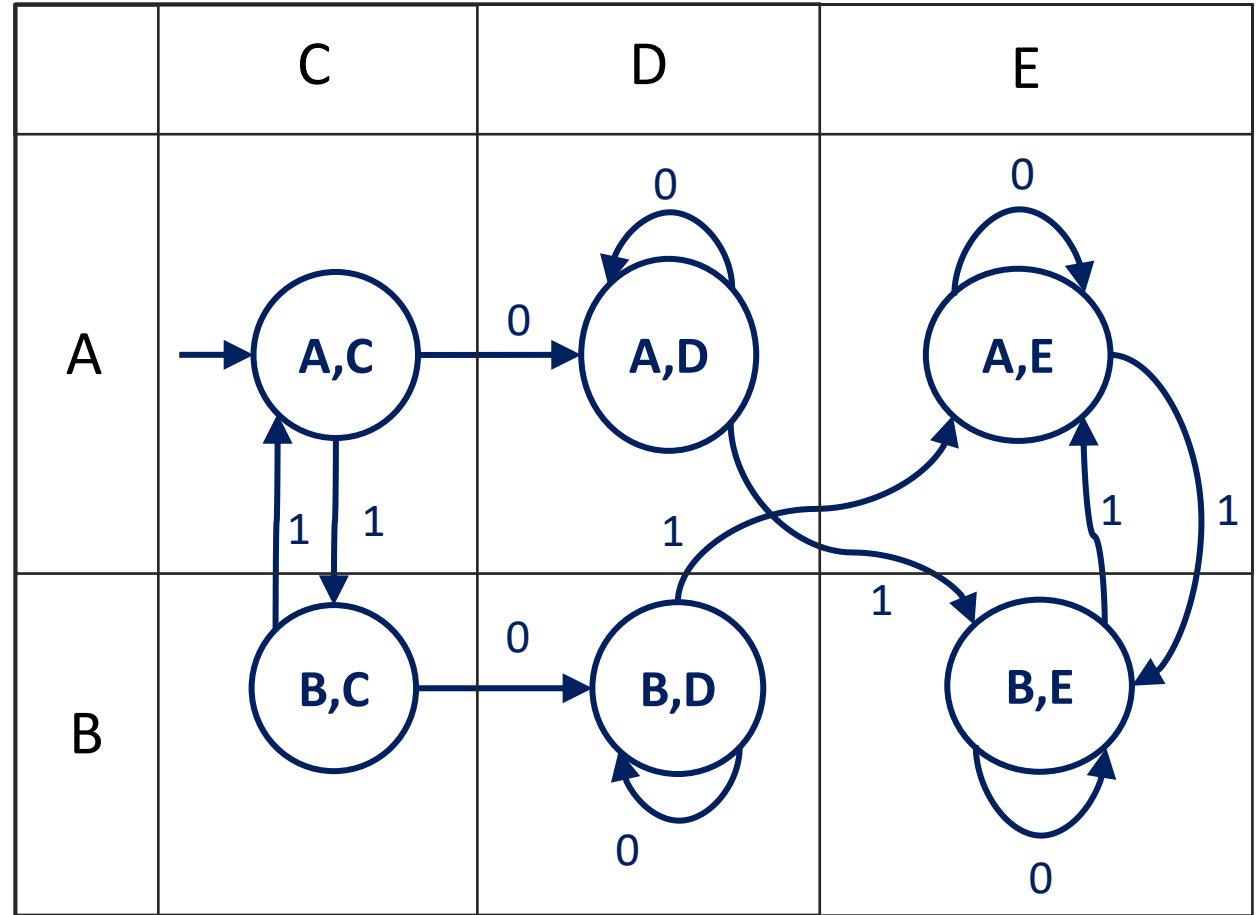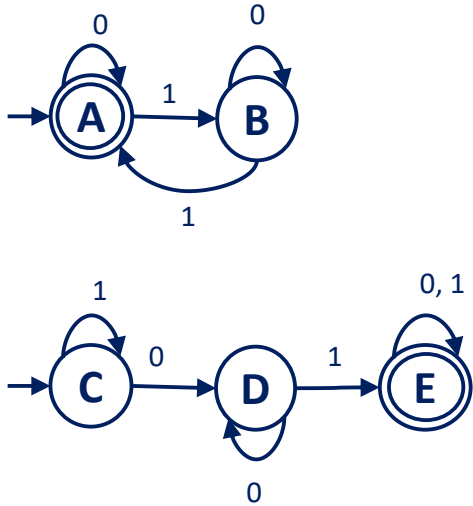

DFA2 that recognizes: L2={x01y | x and y are strings of 0's and 1's}

DFA2
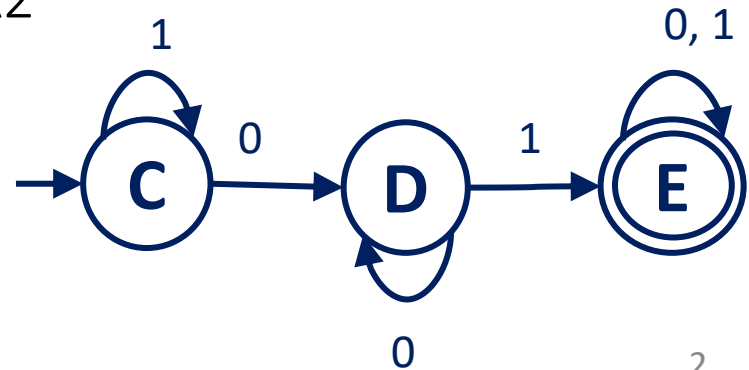
DFA1 x DFA2

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