Probabilistic Inference

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Outline

Marginalization of Variables

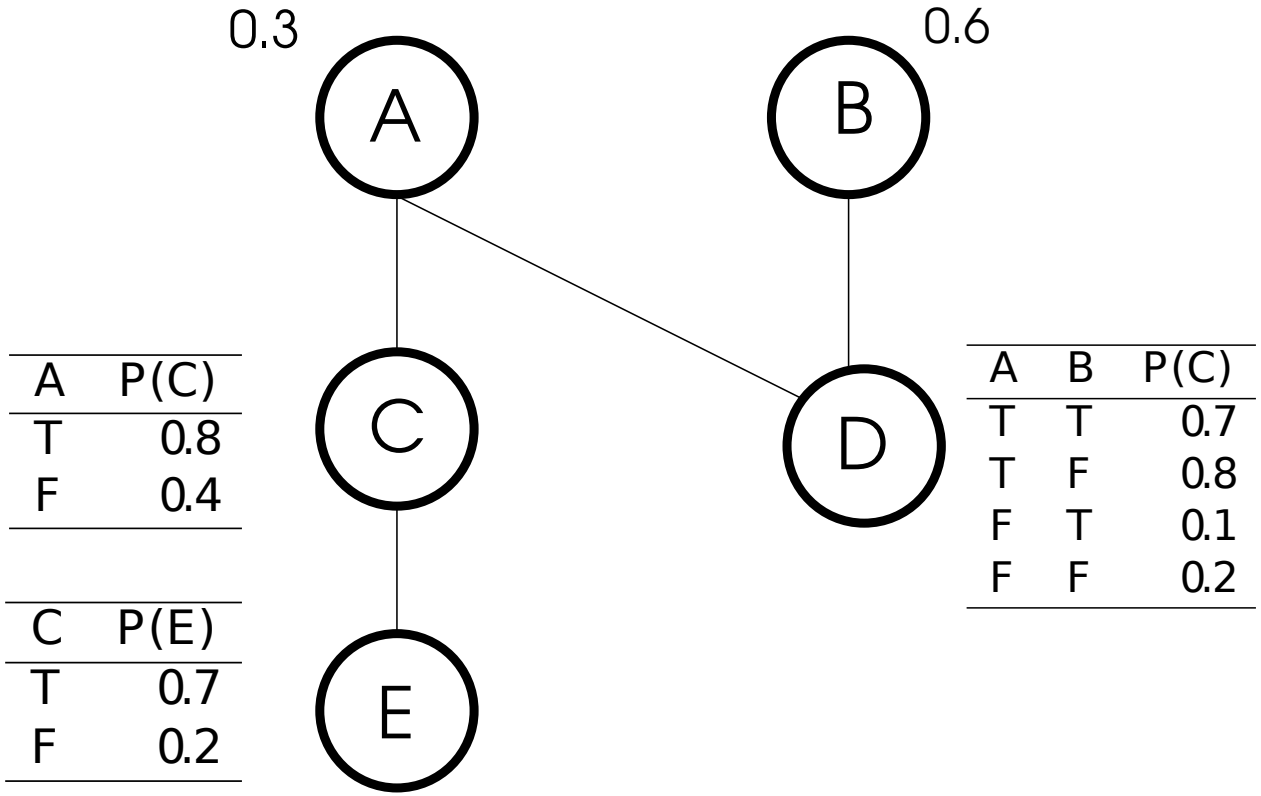

Figure: Bayes Net (A, B, C, D, E)

- Compute a CPT that gives probability of D in terms of B.

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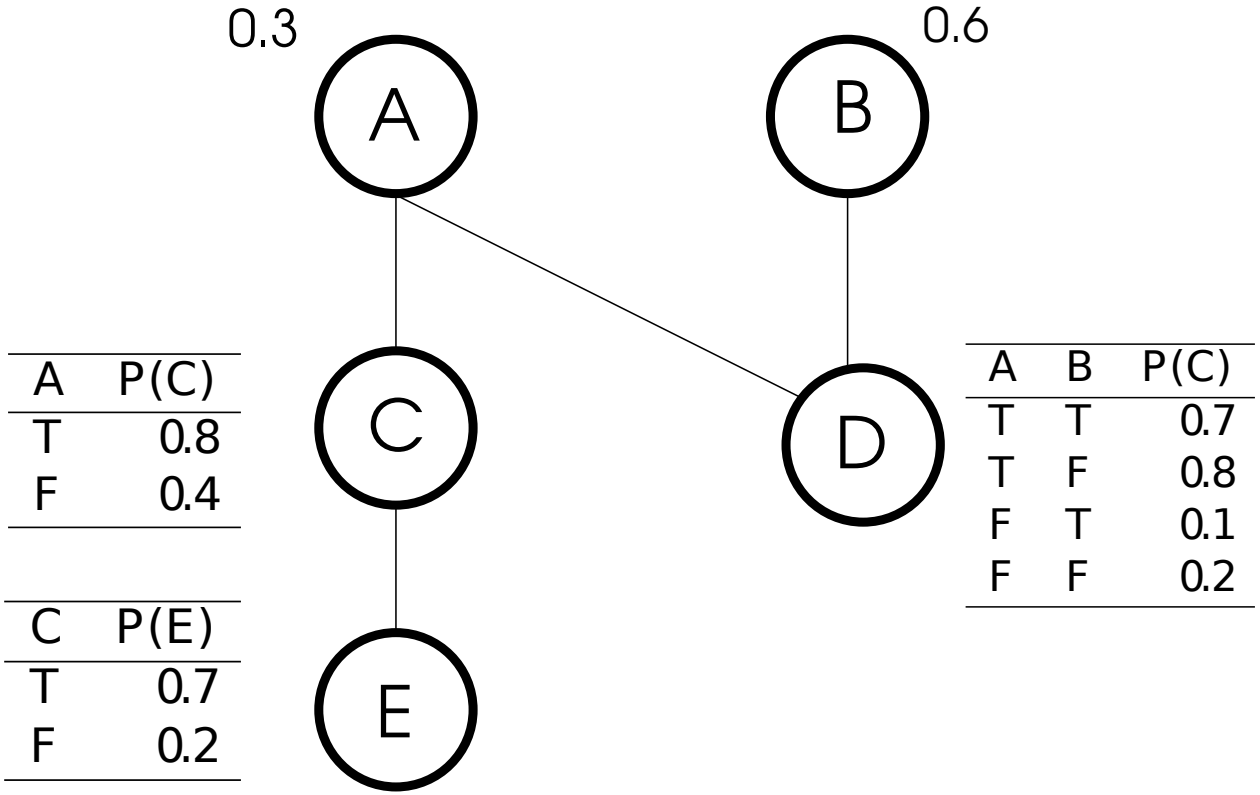

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- Compute a CPT that gives probability of D in terms of B.
  - B = T, P(C) = 0.7*0.3 + 0.1*0.7; B = F, P(C) = 0.8*0.3 + 0.2*0.7

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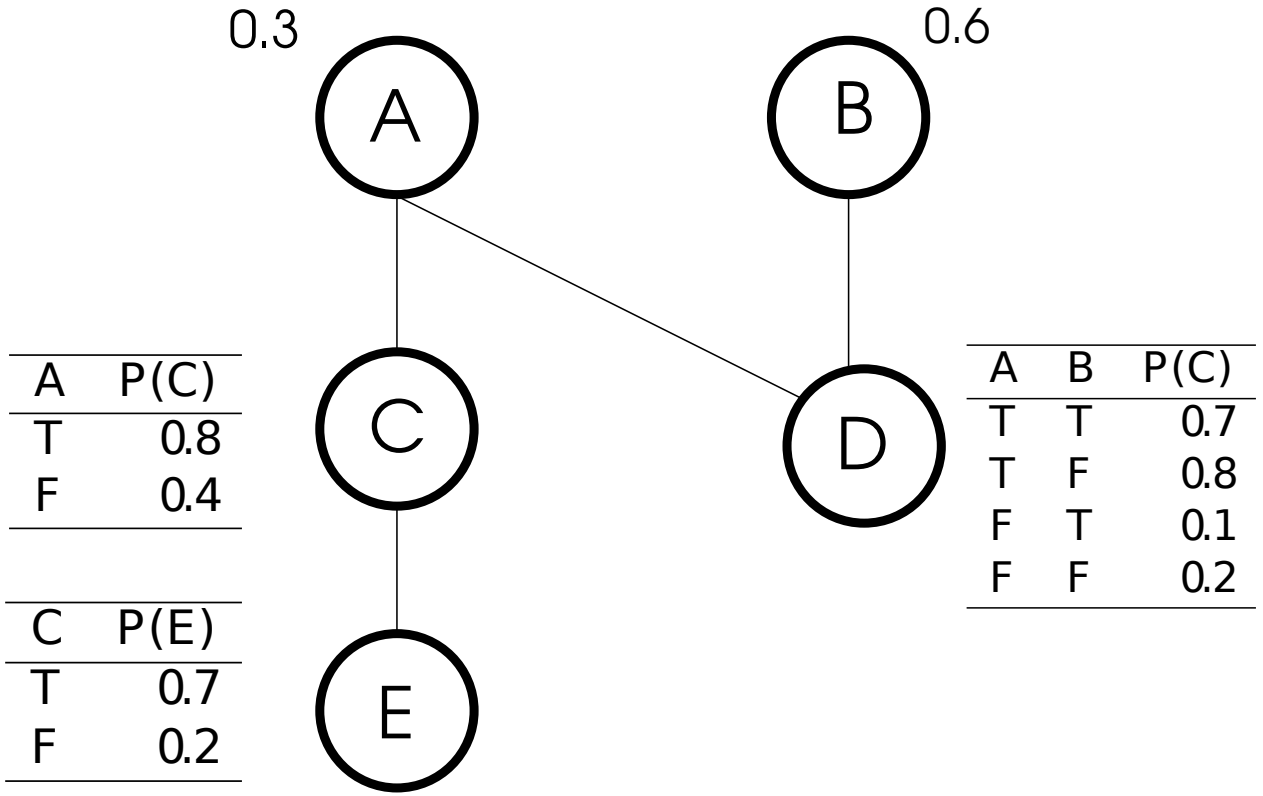

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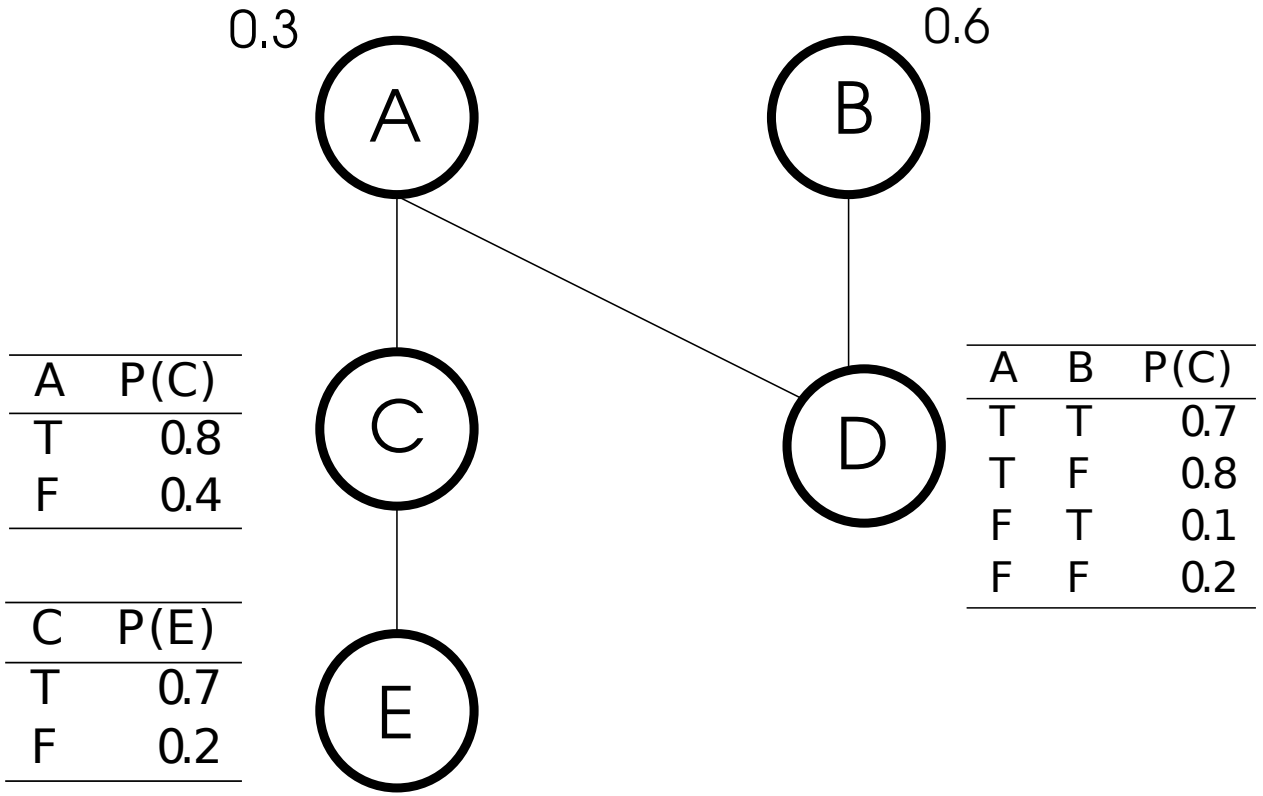

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- Compute a CPT that gives probability of D in terms of B.
  - B = T, P(C) = 0.7*0.3 + 0.1*0.7; B = F, P(C) = 0.8*0.3 + 0.2*0.7
- Compute a CPT that gives probability of E in term of A.
  - A = T, P(E) = 0.8*0.7 + 0.2*0.2; A = F, P(E) = 0.4*0.7 + 0.6*0.2

Utility of an action

Two banks are on the x axis. Left-bank is at lbx=0 and right-bank is at rbx=20. Agent's location on the number line is at 0<a<20. The agent has 5$. If it goes to left-bank, it can get 20$. If it goes to the right-bank, it can get 10$. However, in order to get to the bank the agent has to spend money at the rate of 2*(distance from the bank). The agent has three actions - go-left, go-right and stay. The agent wants to maximize the money it has. Left-bank might be closed with a probability of 0.25, right-bank might be closed with a probability of 0.20.

- What is the expected utility of each action for a position x?

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- What is the expected utility of each action for a position x?
  - EU(stay) = 5

    EU(go-left) = 5 + (0.75*20 + 0.25*0) - 2*x
    EU(go-right) = 5 + (0.80*10 + 0.20*0) - 2(20-x)

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  - threshold 7.5-16

JavaBayes Demo