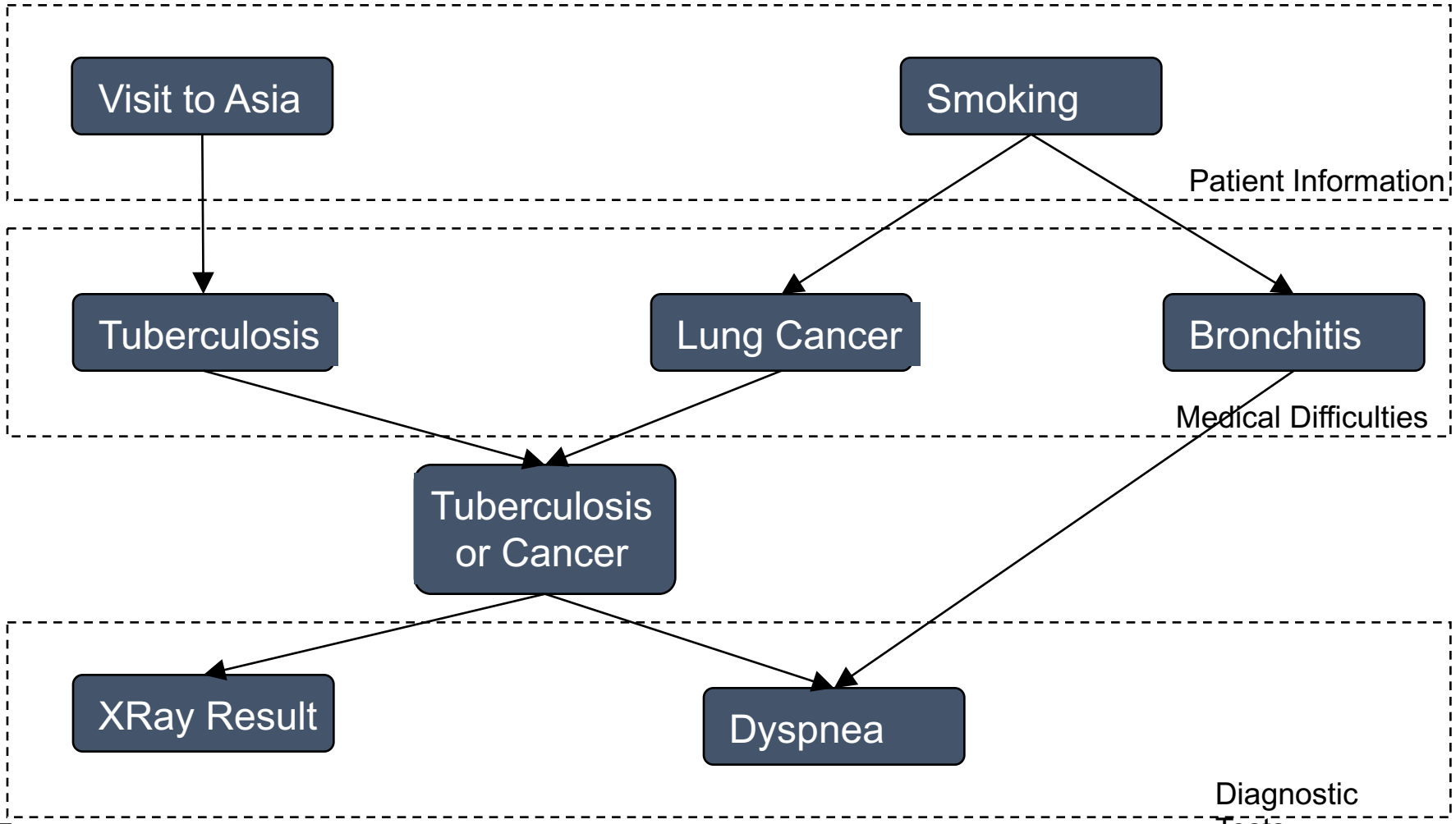
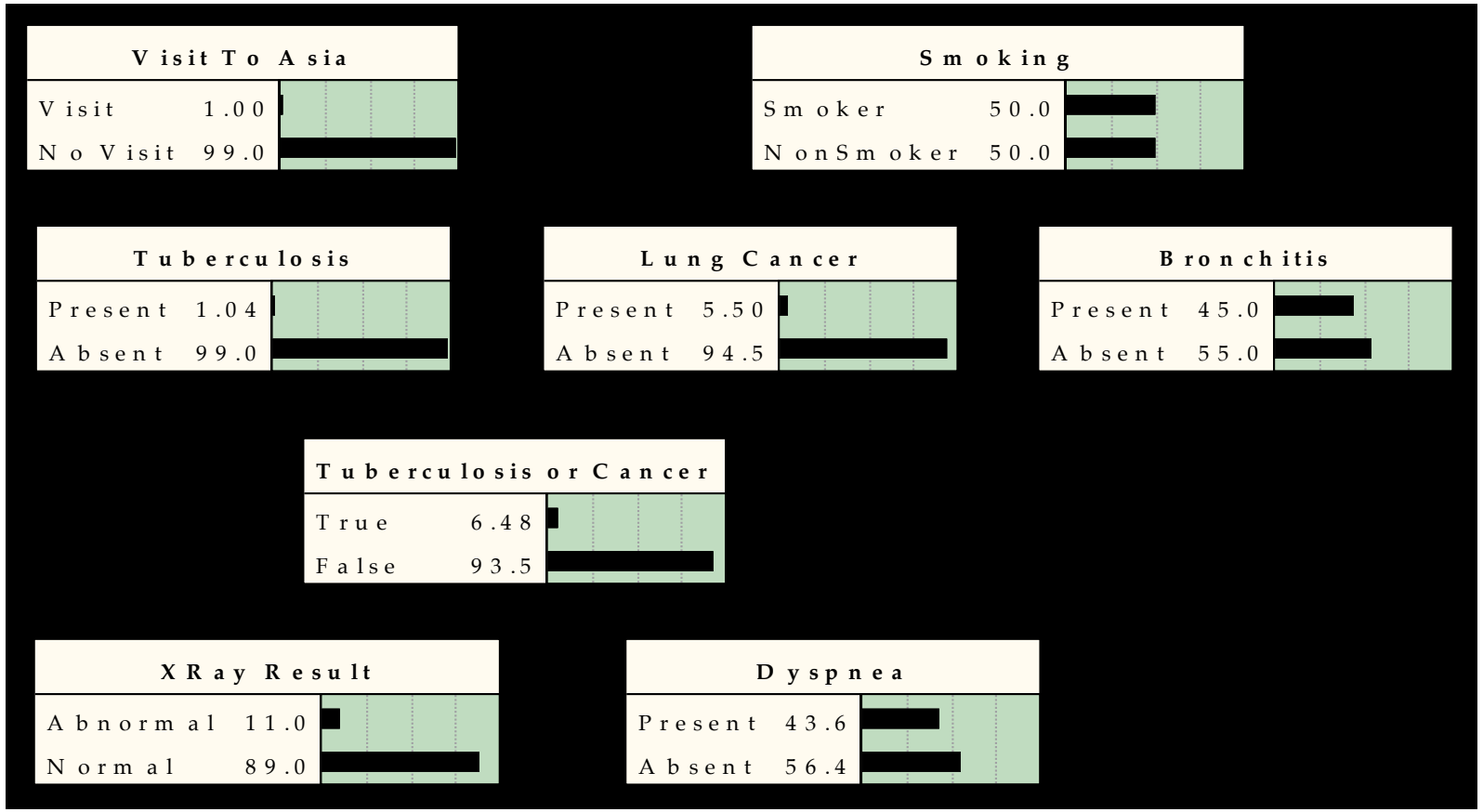
Un altro esempio…

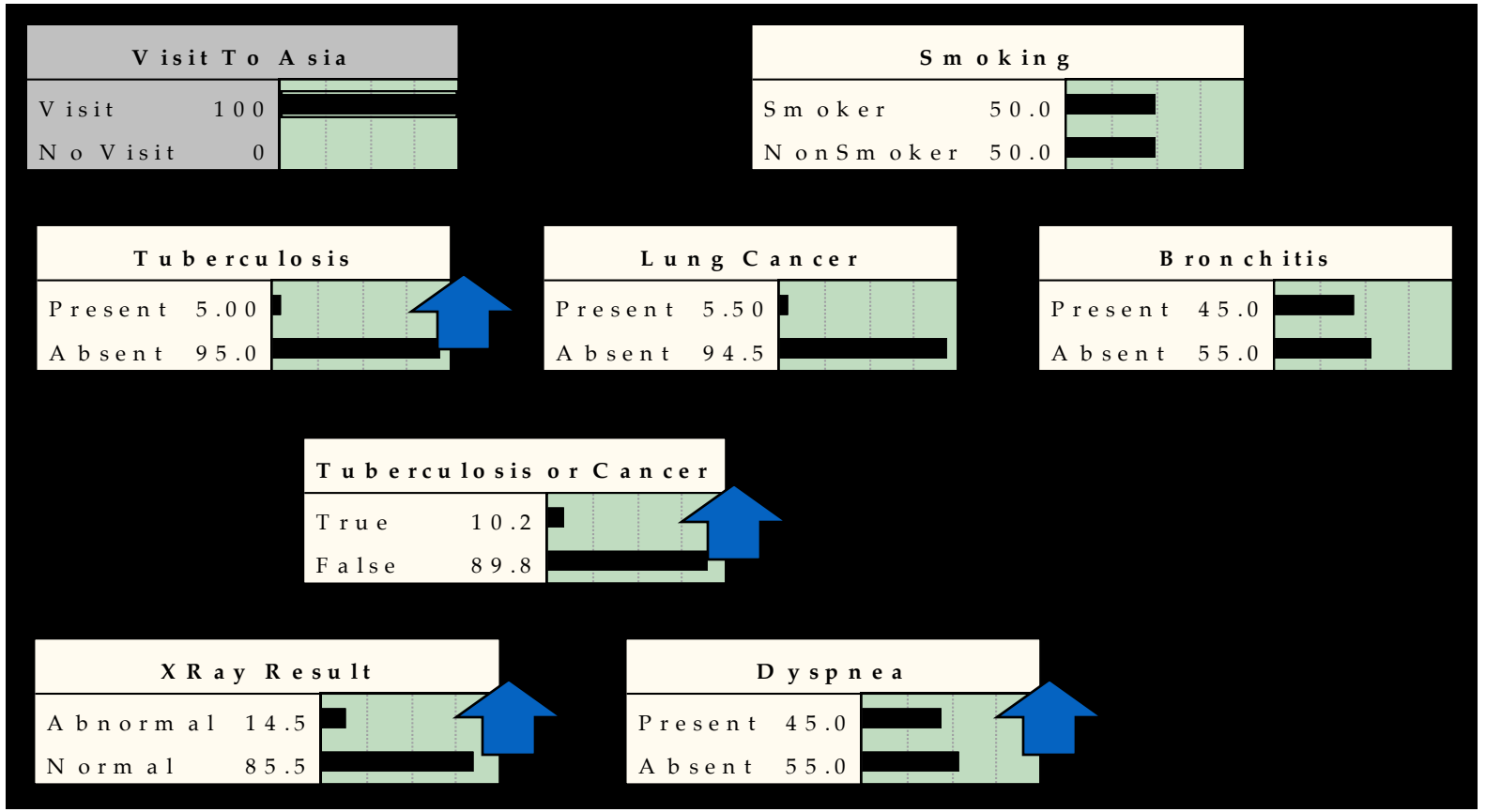
Example from Medical Diagnostics



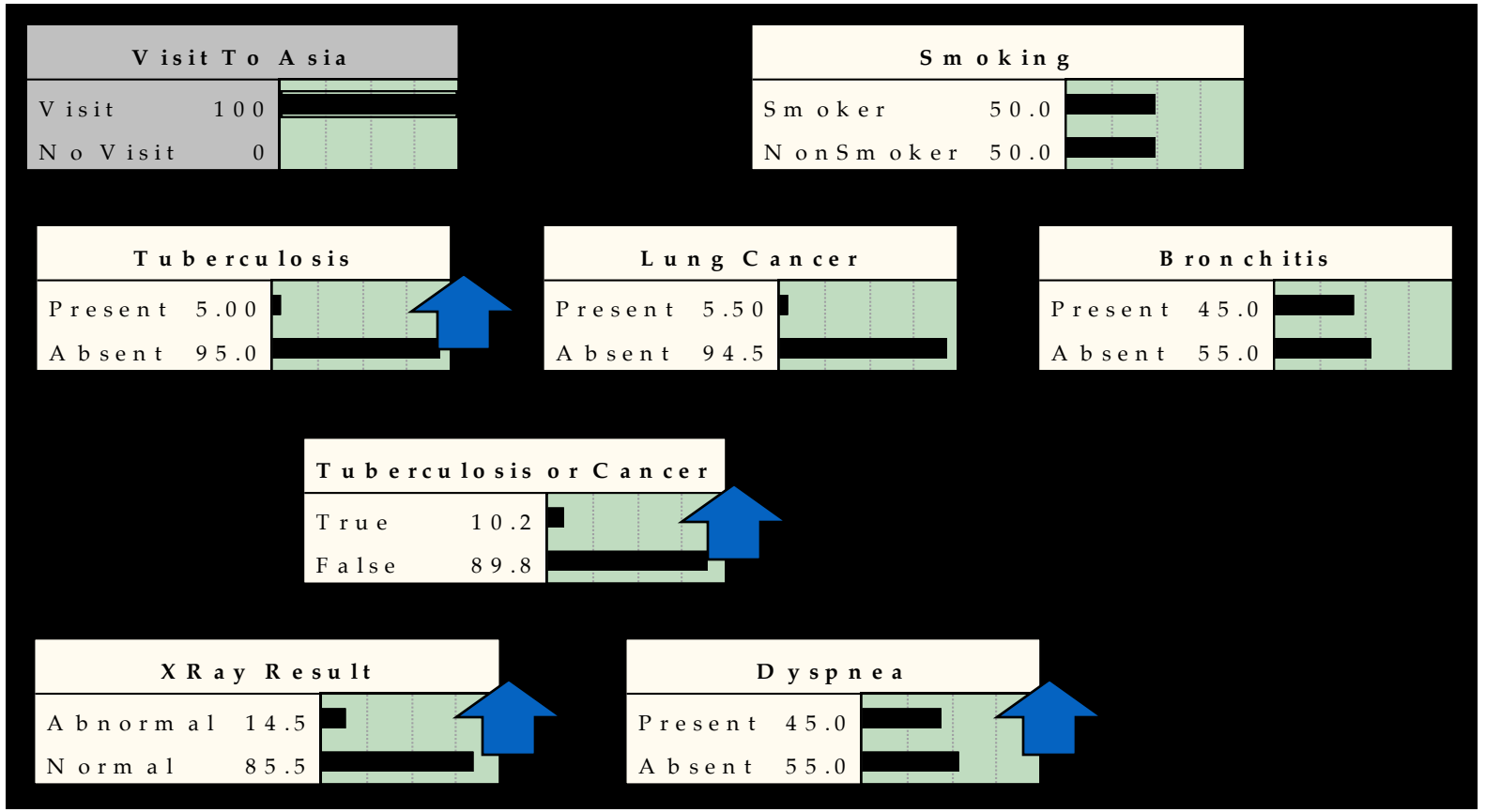
- Network represents a knowledge structure that models the relationship between medical difficulties, their causes and effects, patient information and diagnostic tests



- Propagation algorithm processes relationship information to provide an unconditional or marginal probability distribution for each node
- The unconditional or marginal probability distribution is frequently called the belief function of that node



- As a finding is entered, the propagation algorithm updates the beliefs attached to each relevant node in the network
- Interviewing the patient produces the information that “Visit to Asia” is “Visit”
- This finding propagates through the network and the belief functions of several nodes are updated



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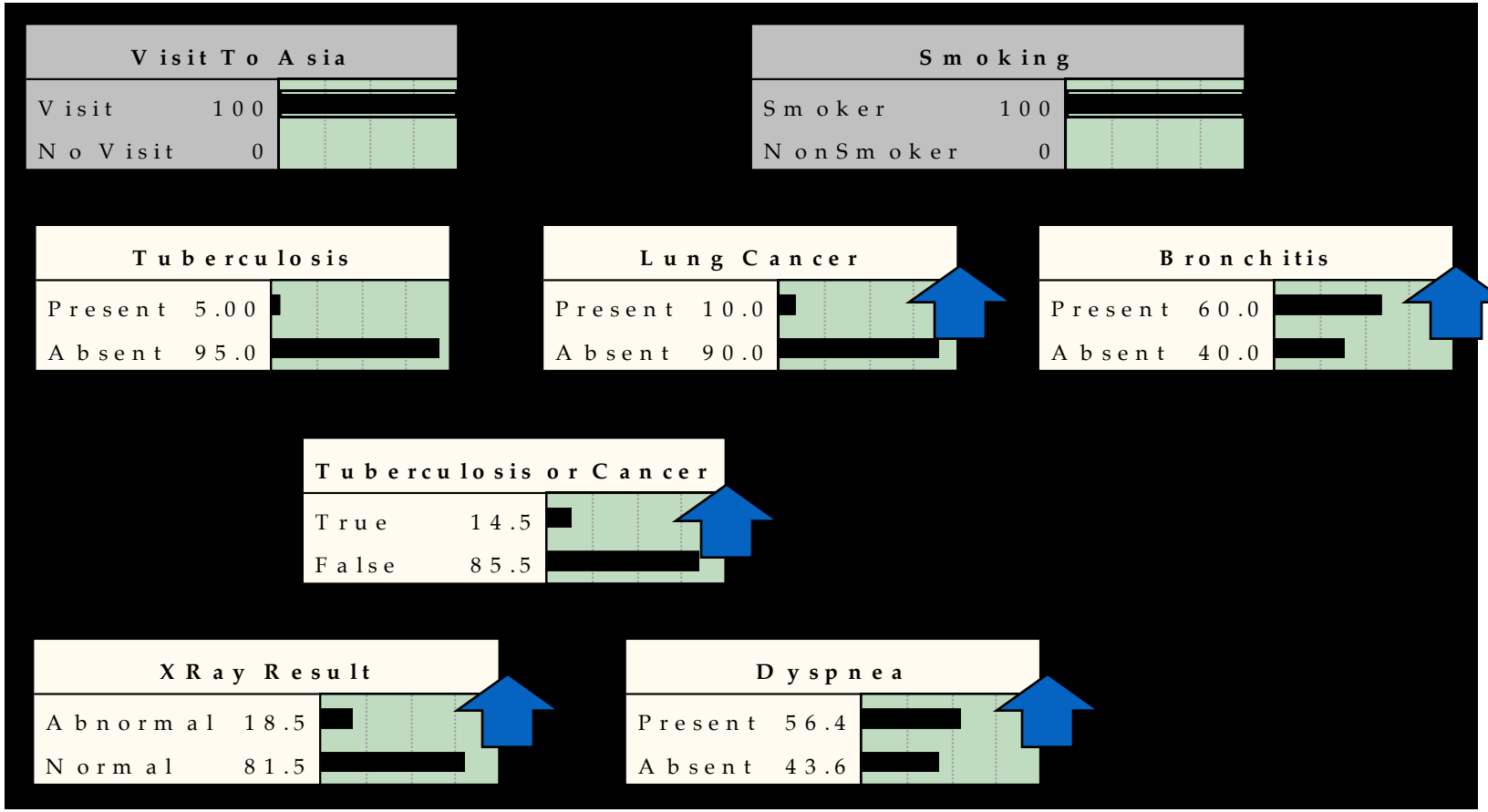
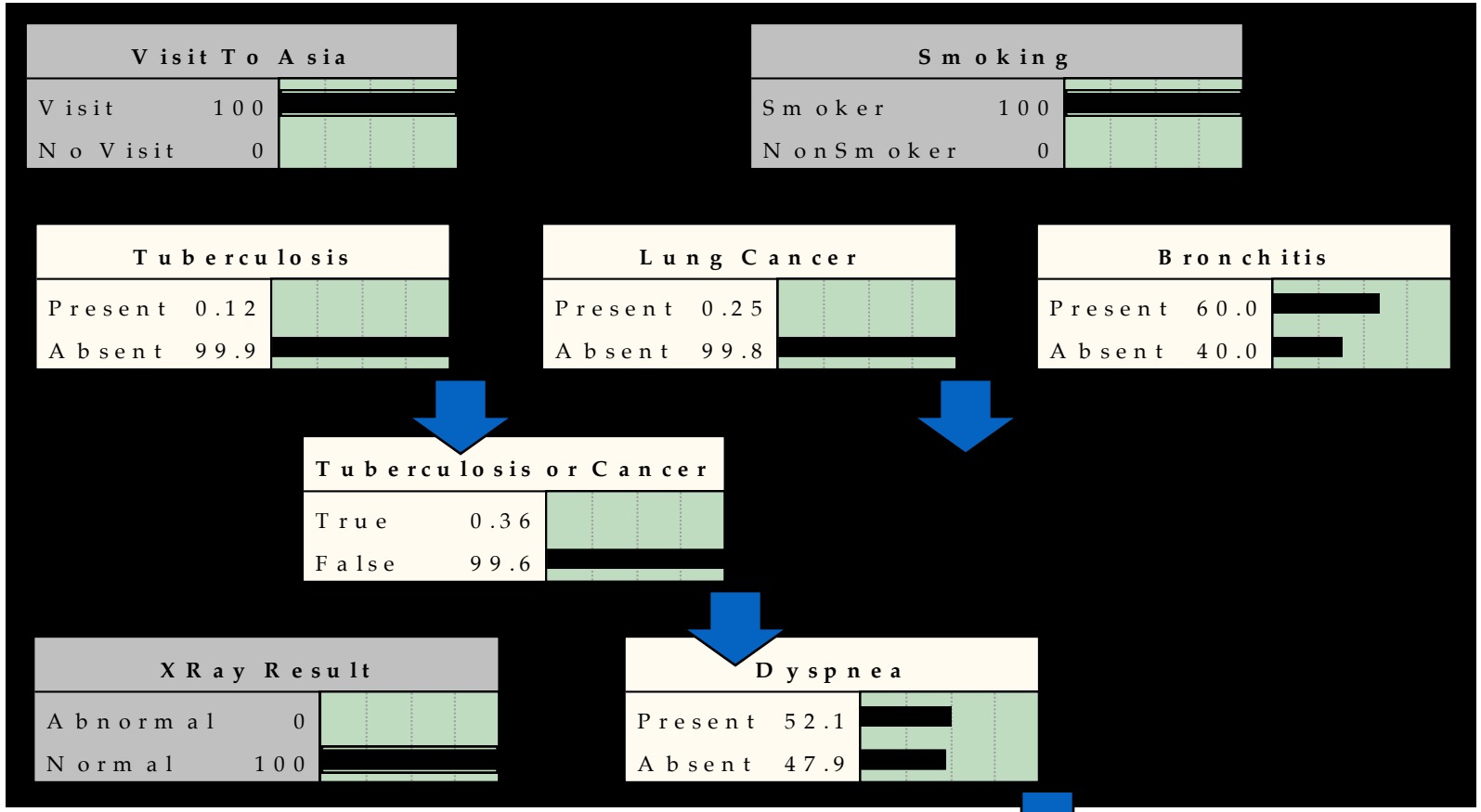
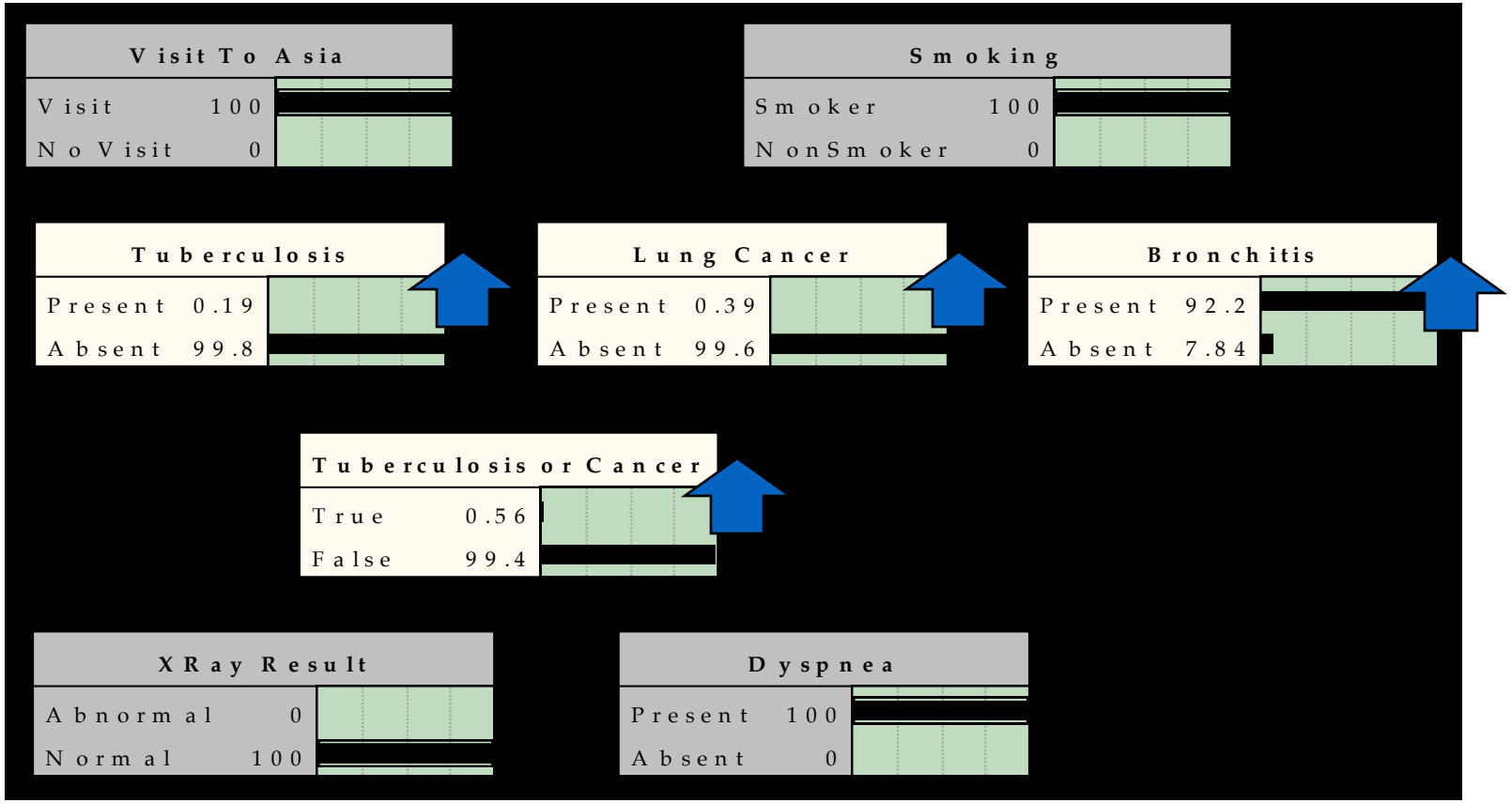


- Further interviewing of the patient produces the finding “Smoking” is “Smoker”
- This information propagates through the network

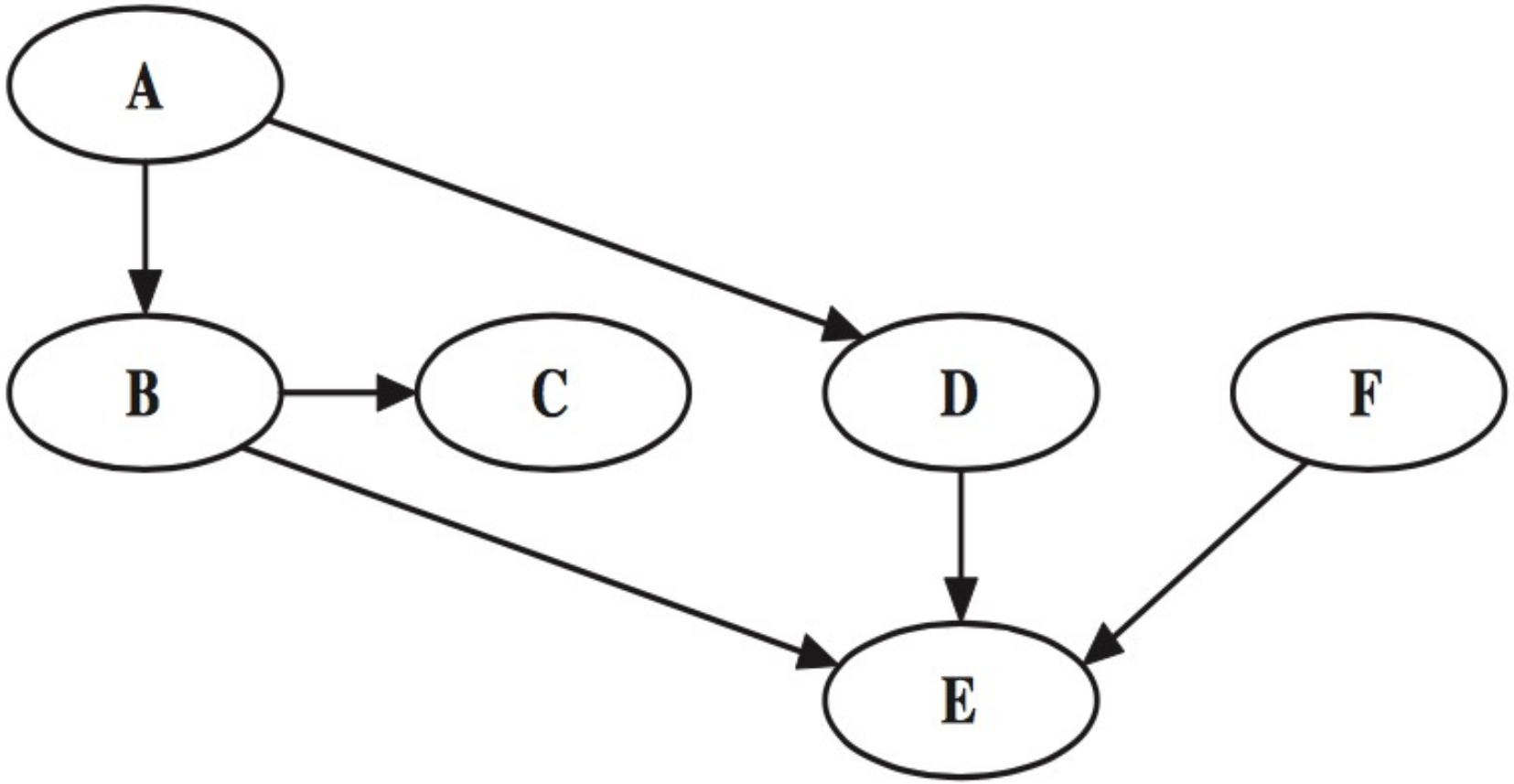


- Finished with interviewing the patient, the physician begins the examination
- The physician now moves to specific diagnostic tests such as an X-Ray, which results in a “Normal” finding which propagates through the network
- Note that the information from this finding propagates backward and forward through the arcs



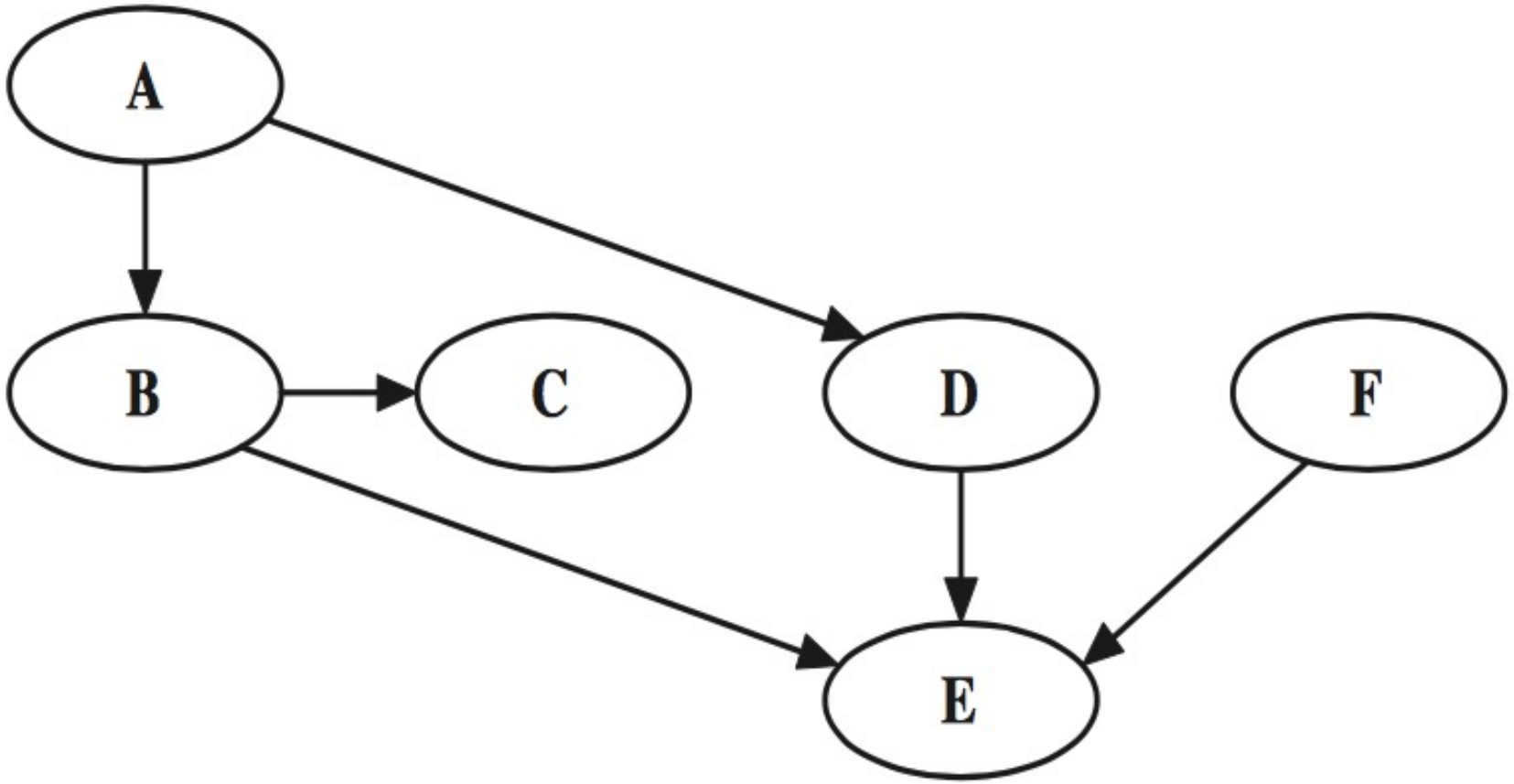
- The physician also determines that the patient is having difficulty breathing, the finding "Present" is entered for "Dyspnea" and is propagated through the network
- The doctor might now conclude that the patient has bronchitis and does not have tuberculosis or lung cancer

Exercise 1



Does D d-separate C and F ?

Exercise 1



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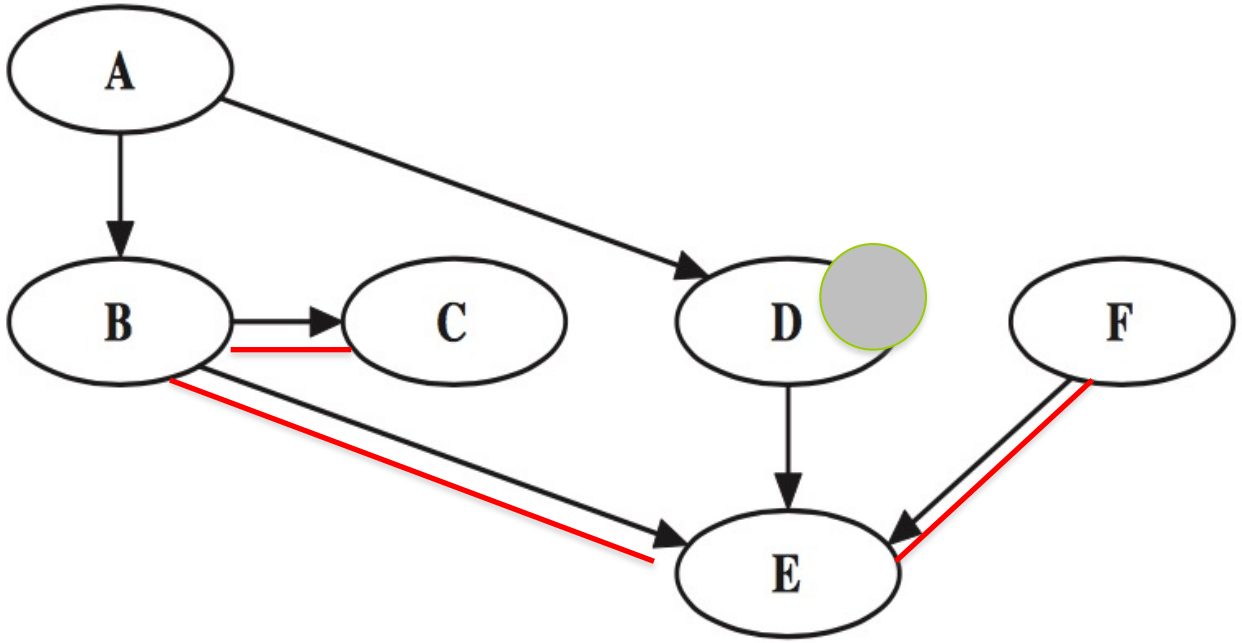
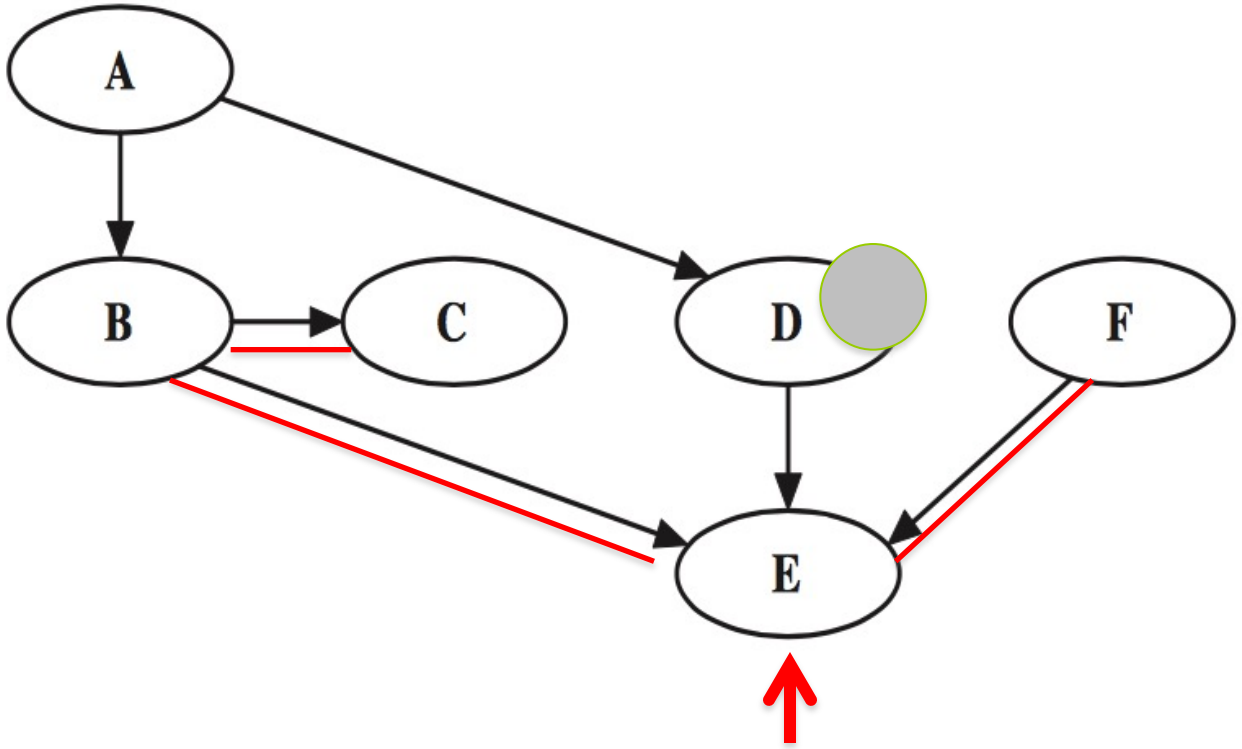


Consider all the possible path from C to F

a)C – B – E - F

Exercise



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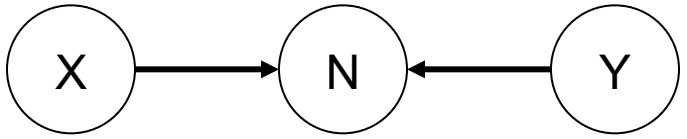
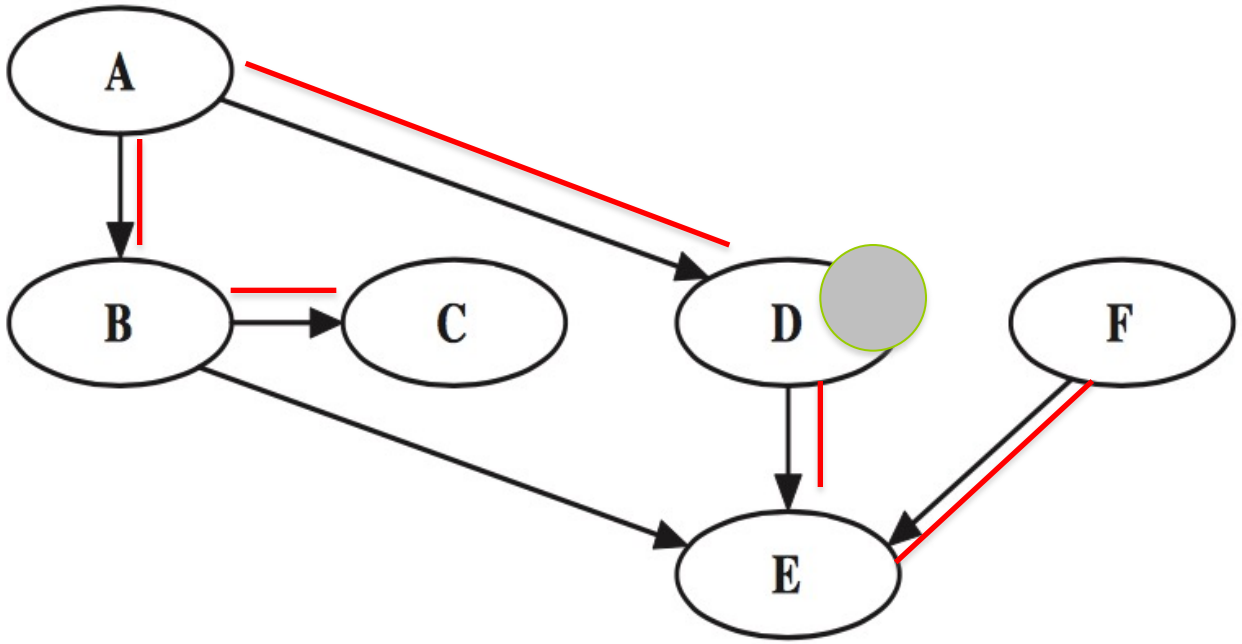
Il cammino è bloccato per la terza regola



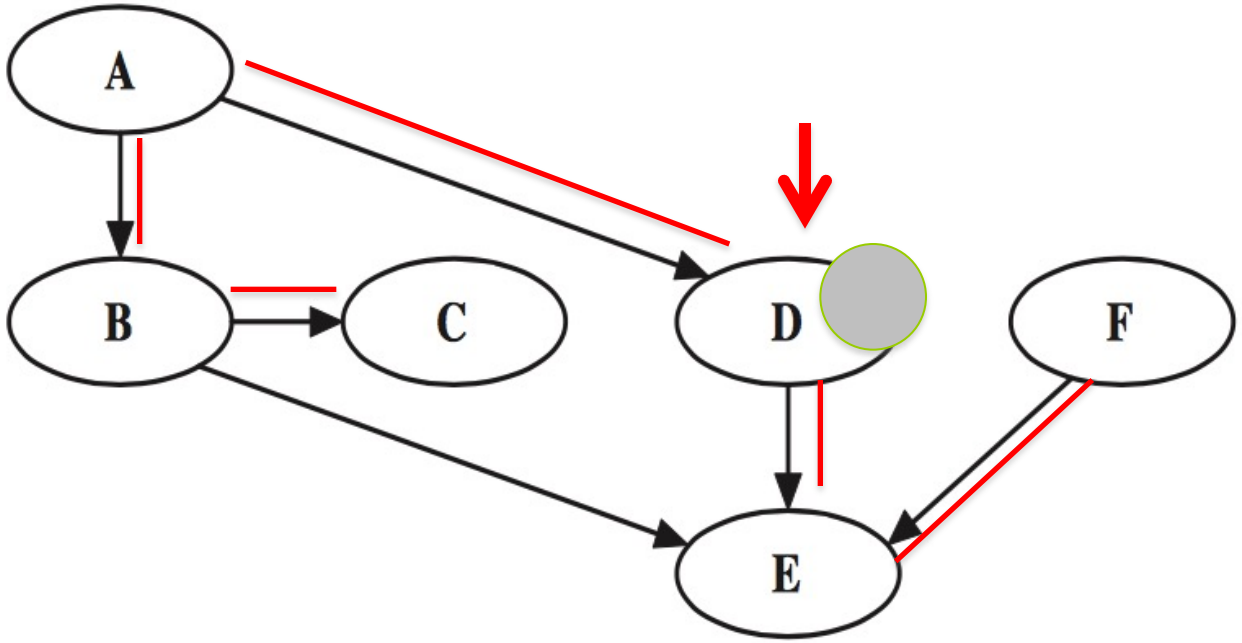
Exercise



Consider all the possible paths from C to F

b) C – B – A – D – E - F

Exercise



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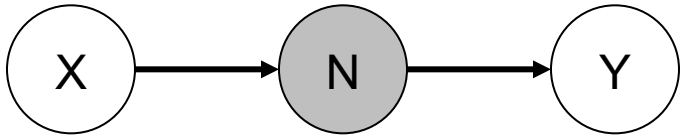

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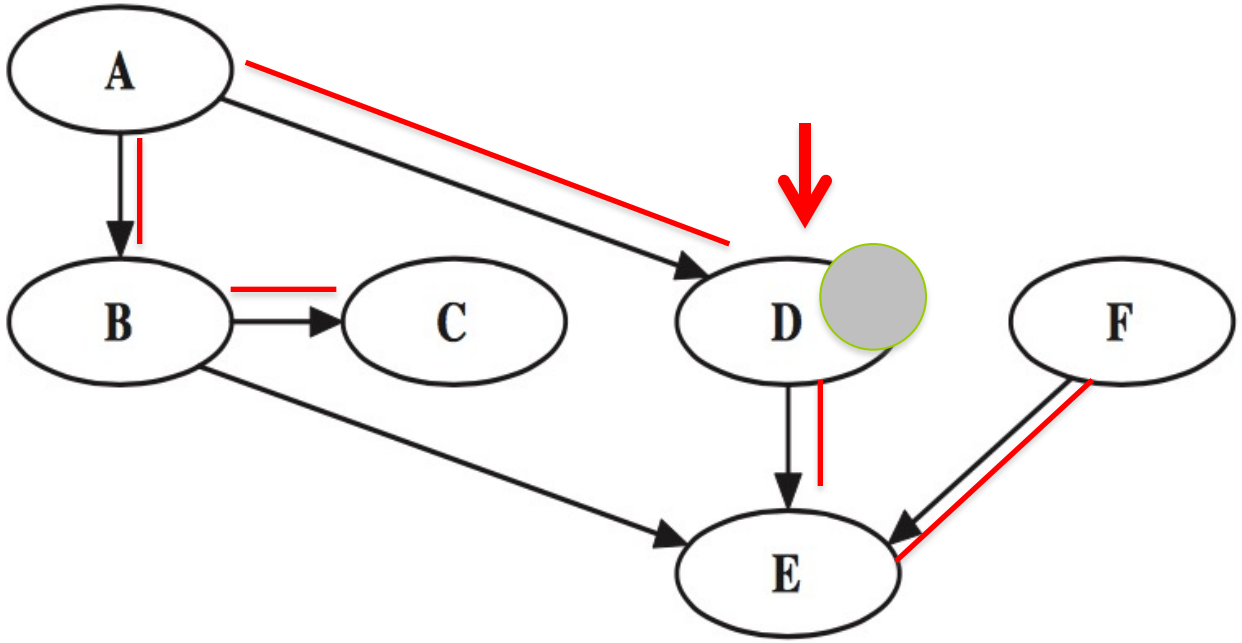

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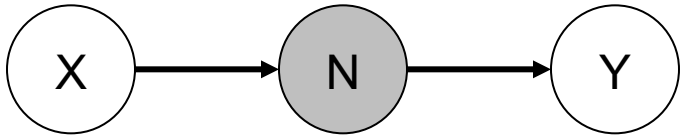
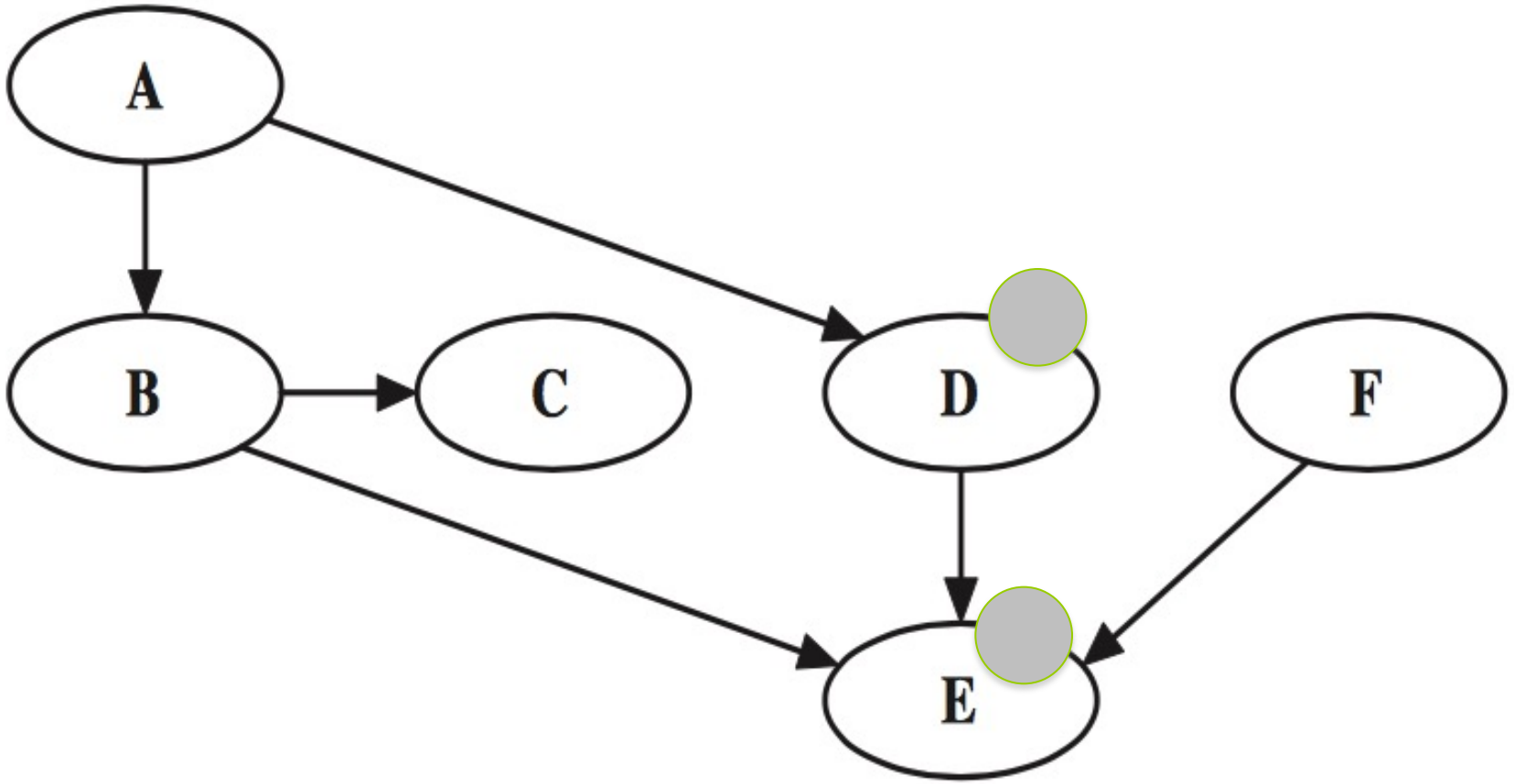
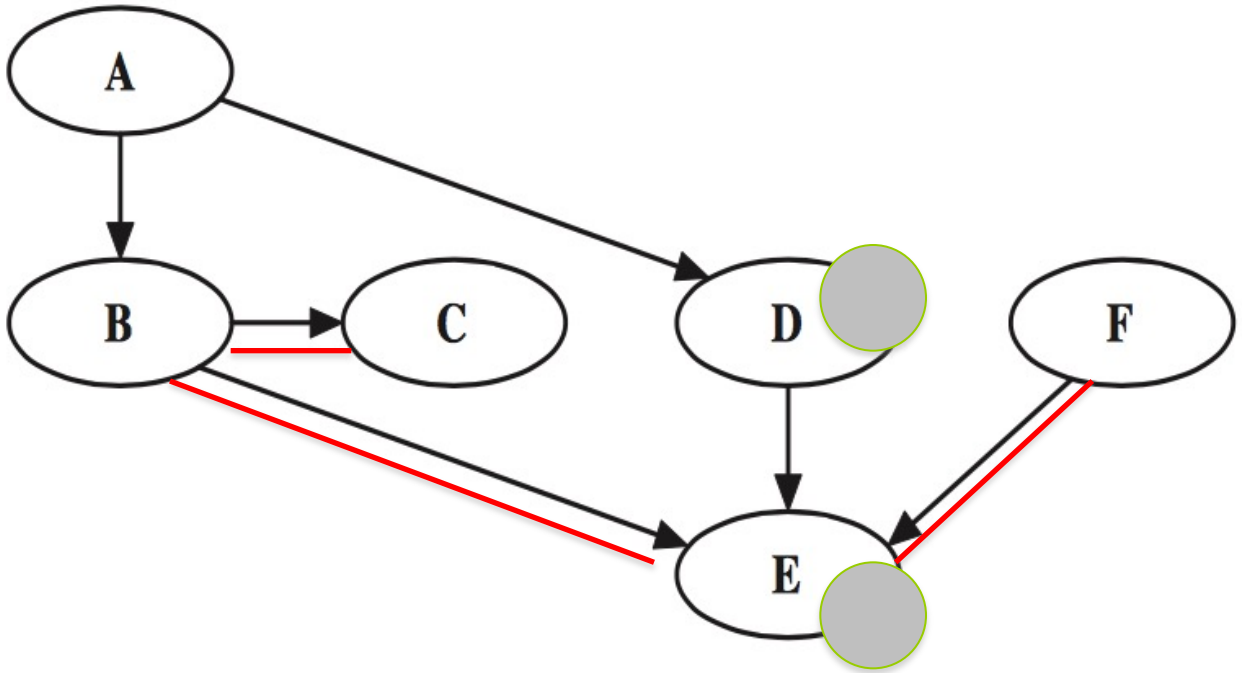


Exercise 2



Does D and E d-separate C and F ?

Exercise

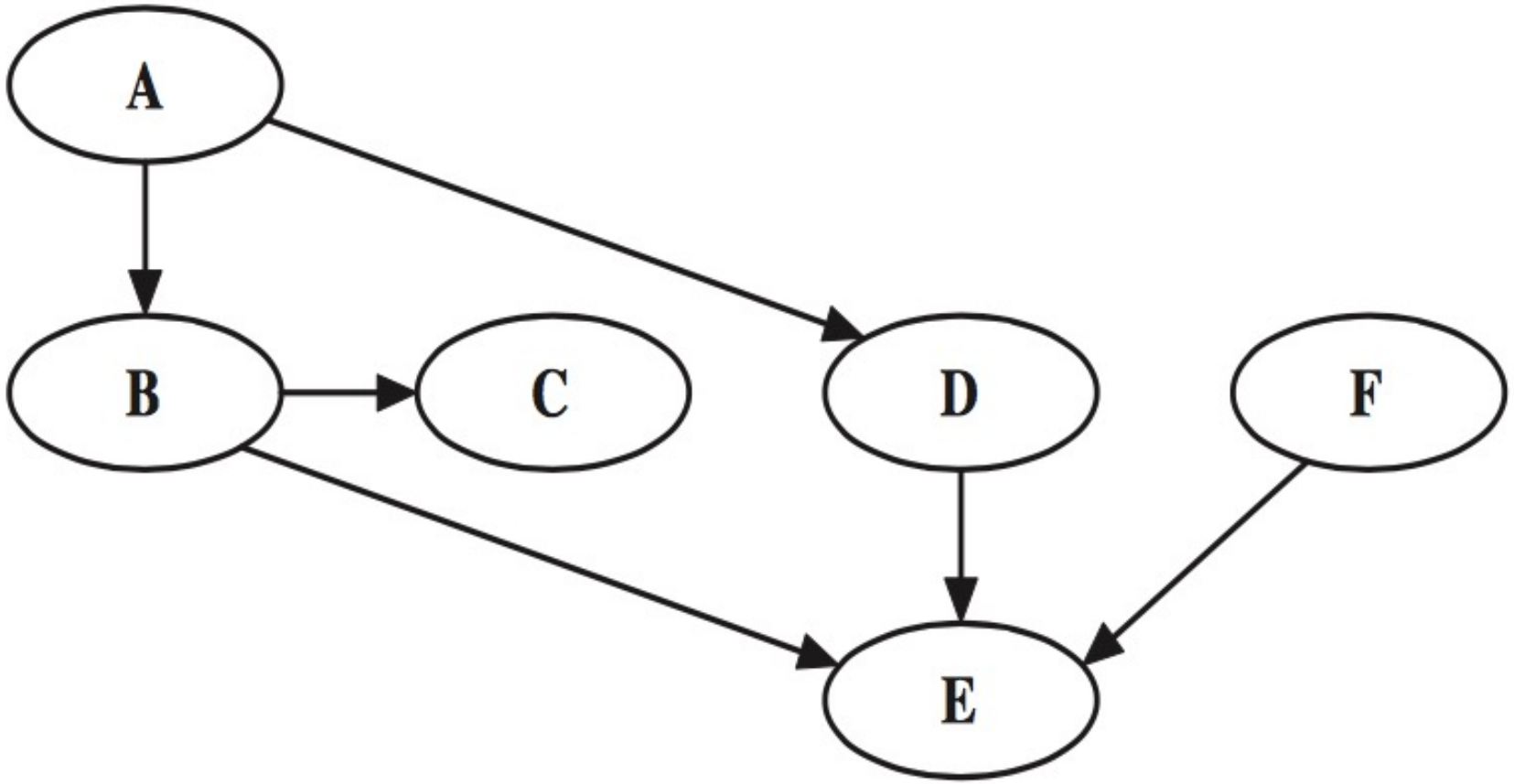


Consider all the possible path from C to F

a)C – B – E – F

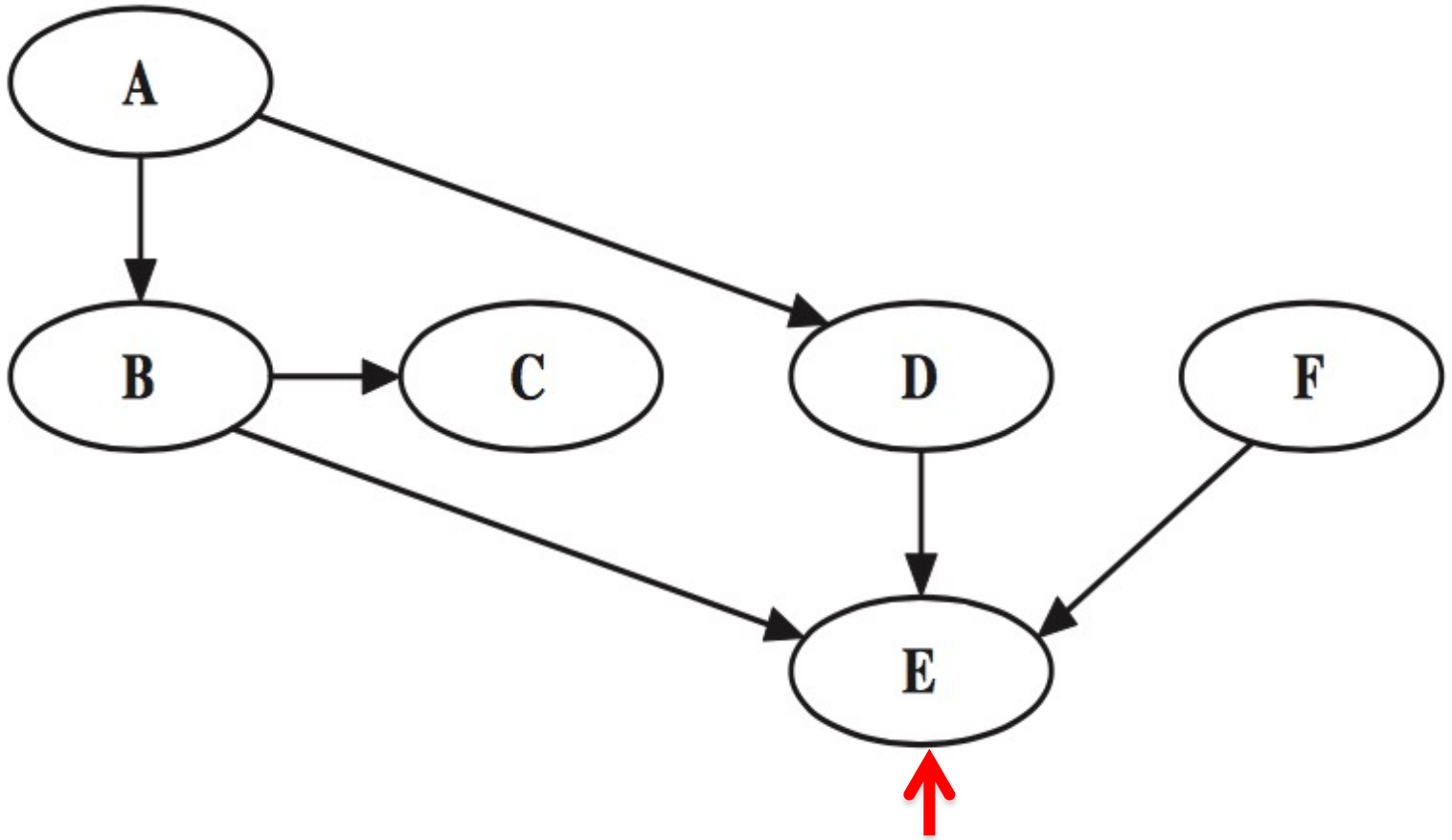
The path is not blocked !!!

Exercise 3



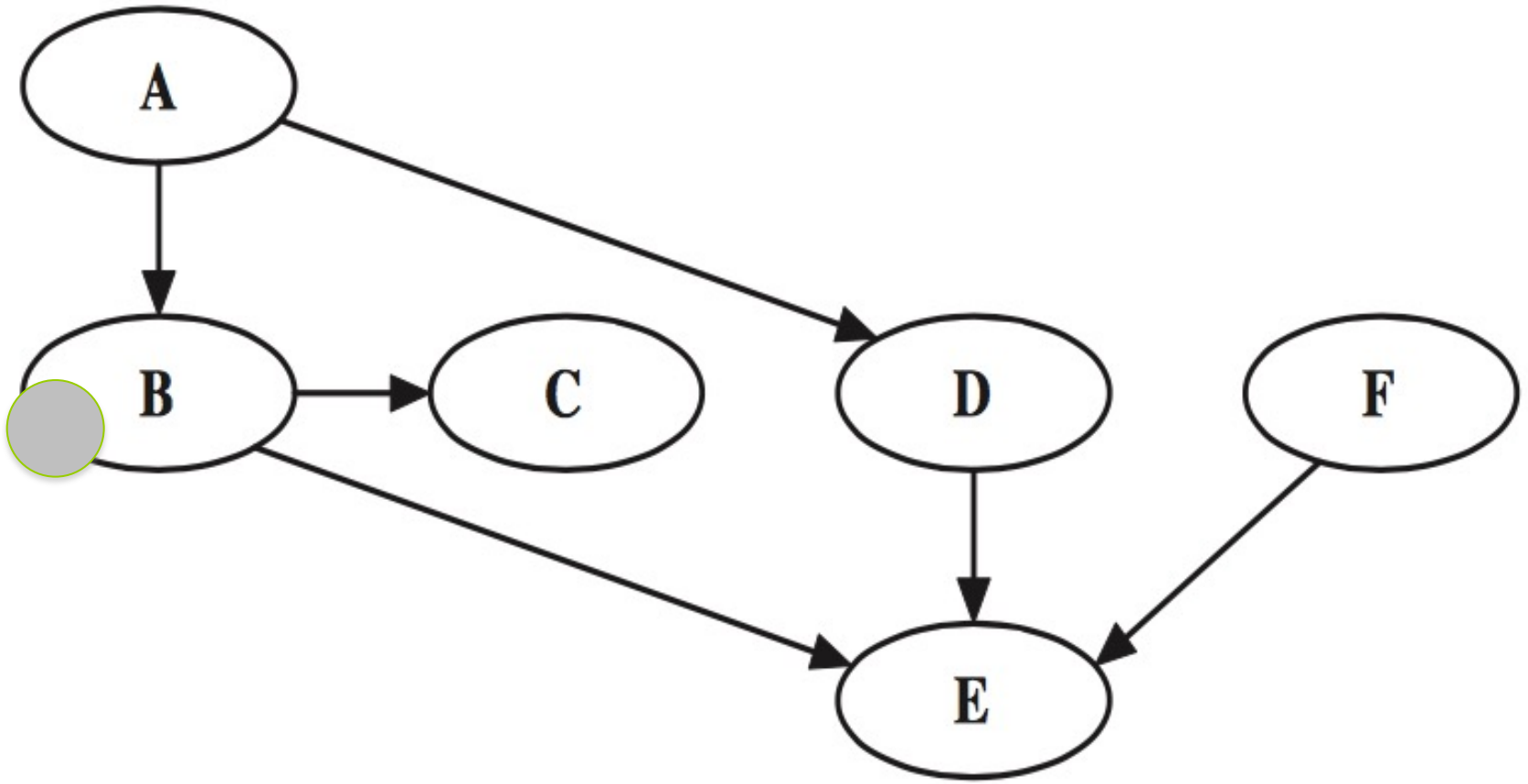
Write all pairs of nodes which are independent of each other

Exercise



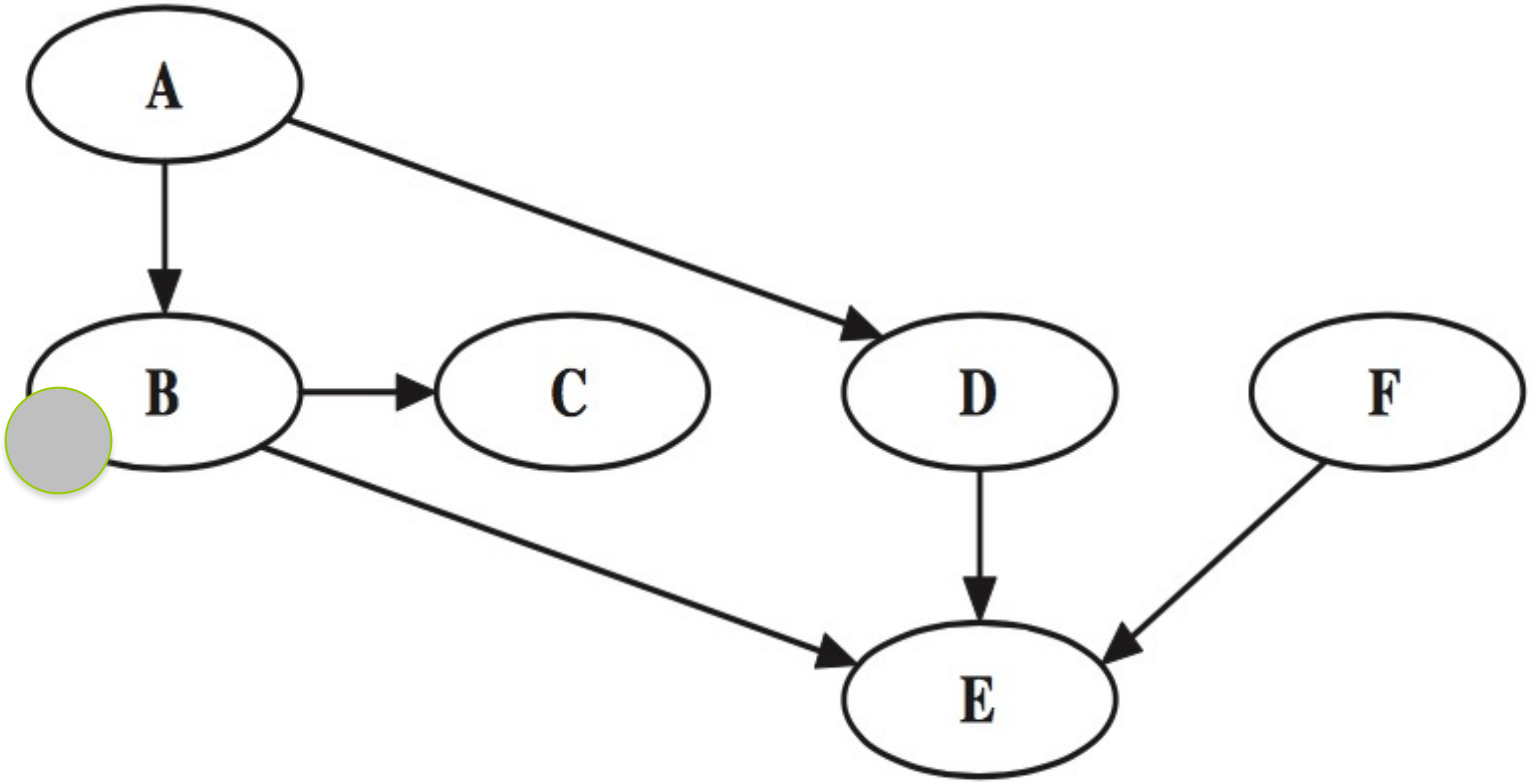
F is d-separated from A, B, C, and D by E

Exercise 4



Which pairs of nodes are independent of each other given B ?

Exercise



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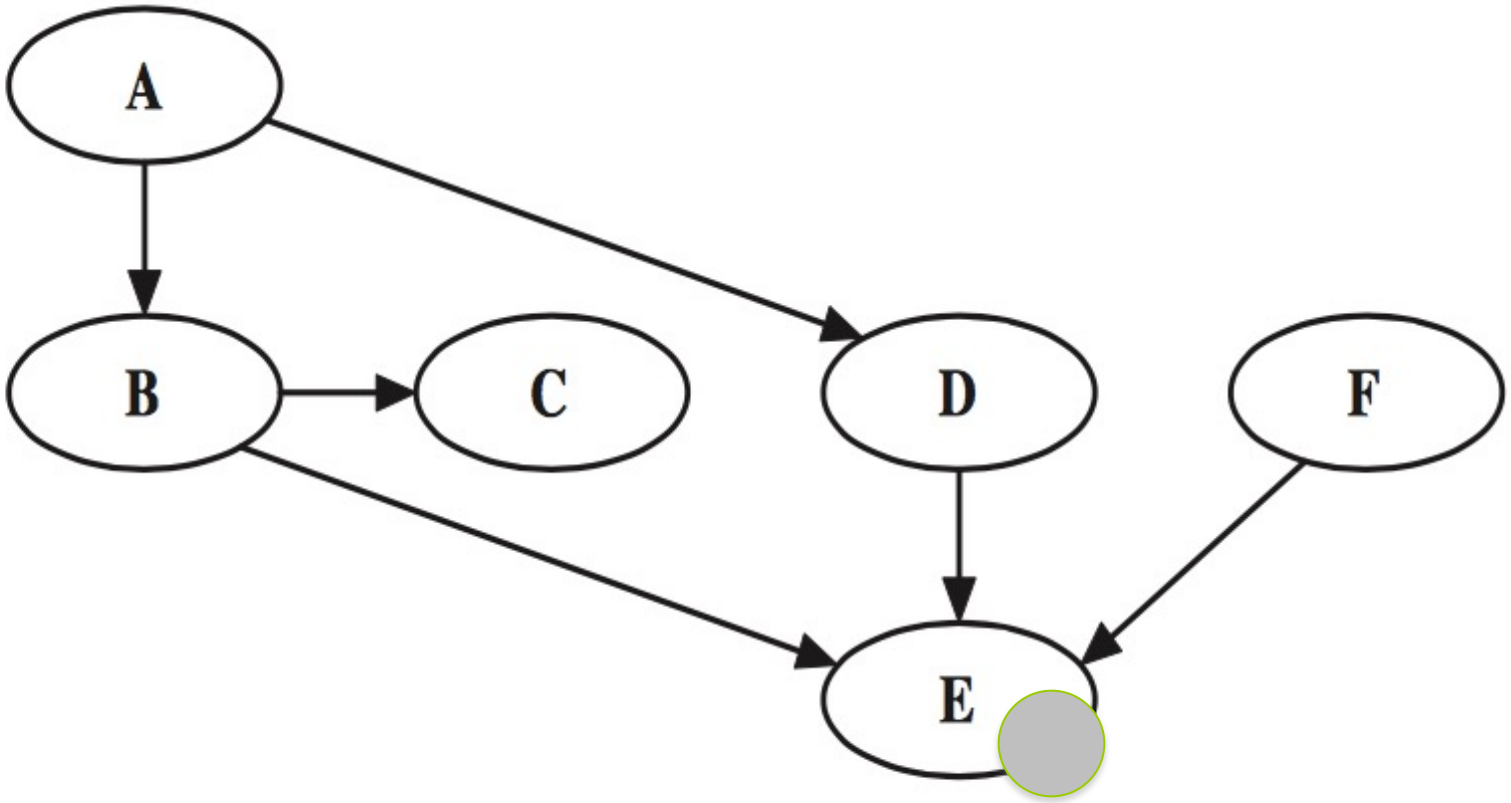
AF, CF, DF, CE, AC, CD

Exercise 5



Do we have that: P (A, F |E) = P (A|E)P (F |E)*?*
(i.e., are A and F independent given E?)

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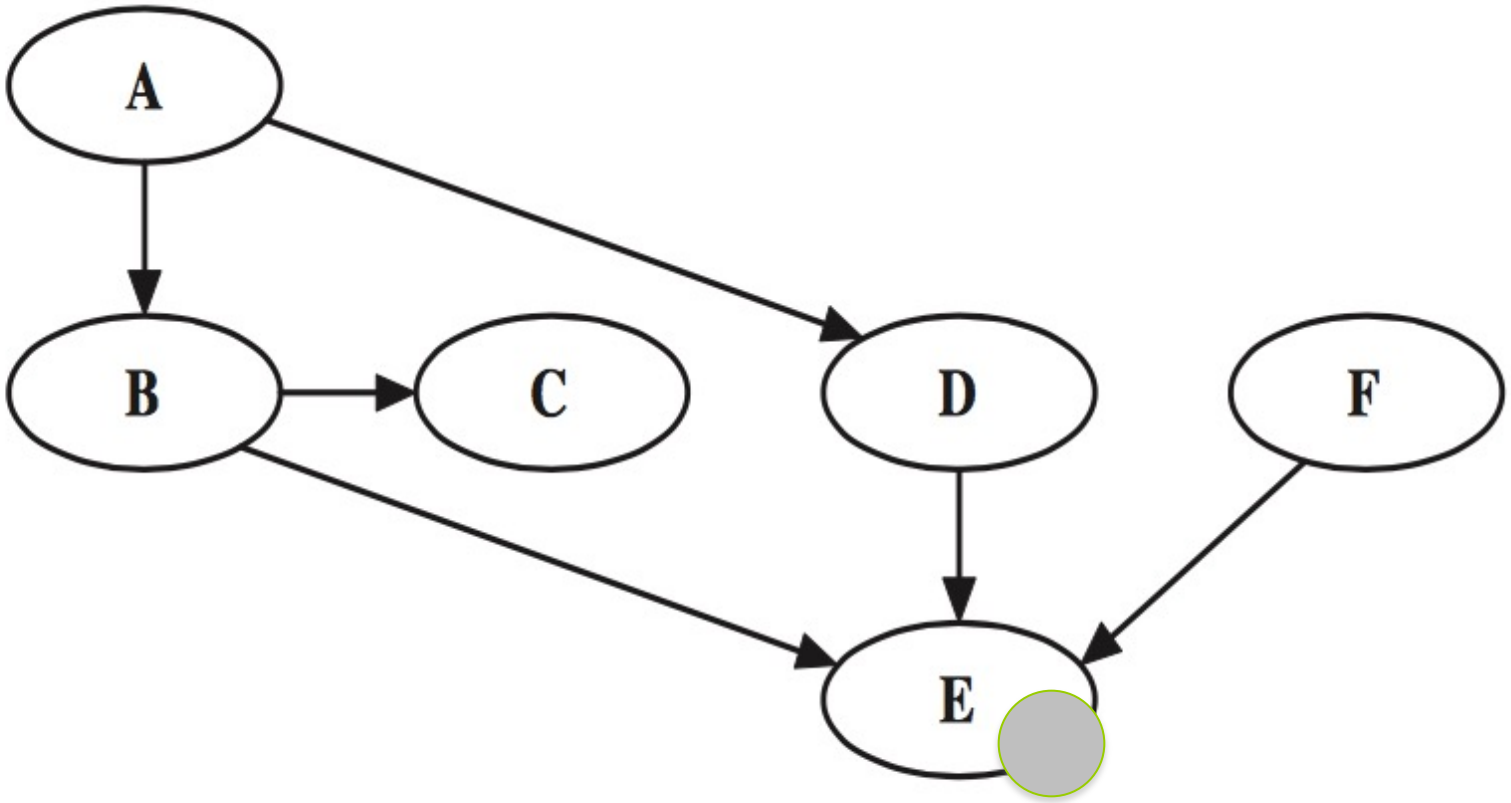

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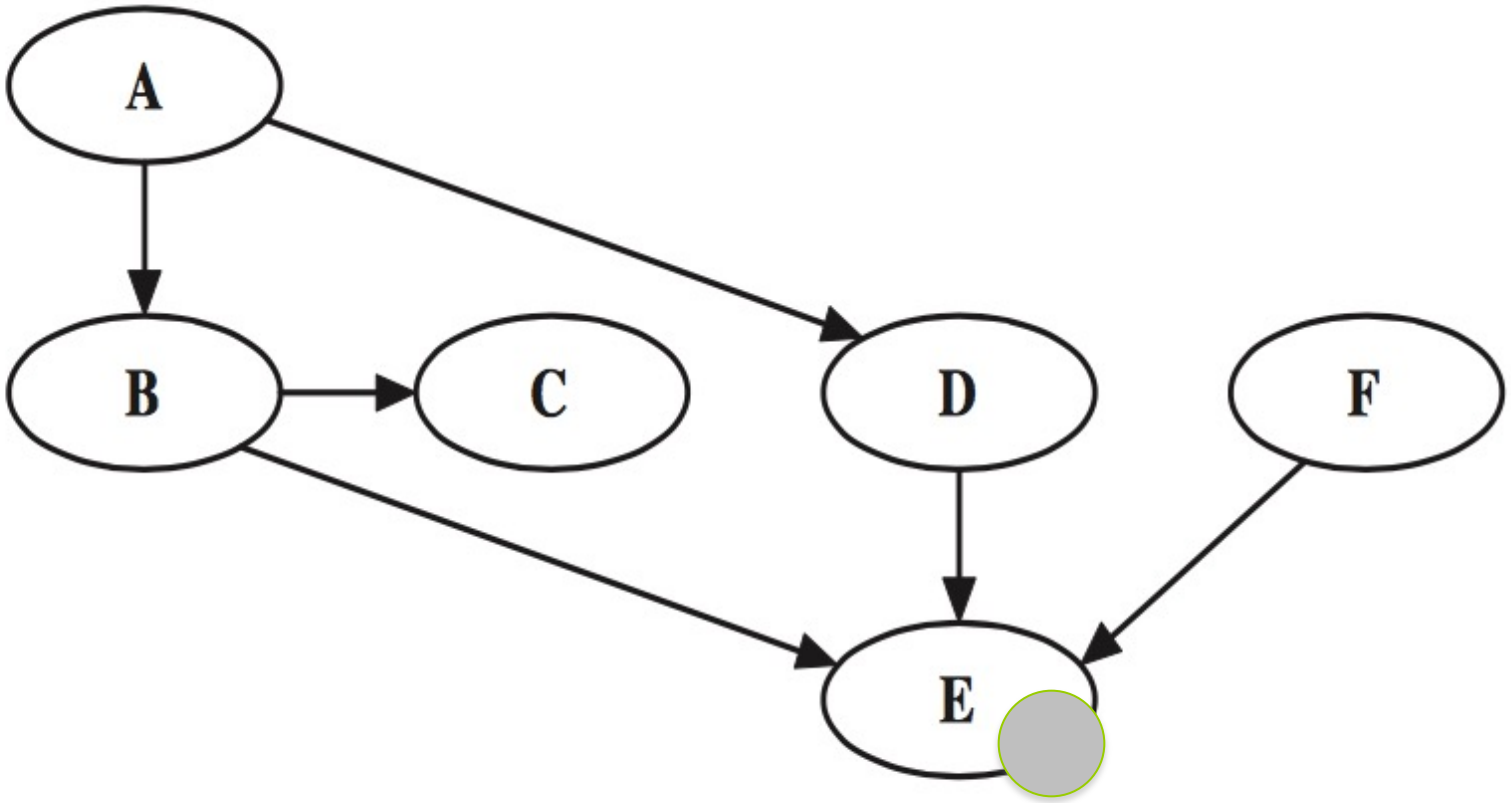

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