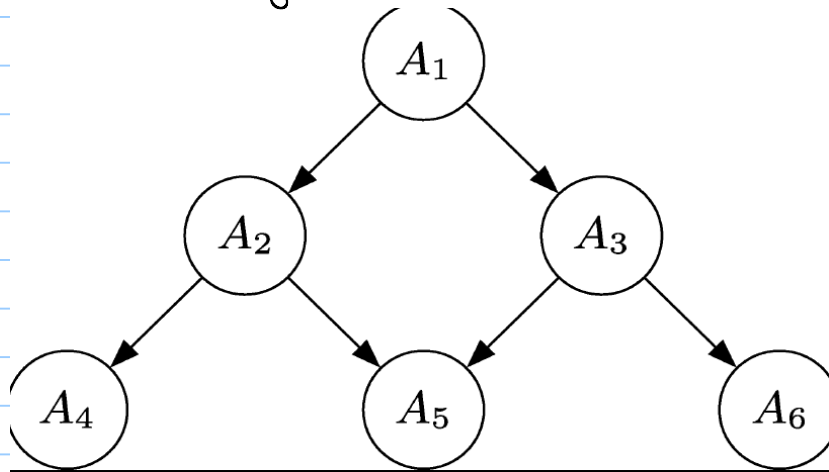
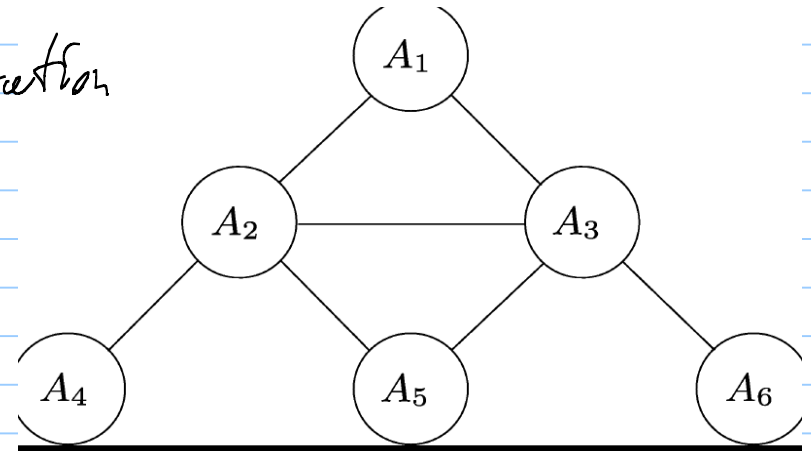
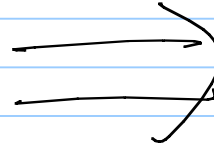


Section 4.4 [507] Propagation in Junction Trees

We distinguish junction tree from join tree.



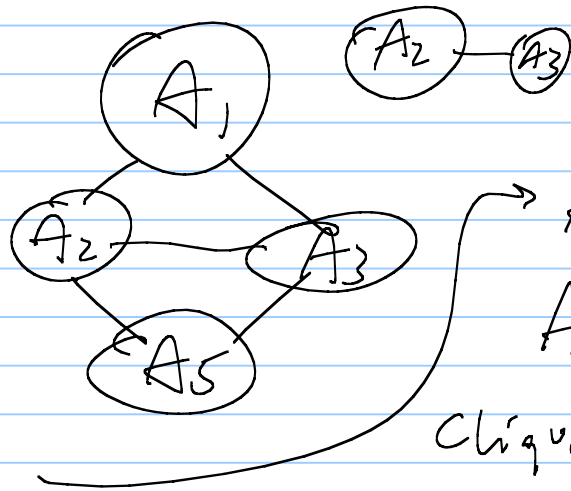
moralization



BN structure

(e DAG)

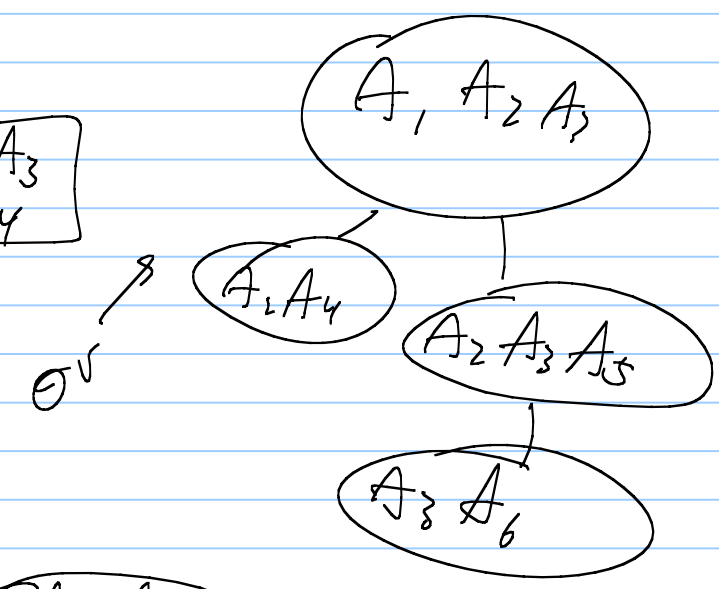
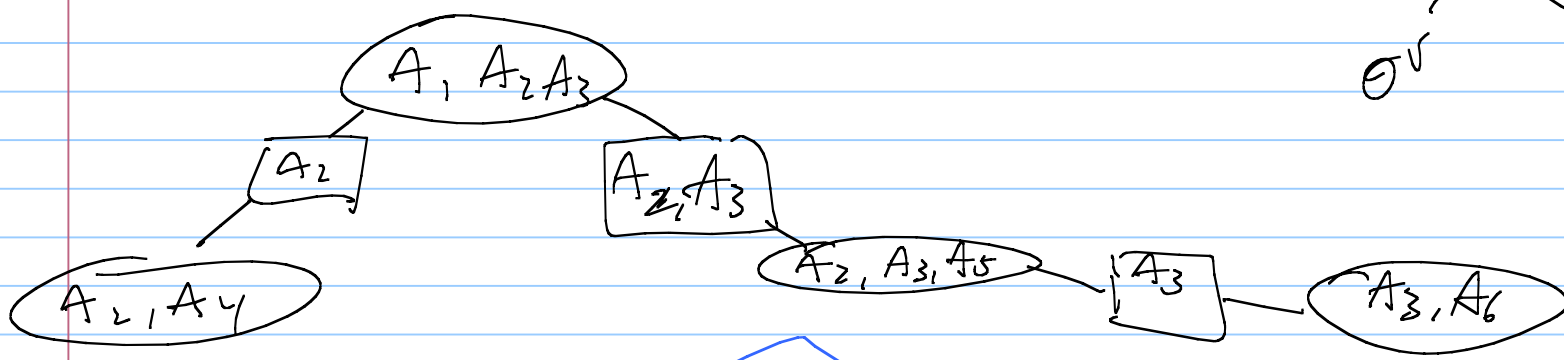
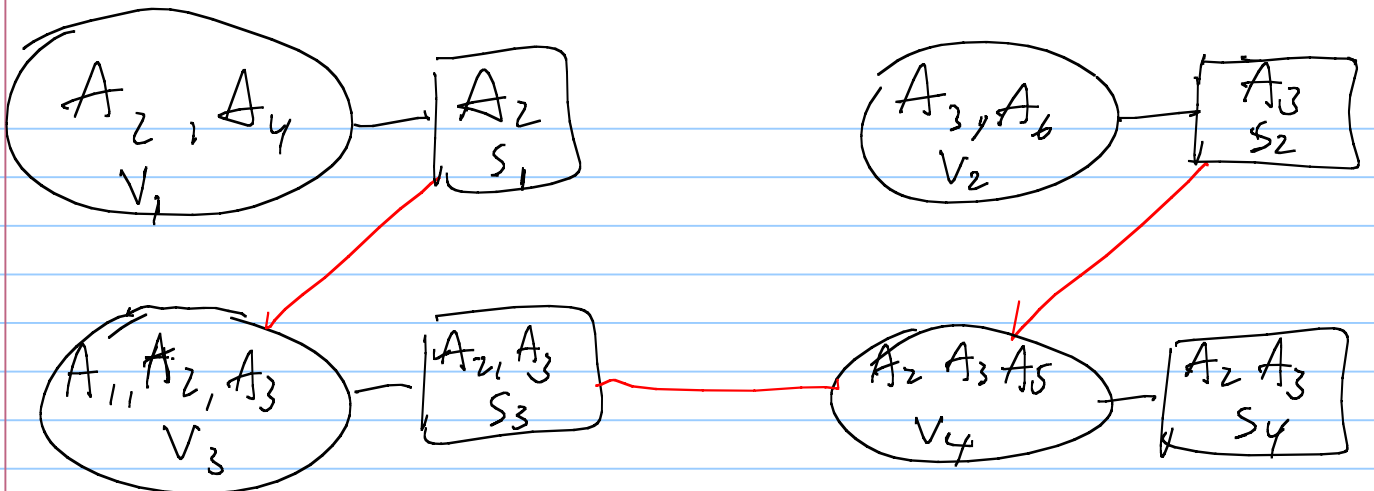
- A_4 $\{A_2, A_4\}$
- A_6 $\{A_3, A_6\}$
- A_1 $\{A_1, A_2, A_3\}$
- A_5 $\{A_2, A_3, A_5\}$



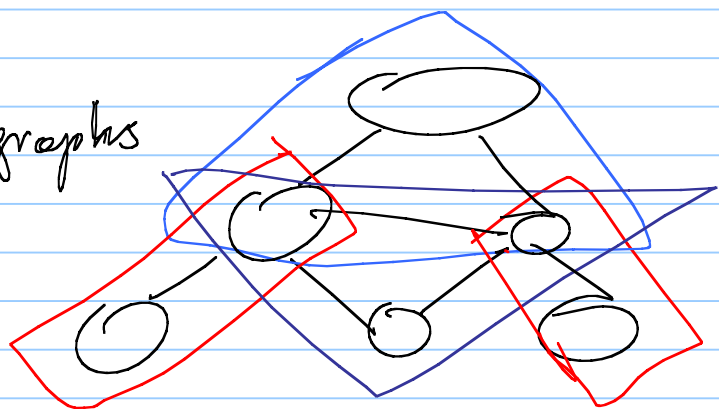
The moral graph of the DAG on the left

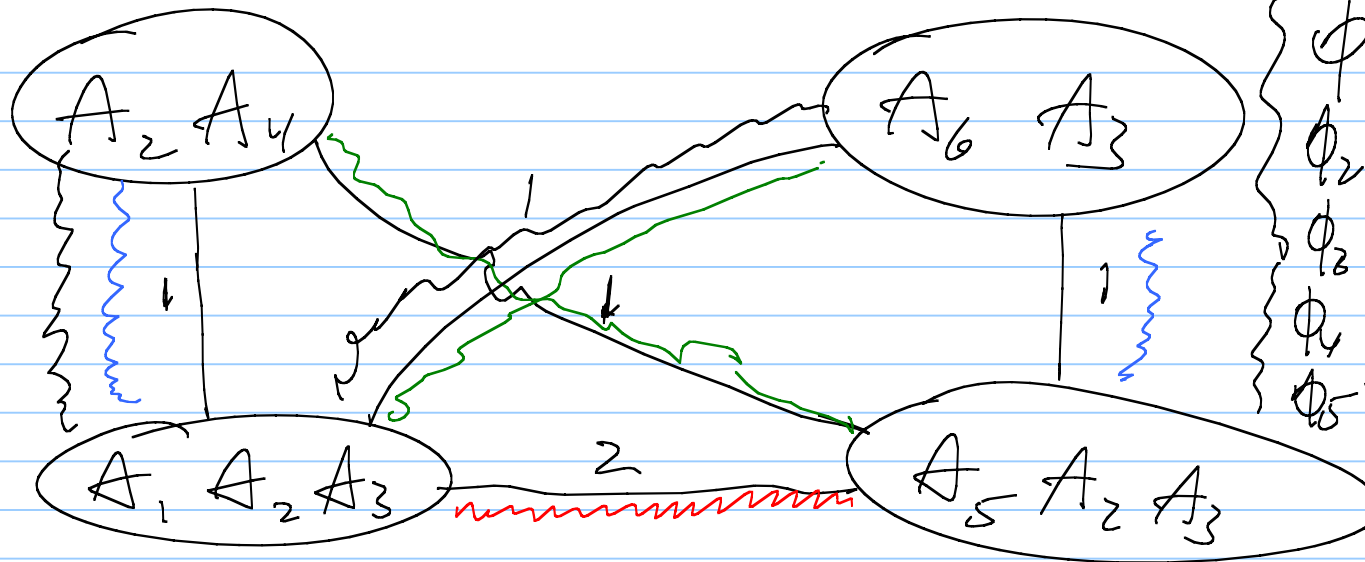
- A_2 ~~$\{A_2, A_3\}$~~
- A_3 ~~$\{A_3\}$~~

Cliques are $\{A_2, A_4\}, \{A_3, A_6\}, \{A_1, A_2, A_3\}, \{A_2, A_3, A_5\}$



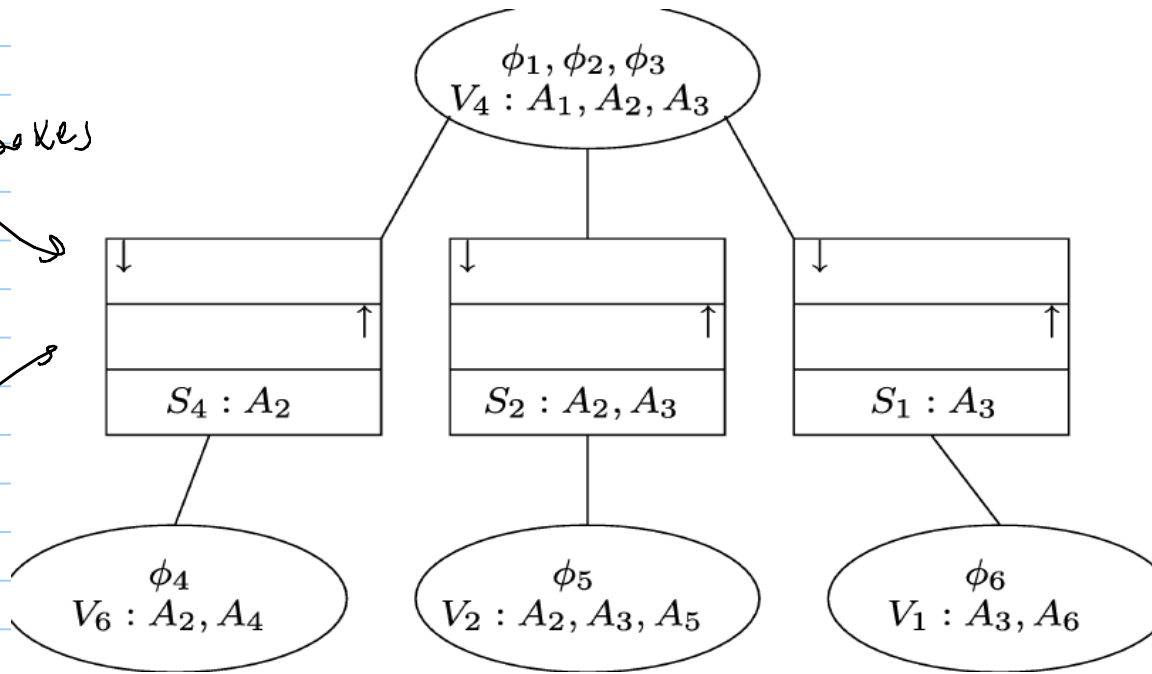
Using hypergraphs





- down
- $\phi_1 = P(A_1) \quad \{A_1\}$
 - $\phi_2 = P(A_2 | A_1) \quad \{A_1, A_2\}$
 - $\phi_3 = P(A_3 | A_1)$
 - $\phi_4 = P(A_4 | A_2)$
 - $\phi_5 = P(A_5 | A_2, A_3)$
 - $\phi_6 = P(A_6, A_3)$

multi-blocks

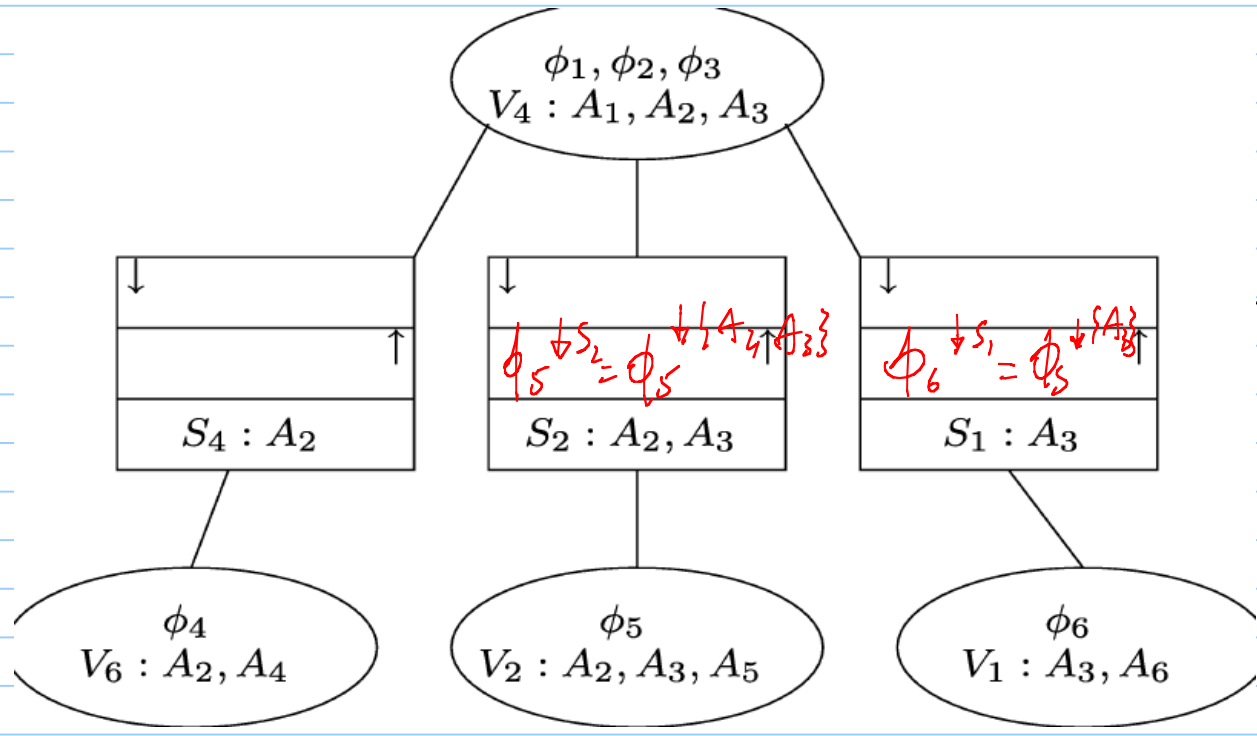


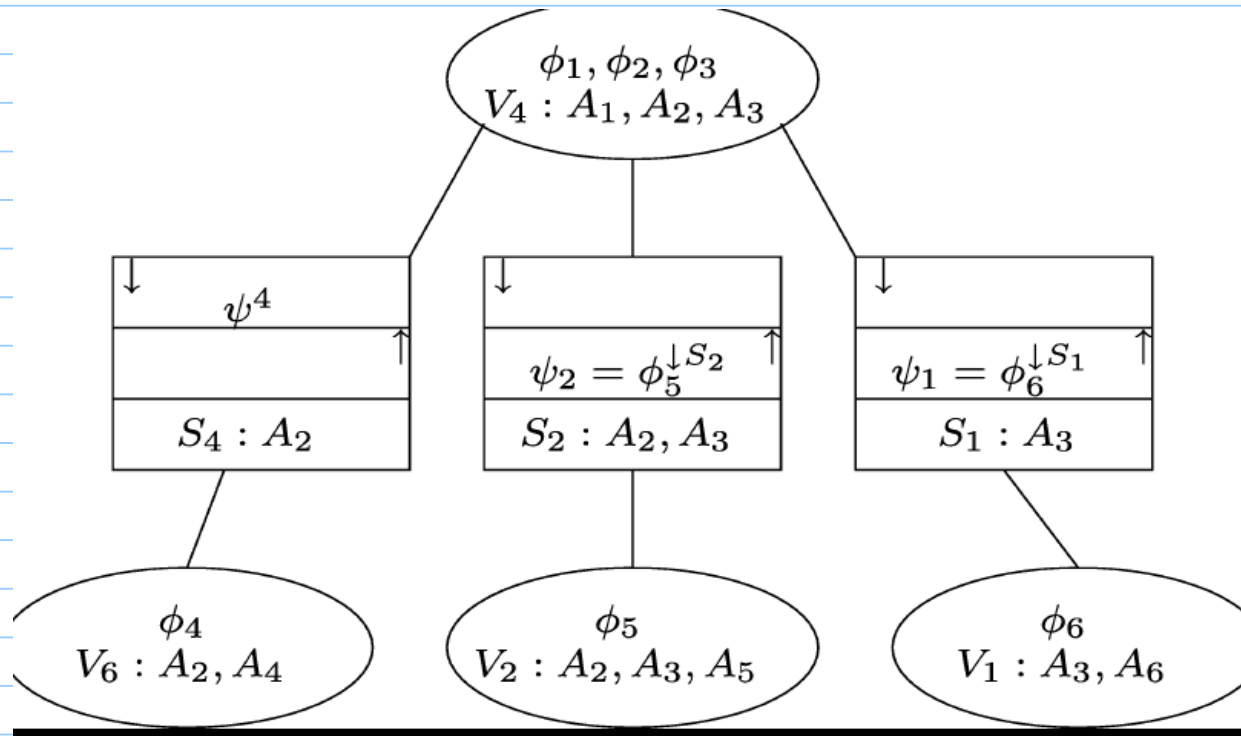
1. The potentials of the BN are assigned to cliques (each potential is assigned to one (only one) clique that contains all its domains)

Ex. compute $P(A_4)$

- set up a node counter by A_4 as a temporary root.

- send messages to the root.





$$\psi_4 = \sum_{A_1} \phi_1 \phi_2 \sum_{A_3} \phi_3 \psi_2 \psi_1$$

