

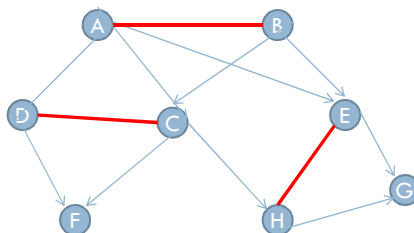
JUNCTION TREE CONSTRUCTION

Practice exercise

Example 1: Junction Tree Construction

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Step 1: Insert link between parents of common child

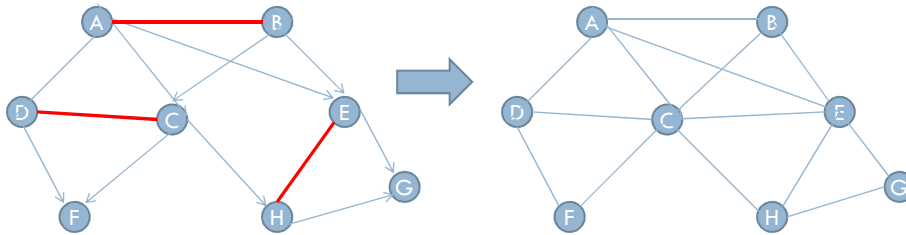


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Example 1: Junction Tree Construction

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Step2: Convert into undirected graph

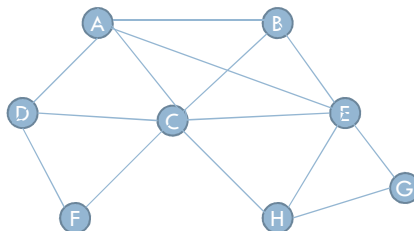


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Example 1: Junction Tree Construction

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Step3: Triangulate a graph if it has circle of length > 3



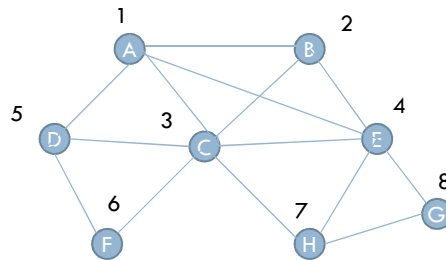
Note : No need of triangulation in this example.

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Example 1: Junction Tree Construction

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Step3: Numbered the node if its numbered neighbored nodes are connected together.



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Example 1: Junction Tree Construction

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Definition:

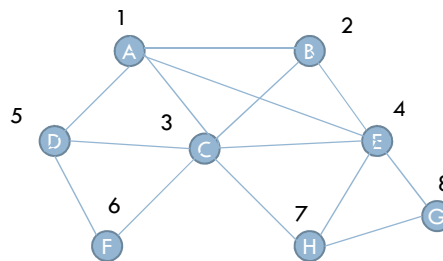
A Clique in a graph is set of adjacent vertices which is a complete graph.

Five cliques are found in Example 1:

- One clique of four nodes
- Four cliques of three nodes

- ABCDE 4
- ACD 5
- CDF 6
- CEH 7
- EHG 8

Step4: Ordered the node by max cardinality search.

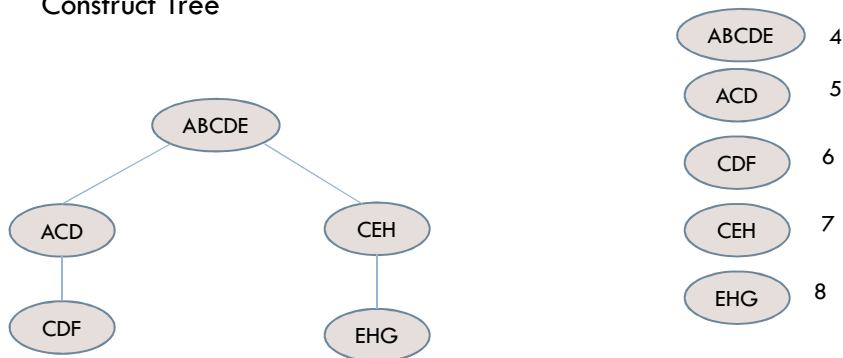


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Example 1: Junction Tree Construction

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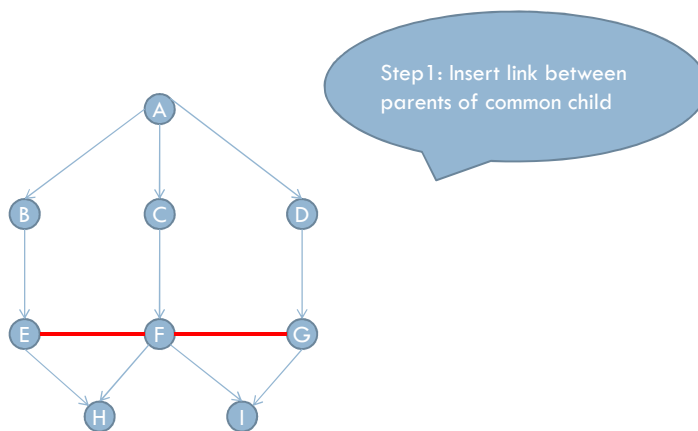
Construct Tree



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Example 2: Junction Tree Construction

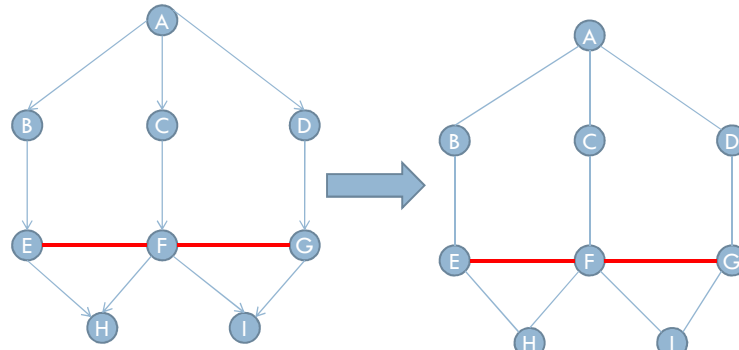
8



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Example 2: Junction Tree Construction

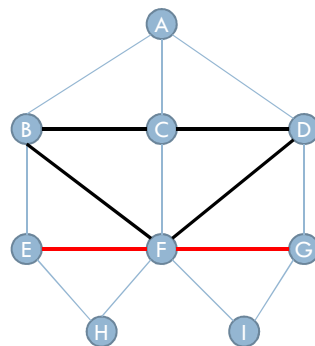
9



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Example 2: Junction Tree Construction

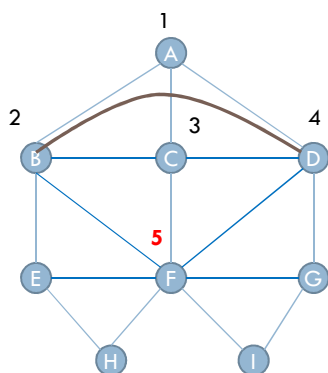
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Example 2: Junction Tree Construction

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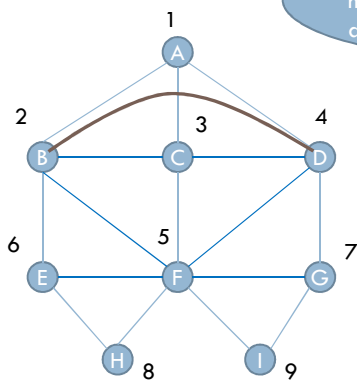
Step3: Numbered the node if its numbered neighbored nodes are connected together.

F has three numbered neighbour B, C and D where B and D are not connected therefore add link between B and D and restart numbering again from beginning.

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Example 2: Junction Tree Construction

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Step3: Numbered the node if its numbered neighbored nodes are connected together.

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Example 2: Junction Tree Construction

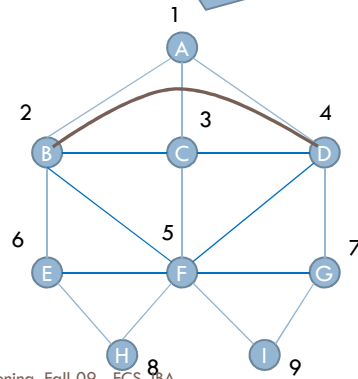
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Five cliques are found in Example 2:
 •Two cliques of four nodes
 •Four cliques of three nodes

Clique Nodes Max Cardinality

ABCD	4
BCDF	5
BEF	6
DFG	7
EFH	8
FGI	9

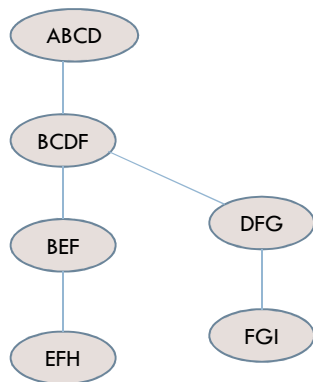
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Example 2: Junction Tree Construction

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Construct Tree

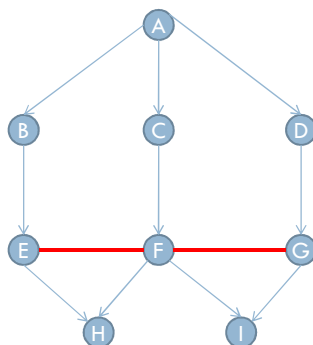


ABCD	4
BCDF	5
BEF	6
DFG	7
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Example 2: Junction Tree Construction (with different triangulation)

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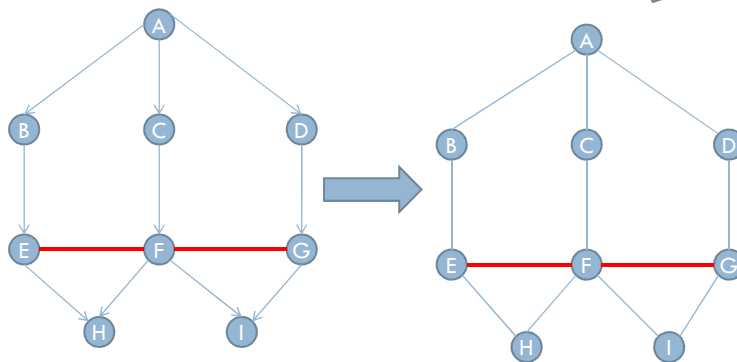


Step 1: Insert link between
parents of common child

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Example 2: Junction Tree Construction

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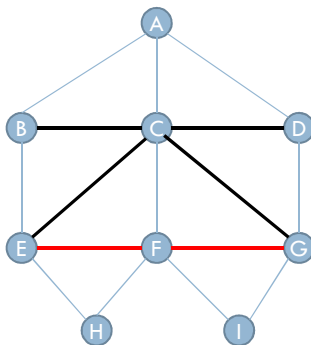
Step 2: Convert into
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Example 2: Junction Tree Construction

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Step3: Triangulate a graph if it has circle of length > 3

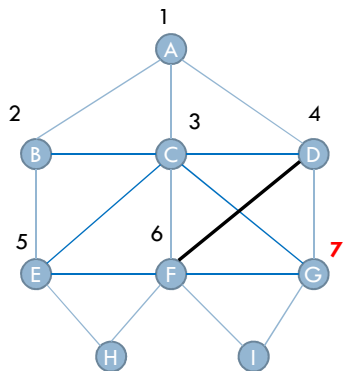


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Example 2: Junction Tree Construction

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Step3: Numbered the node if its numbered neighbored nodes are connected together.

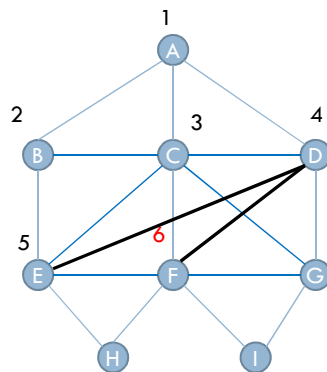


G has three numbered neighbour F, C and D where F and D are not connected therefore add link between F and D and restart numbering again from beginning.

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Example 2: Junction Tree Construction

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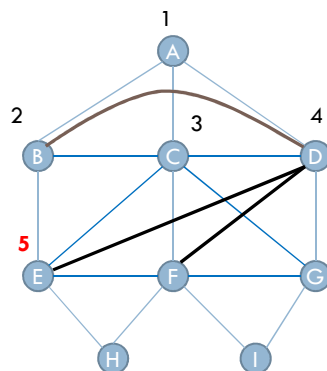
Step3: Numbered the node if its numbered neighbored nodes are connected together.

F has three numbered neighbour E, C and D where E and D are not connected therefore add link between E and D and restart numbering again from beginning.

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Example 2: Junction Tree Construction

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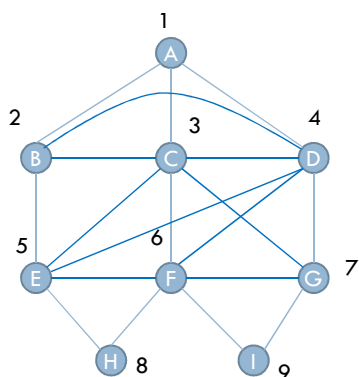
Step3: Numbered the node if its numbered neighbored nodes are connected together.

E has three numbered neighbour B, C and D where B and D are not connected therefore add link between B and D and restart numbering again from beginning.

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Example 2: Junction Tree Construction

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Step3: Numbered the node if its numbered neighbored nodes are connected together.

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Example 2: Junction Tree Construction

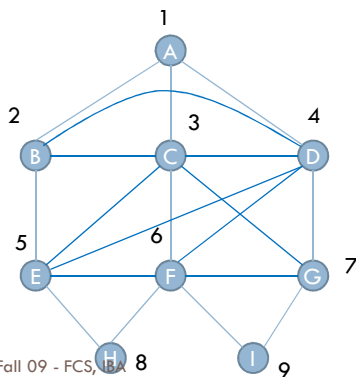
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Cliques are found in Example 2:

Clique Nodes Max Cardinality

ABCD	4
BCDE	5
CDEF	6
CDGF	7
EFH	8
FGI	9

Step4: Ordered the node by max cardinality search.

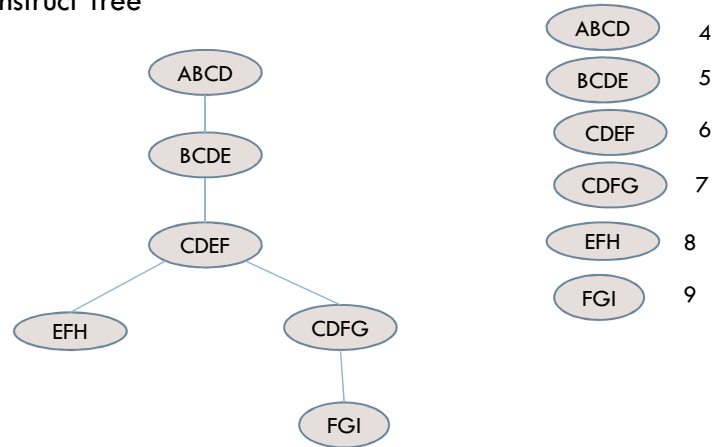


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Example 2: Junction Tree Construction

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Construct Tree



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