

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

Mathematics for Computer Science  
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# Spanning Trees



Albert R Meyer, October 31, 2015

spanning.1

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

## Spanning Subgraphs

A **spanning subgraph** of graph  $G$  is a subgraph that has all the vertices of  $G$ .



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spanning.2

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

## Spanning Subgraphs

A **spanning subgraph** of graph  $G$  is a subgraph that has all the vertices of  $G$ . A **spanning tree** is a spanning subgraph that is a tree.

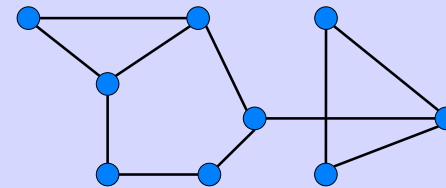


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spanning.3

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

## Spanning Trees

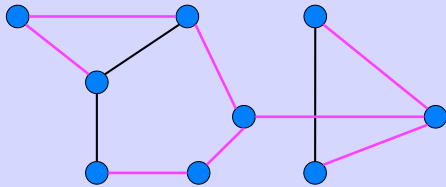


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spanning.4

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

## Spanning Trees



a spanning tree

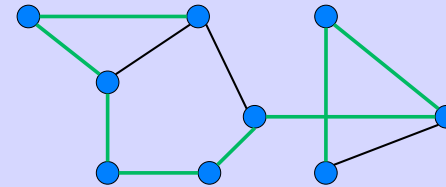


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spanning.5

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

## Spanning Trees



another spanning tree  
(can have many)



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spanning.6

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

## Spanning Trees

Lemma:  $G$  connected implies  
 $G$  has a spanning tree

Pf: Namely, any minimum edge  
connected spanning graph.



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spanning.7