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Network Analysis: The network

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- ✓Network Science and Complexity
- ✓Network Concept and Model
- ✓Node Degree
- ✓Other metrics of Node Centrality

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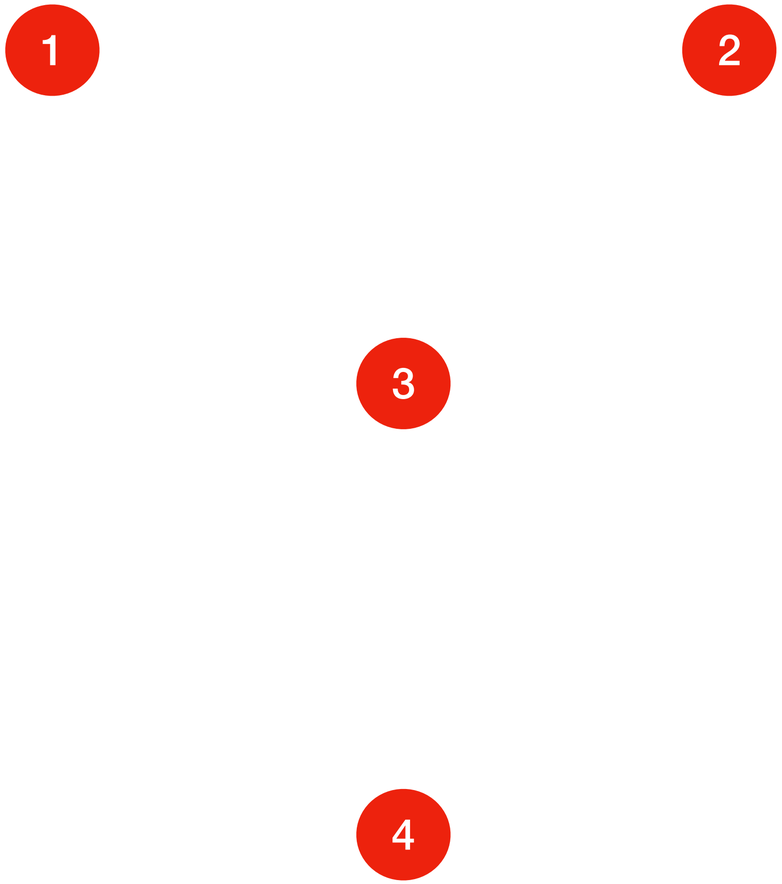
Concept of a network: nodes



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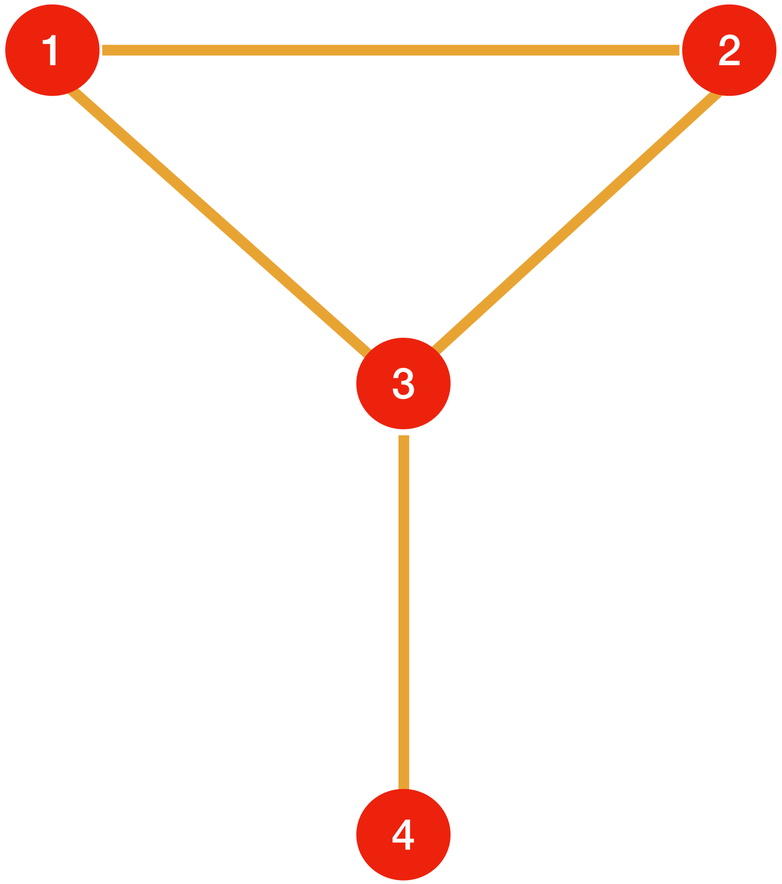
Concept of a network: edges



$$G = (N, E)$$

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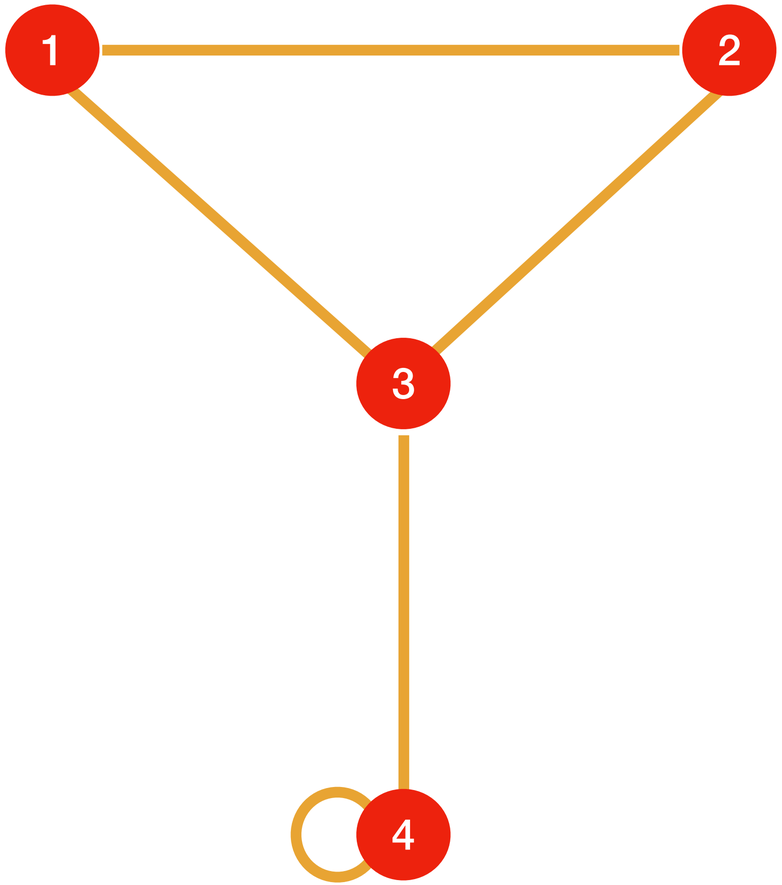
Loop edges



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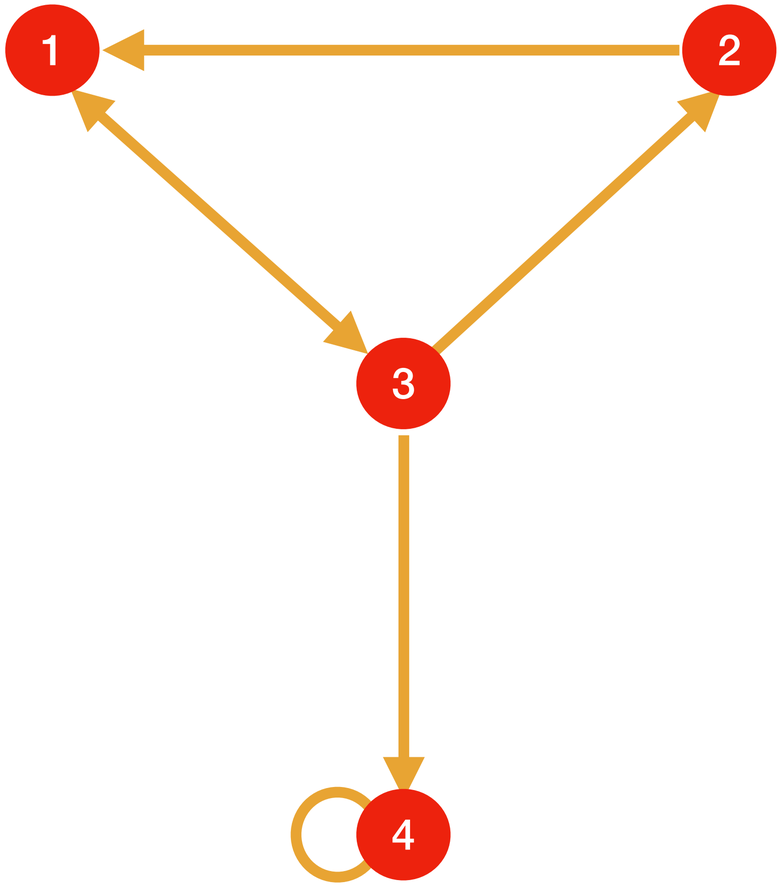
Directed network



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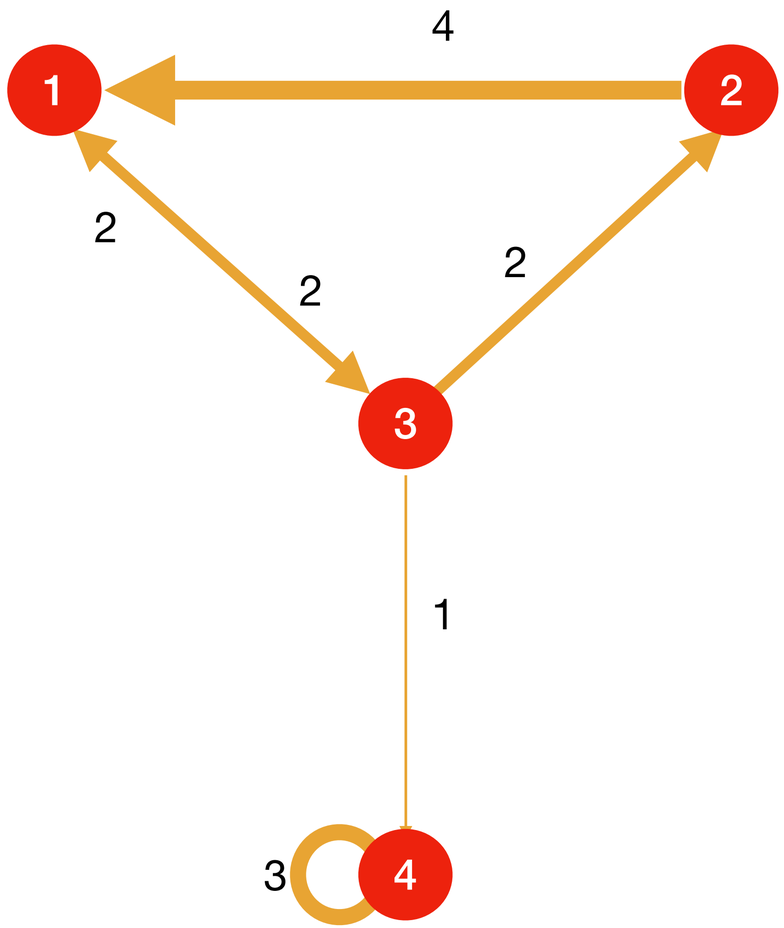
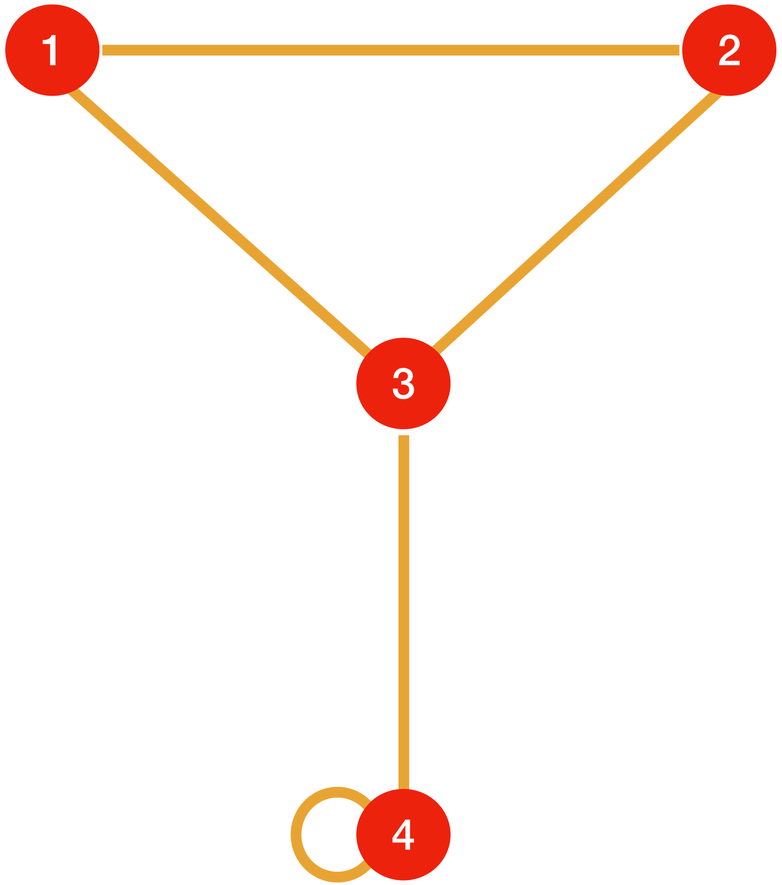
Weighted network



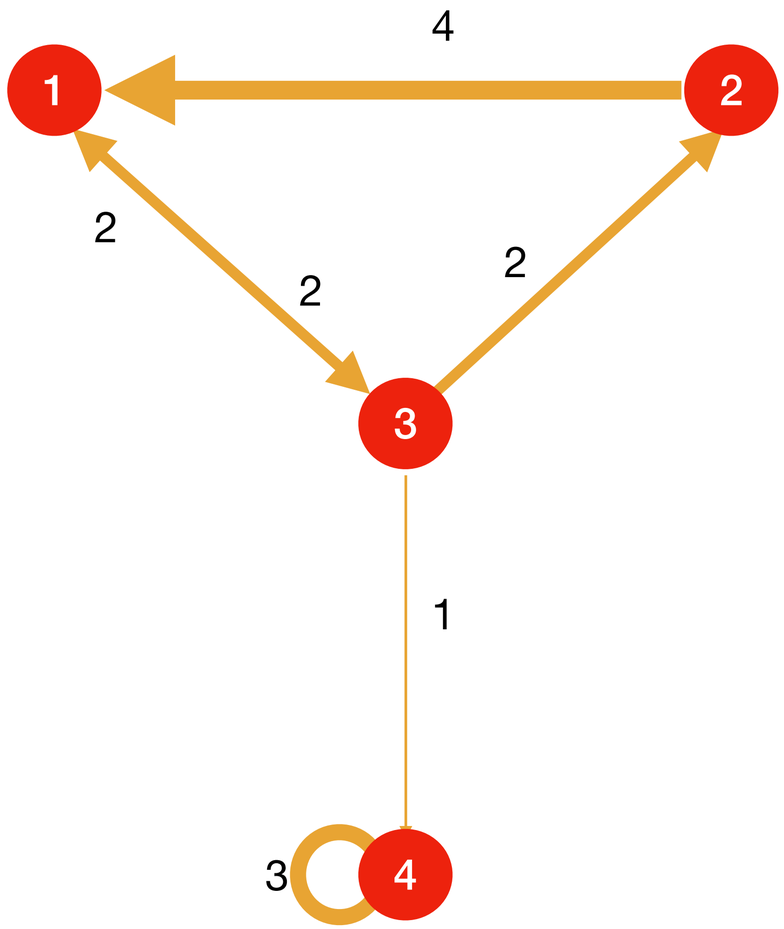
Numeric representation



O	D
1	2
1	3
2	2
3	4
4	4

	1	2	3	4
1	0	1	1	0
2	1	0	1	0
3	1	1	0	1
4	0	0	1	1

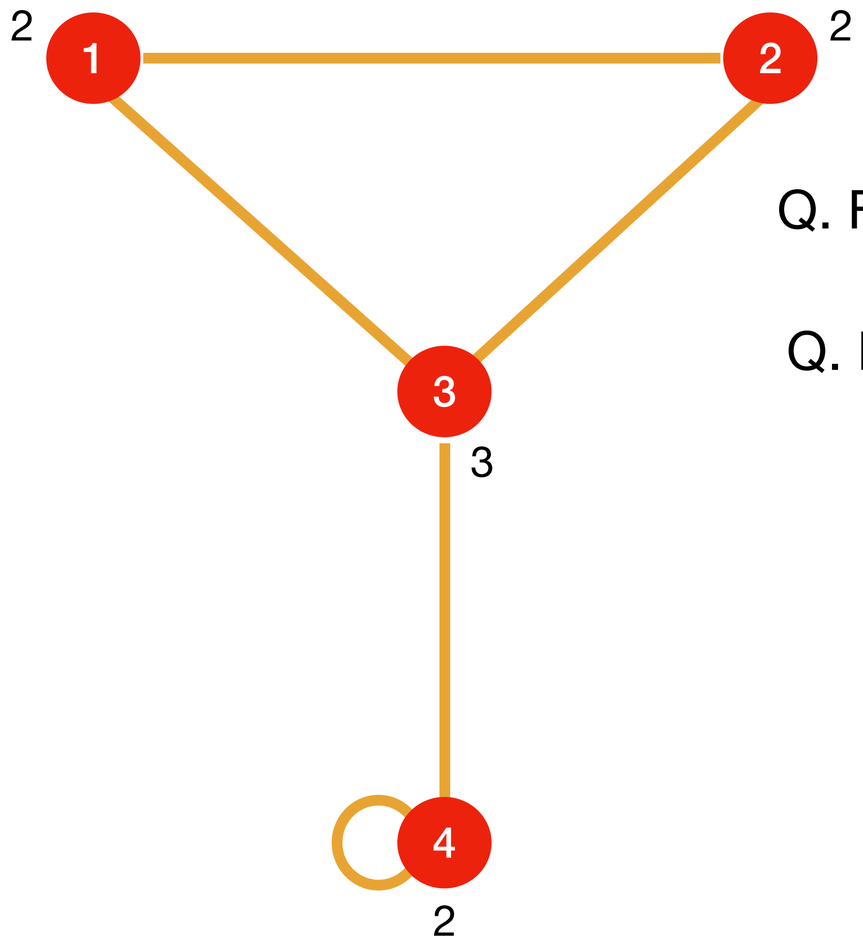
Concept of a network



O	D	W
2	1	4
1	3	2
3	1	2
3	2	2
3	4	1
4	4	3

	1	2	3	4
1	0	0	2	0
2	4	0	0	0
3	2	2	0	1
4	0	0	0	3

Node degree

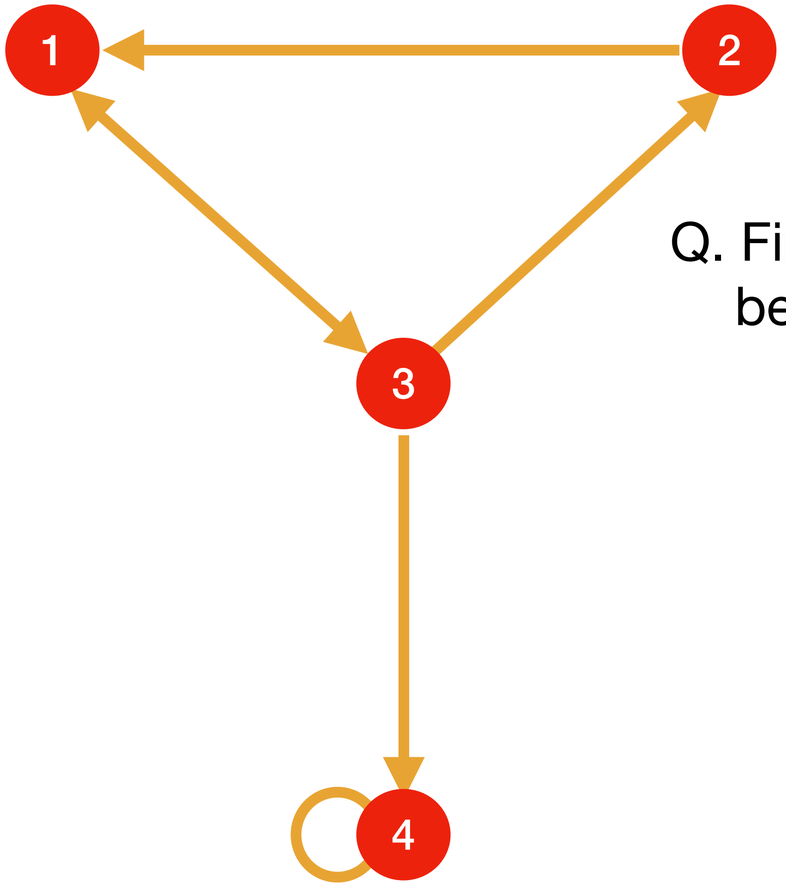


Q. Find the node(s) with the highest degree?

Q. Find the node(s) with the lowest degree?

	1	2	3	4	D
1	0	1	1	0	2
2	1	0	1	0	2
3	1	1	0	1	3
4	0	0	1	1	2

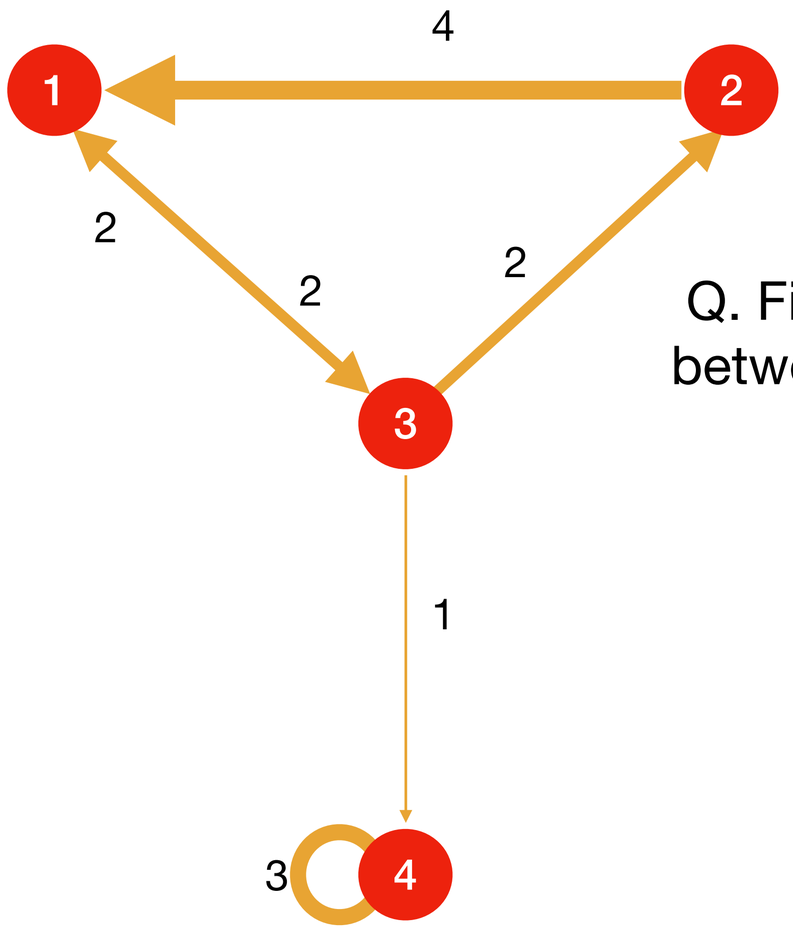
Directed network: node in/out degree



Q. Find the node(s) with the highest imbalance between incoming and outgoing degree?

	1	2	3	4	Out
1	0	0	1	0	1
2	1	0	0	0	1
3	1	1	0	1	3
4	0	0	0	1	1
In	2	1	1	2	6

Weighted network: node strength



Q. Find the node(s) with the highest imbalance between incoming and outgoing weighted node strength?

	1	2	3	4	Out
1	0	0	2	0	2
2	4	0	0	0	4
3	2	2	0	1	5
4	0	0	0	3	3
In	6	2	2	4	14