Network Algorithm UE709

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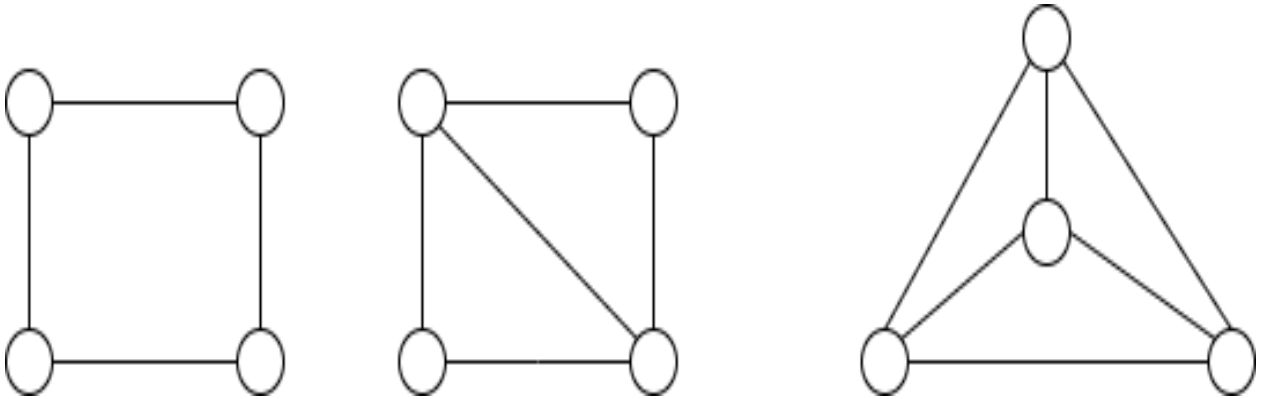
Exercises

How many different trees wre there with 5 vertices ? with 6 vertices ? with 7 vertices?

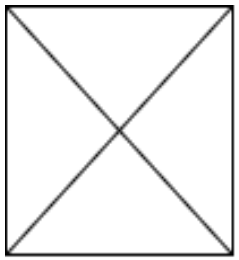
Exercises

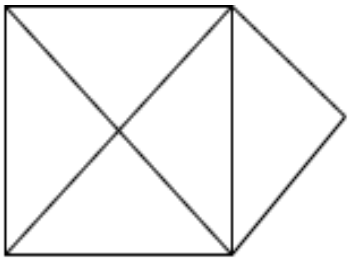
How many different spanning Trees do we have in these Graphs ?

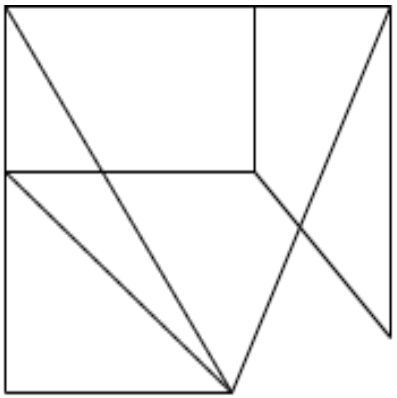


Exercises

Is it possible to draw the following figures without lifting the pencil ? and without passing twice over the same edge ! Why ?







Such plots are possible if the corresponding graph admits an Eulerian path. That is to say if it contains exactly 0 or 2 vertices of odd degree. The answer is therefore positive only for the second figure.

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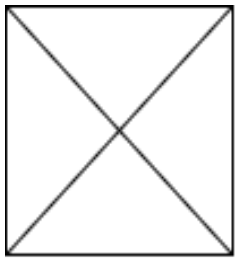

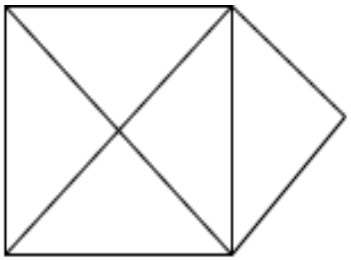

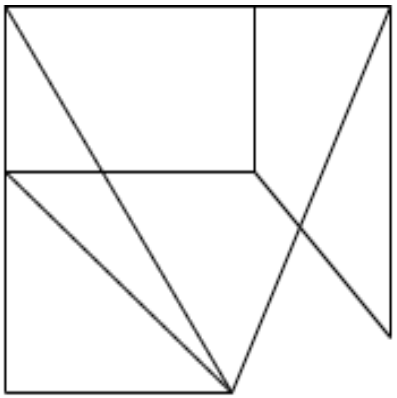

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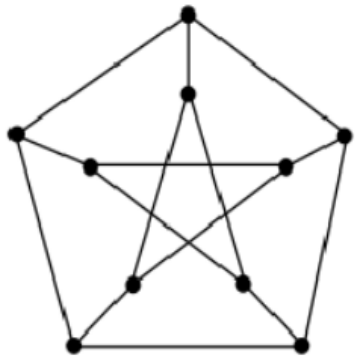
By passing once and only through each of the nodes and returning to its starting point?
Without necessarily going beck to where it strated?



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We can however find a Hamiltonian Path, as shown in the new figure.

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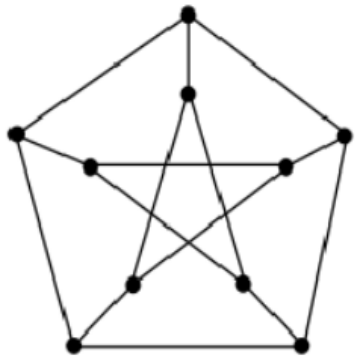

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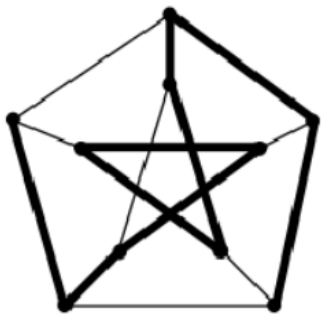

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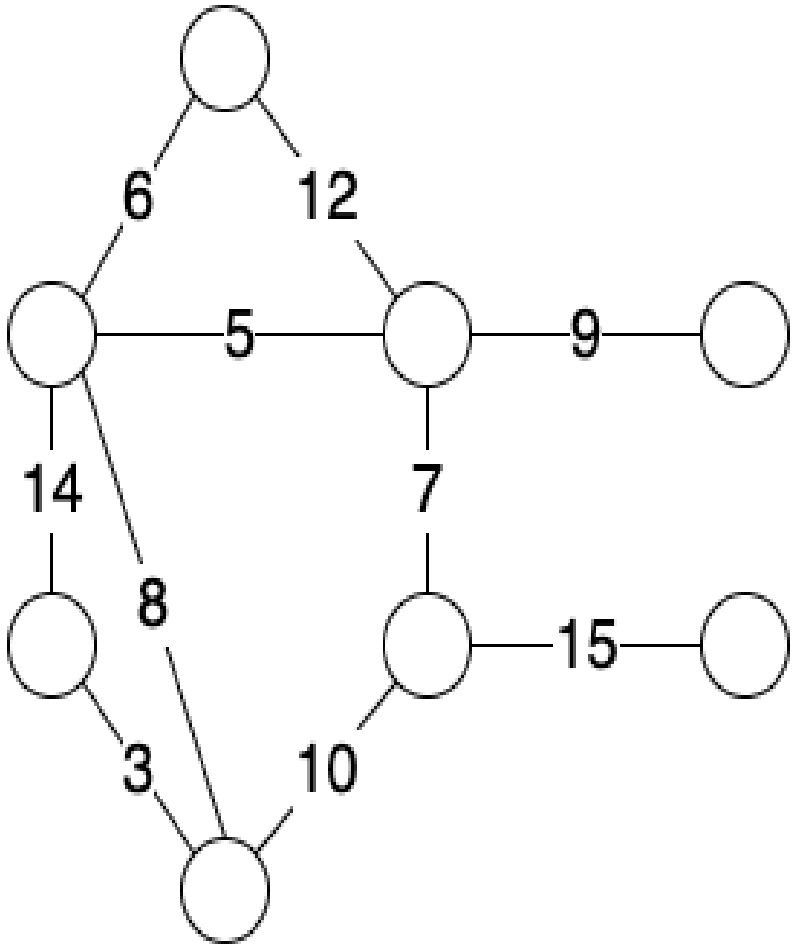
Exercises

Minimum Spanning Tree (MST): subset of edges of an edge-weighted graph that connects all the vertices together, without any cycles and with the minimum possible total edge weight.

- PRIM
- KRUSKAL

MST: Kruskal



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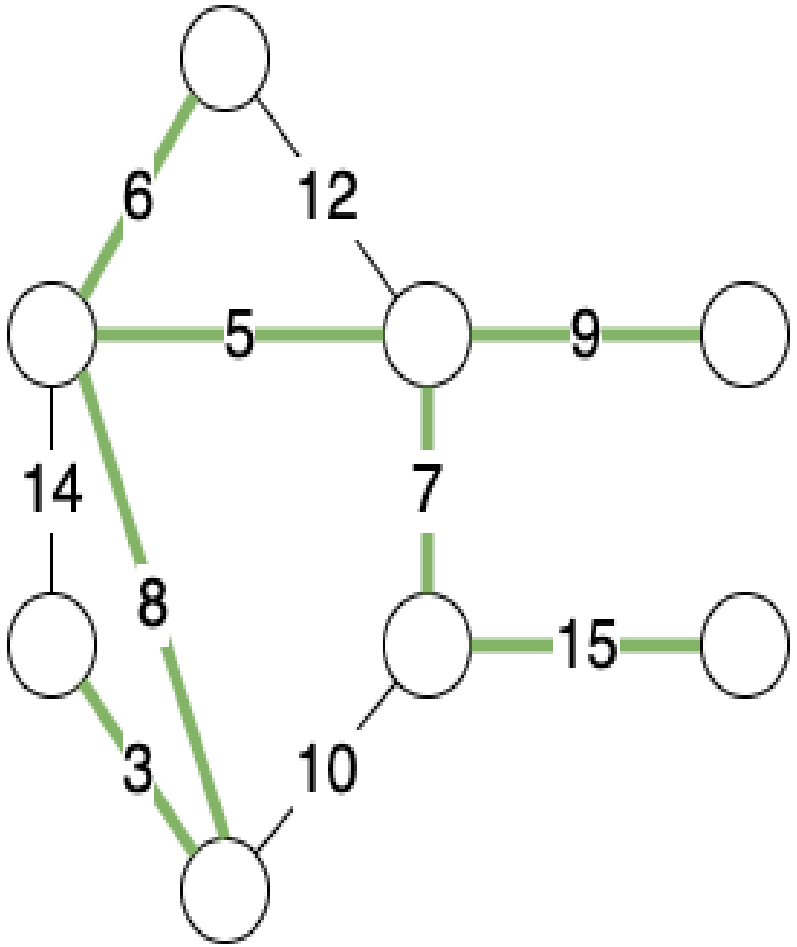

A Toulouse Bank, Midi-Pyrénées, is setting up a network to connect its seven branches to the head office in Toulouse. The seven cities in which agencies are located and the cost matrix is shown in the next table (cost are calculated according to the operators' offers and are proportional to the distances between agencies). Find a solution by building the maximum tree at minimum cost.

	1 TOULOUSE	2 BLAGNAC	3 ALBI	4 AUCH	5 CAHORS	6 FOIX	7 RODEZ	8 TARBES
1 TOULOUSE	-	2	52	13	45	15	58	59
2 BLAGNAC	2	-	52	14	43	16	58	62
3 ALBI	52	52	-	60	85	42	23	55
4 AUCH	13	14	60	-	50	18	72	50
5 CAHORS	45	43	85	50	-	59	81	95
6 FOIX	15	16	42	18	59	-	55	41
7 RODEZ	58	58	23	72	81	55	-	78
8 TARBES	59	62	55	50	95	41	78	-