Approximations for Metric TSPs

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Problems 1-4 are related to the figure below.

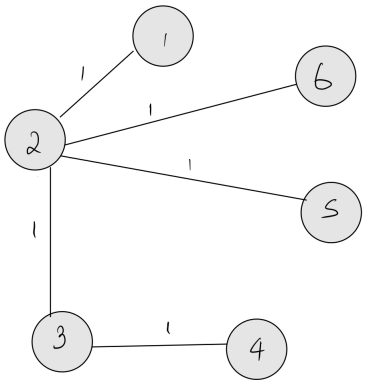

Figure 1: Minimum spanning tree for some TSP instance

Problem 1

▷ $(4, 1)$
▷ $(5, 6)$
▷ $(6, 3)$

Problem 2

▷ $C_{6,5} = C_{5,6}$
▷ $C_{6,5} \leq 2$

Problem 3

▷ The cost of the tour must be less than or equal to twice the cost of the MST.
▷ The cost of the TSP tour must be ≤ 10.

Problem 4

▷ The optimal tour cost has to be ≥ 5.
▷ The optimal tour cost has to be ≤ 10.

The next two problems are related to this graph:

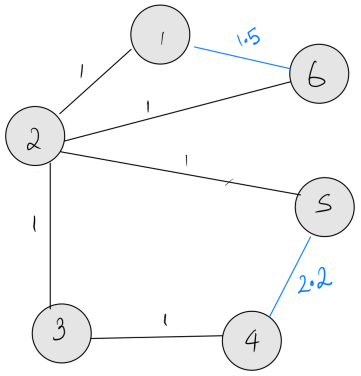

Figure 2: Graph for Problems 5 and 6

Problem 5

Answer: $[1, 2, 5, 4, 3, 6]$

Problem 6

- ▷ Cost of TSP tour is less than or equal to 8.7.
- ▷ The cost of the tour must be less than or equal to the cost of all the edges in the matching + cost of all edges in the MST.
- ▷ Cost of TSP tour is less than or equal to 10 (the bound we placed on the cost of the previous tour using DFS).