5. Greedy algoritm

5.0 Basics

5.1 Minimum spanning trees

5.2 Knapsack problem

5.3 Job sequencing with deadline

5.4 Optimal merge patterns

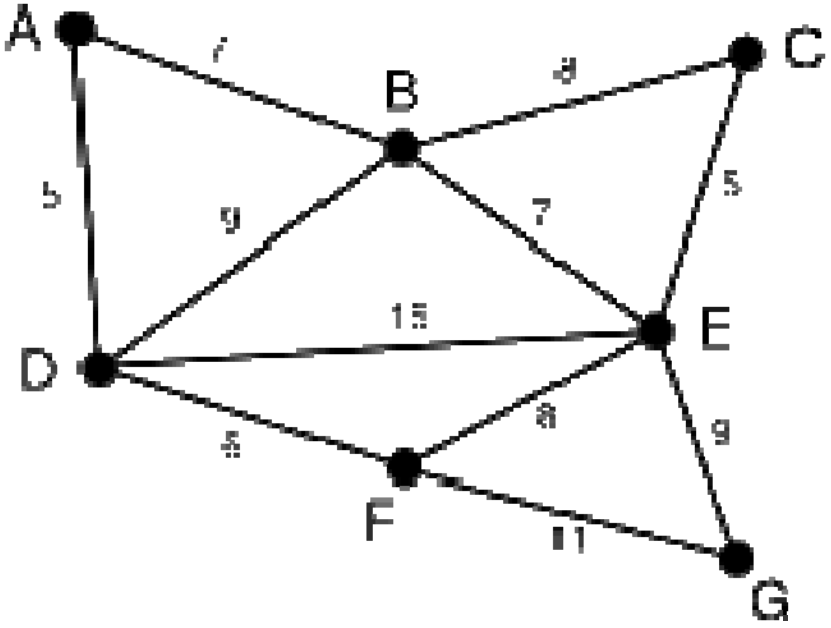
5.5 Huffman encoding

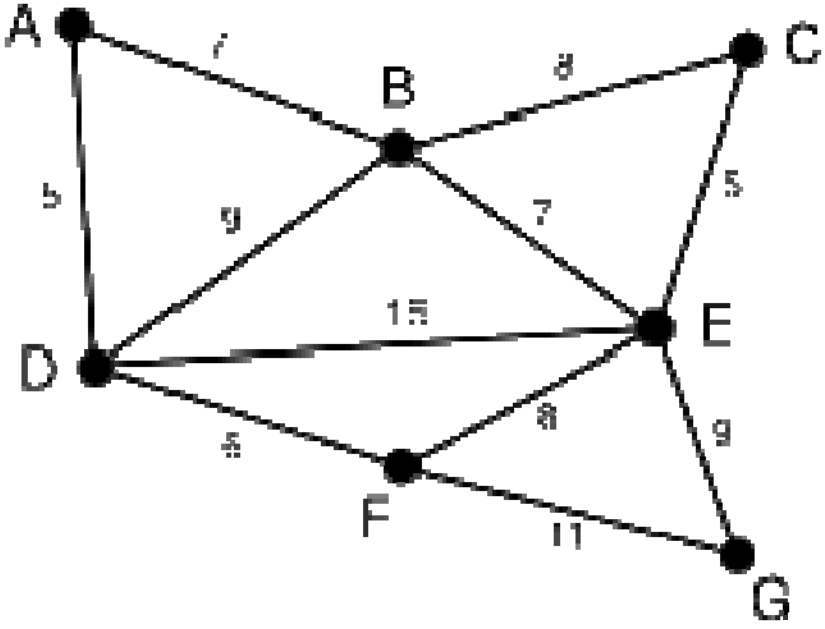
5.1 Minimum cost spanning tree

- Spanning tree
  - Connecting every vertex of a graph G using minimum number of edges
  - If |V| = n, then at least (n-1) edges are required
  - Does not allow a cycle
  - Spanning trees through graph search algorithms
    - Depth-first search → Depth-first spanning tree
    - Breadth-first search → Breadth-first spanning tree

5.1 Minimum cost spanning tree

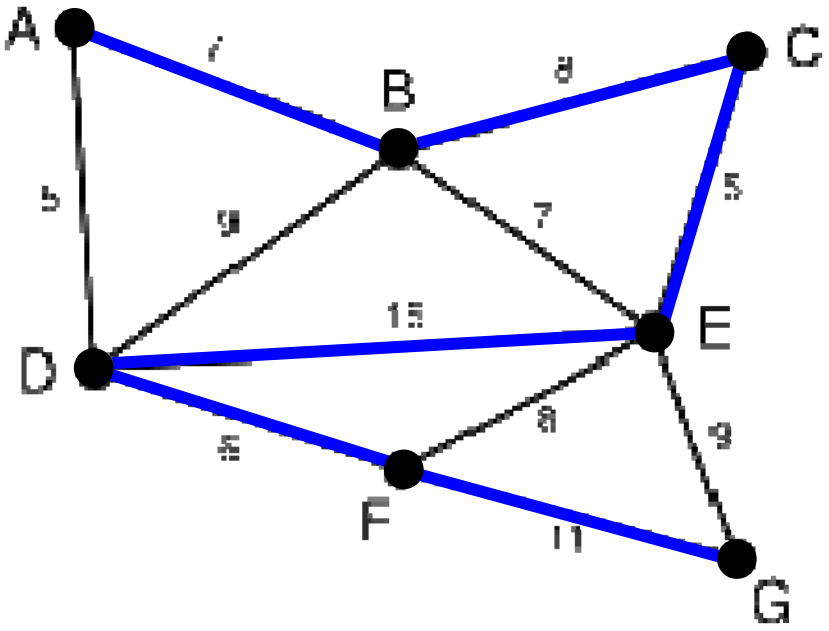
- Ex)



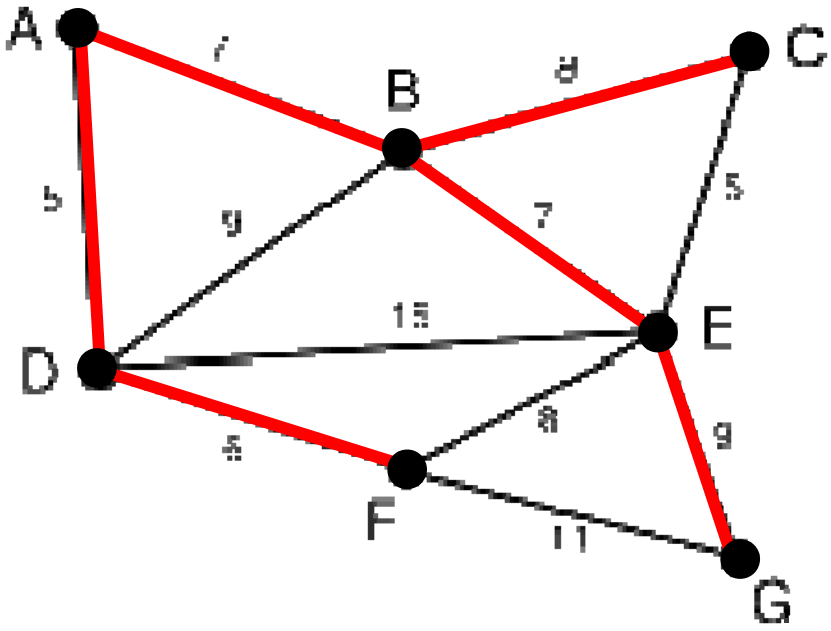


5.1 Minimum cost spanning tree

- Ex) Spanning trees



Depth-first spanning tree

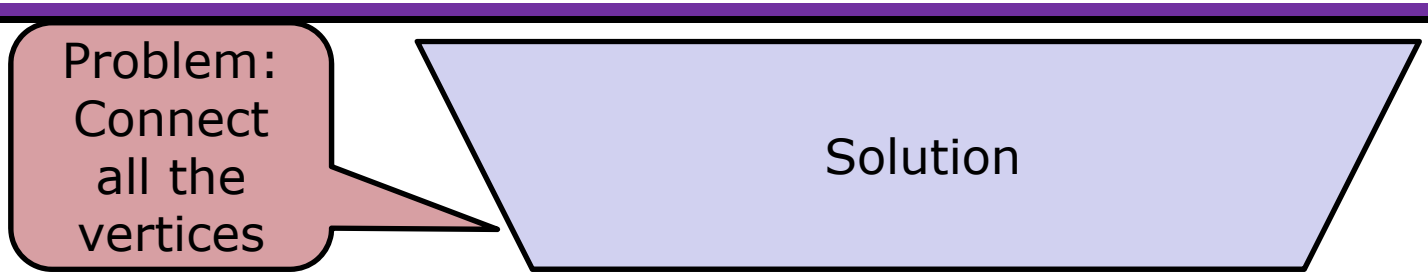


Breadth-first spanning tree

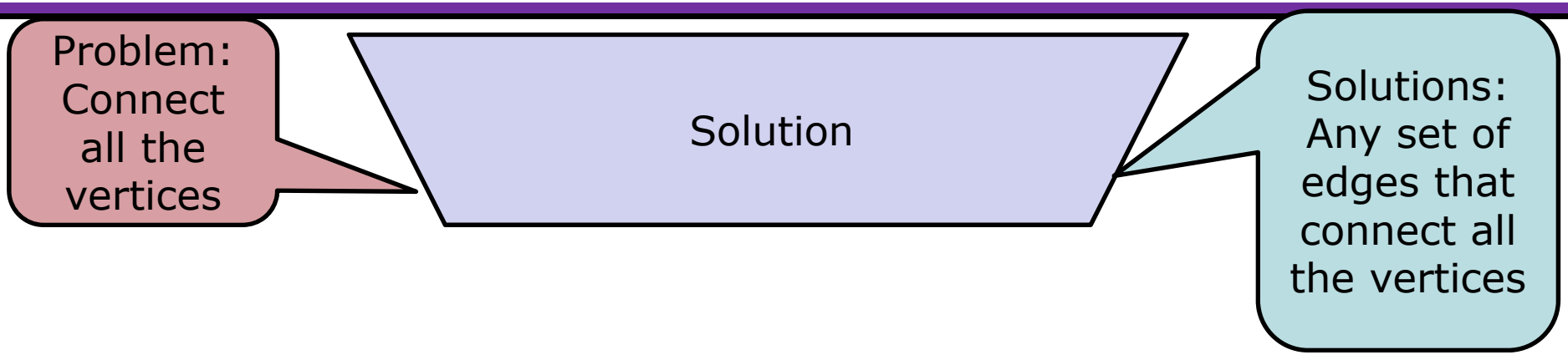
5.1 Minimum cost spanning tree

- Minimum cost spanning tree
  - Computed on a weighted graph
  - A spanning tree whose sum of edge weights is minimum.
  - Properties
    - No new edges.
    - (n-1) edges for |V| = n.
    - No cycle.

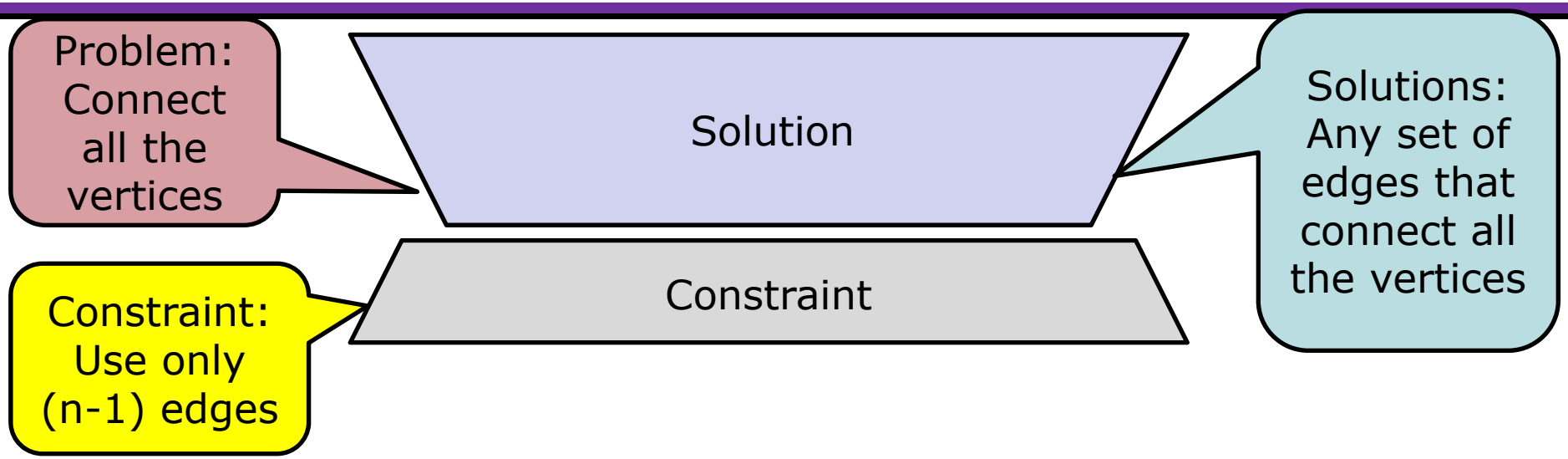
5.1 Minimum cost spanning tree



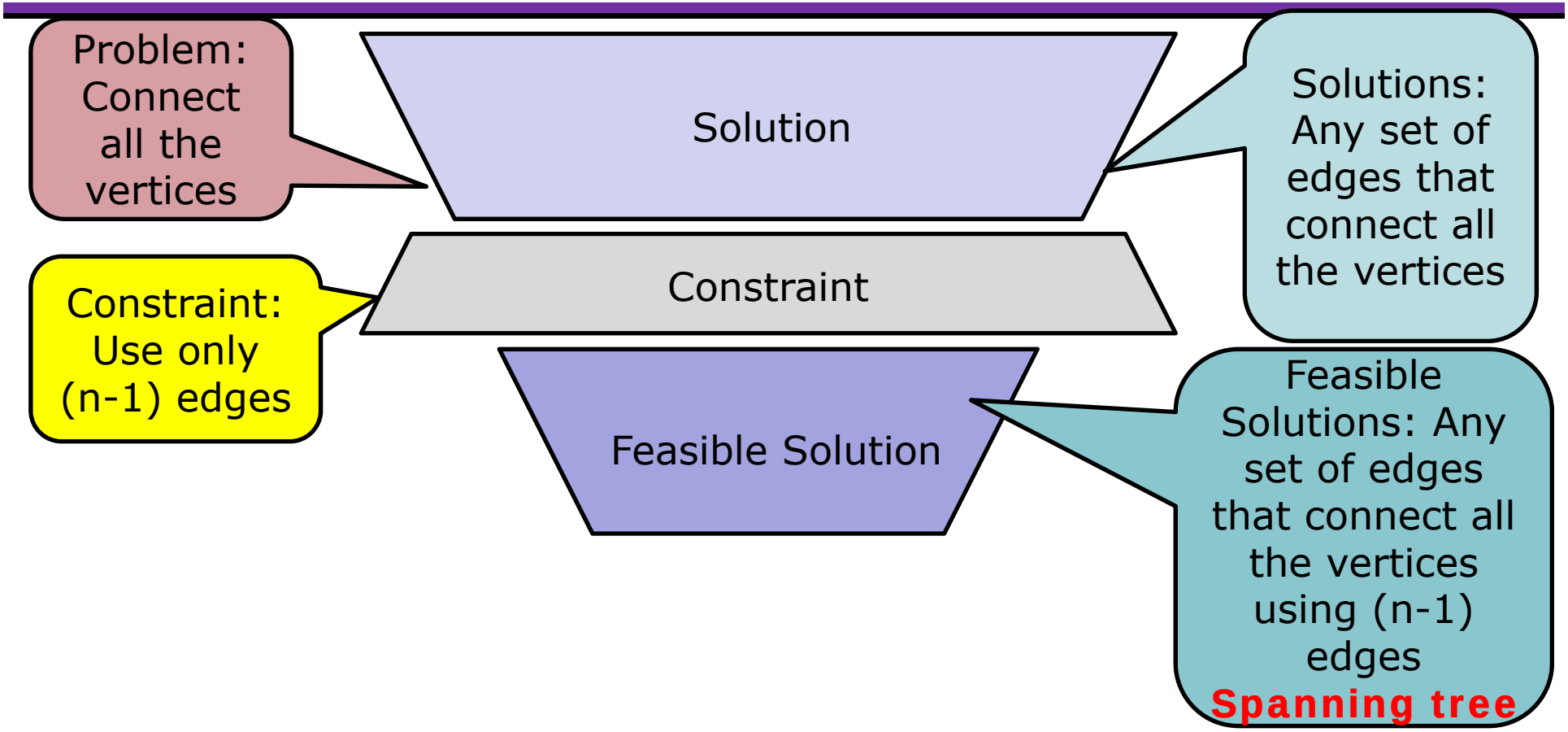
5.1 Minimum cost spanning tree



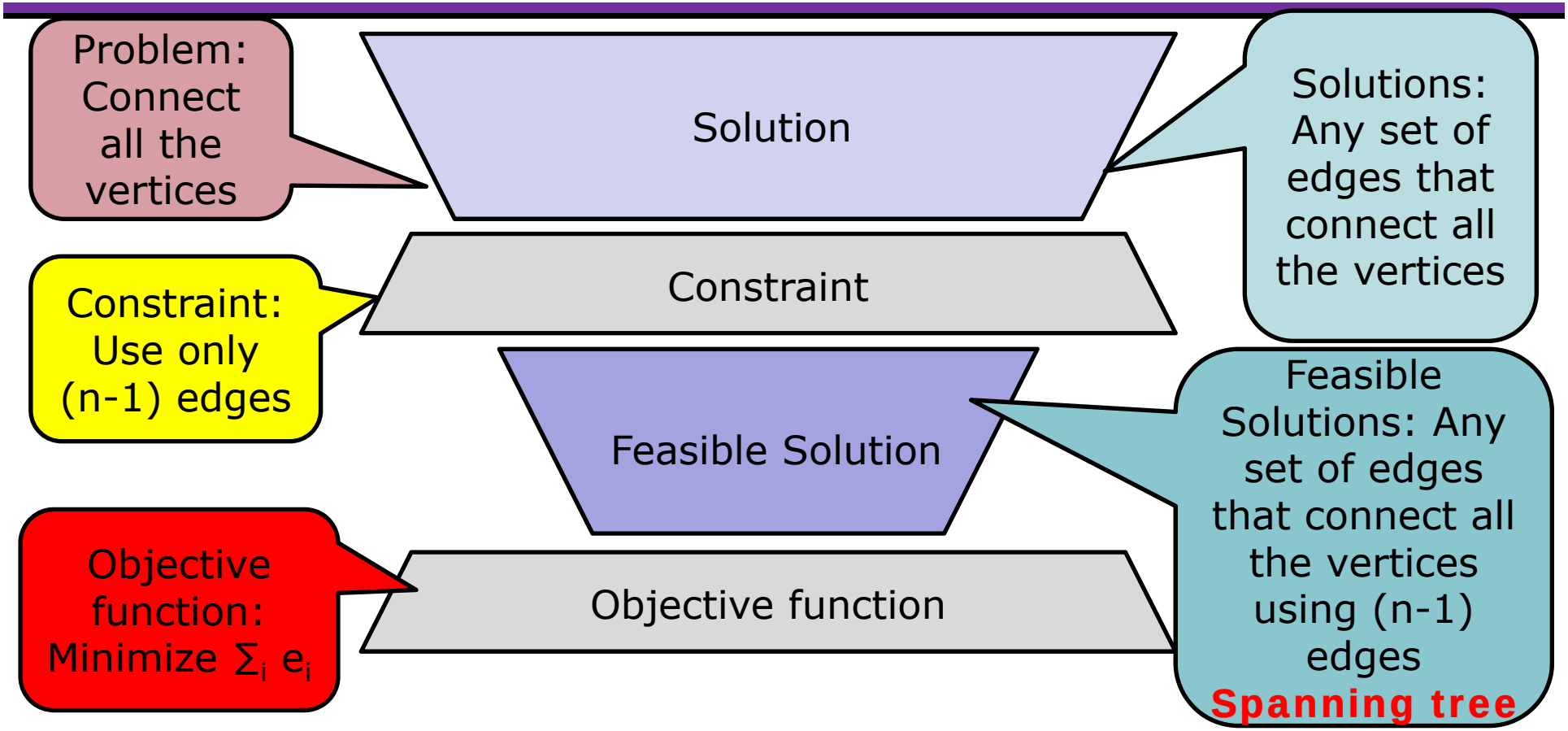
5.1 Minimum cost spanning tree



5.1 Minimum cost spanning tree



5.1 Minimum cost spanning tree



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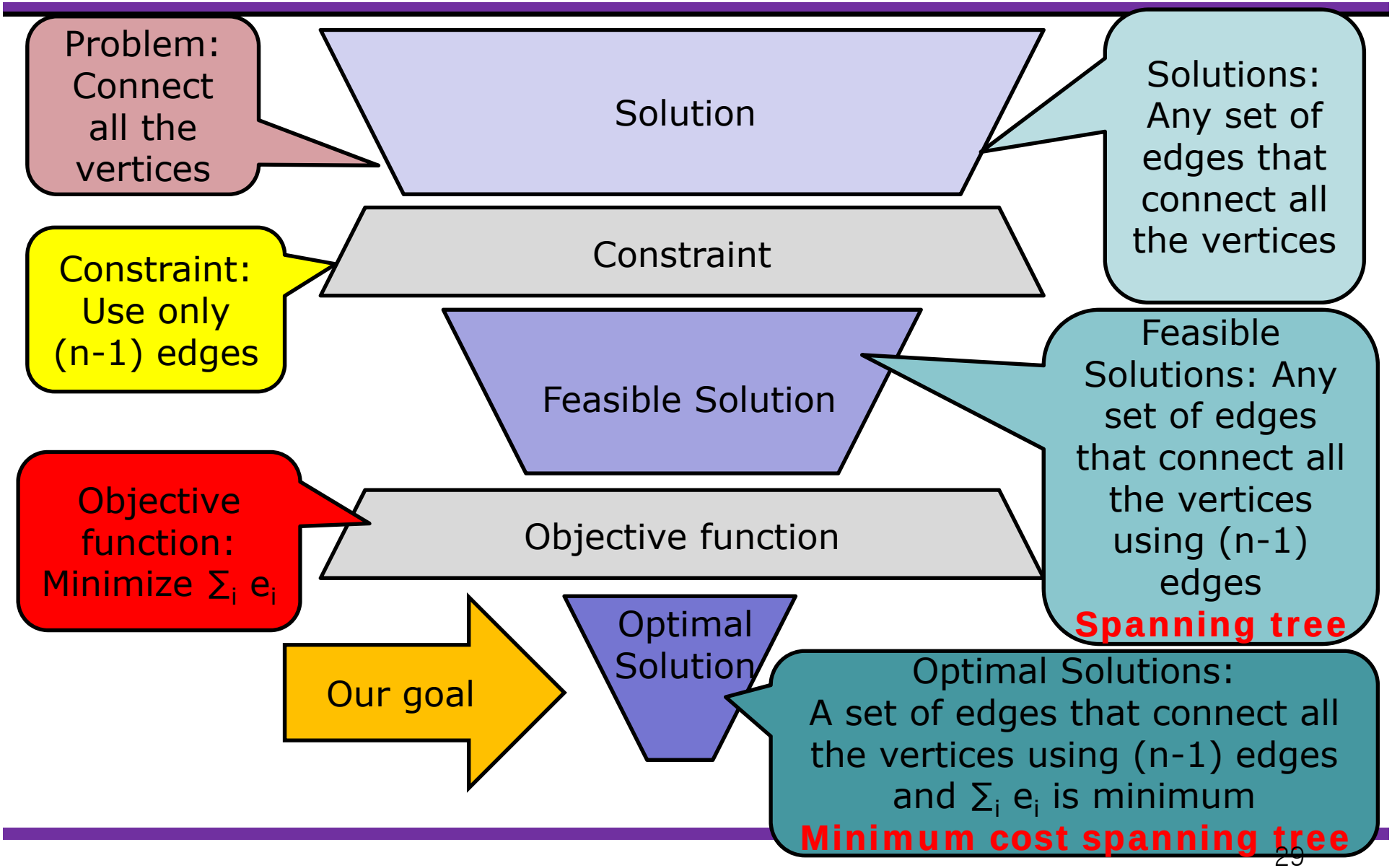

5.1 Minimum cost spanning tree

다음 설명 중 옳은 것을 모두 고르시오.

(a) G = (V, E)인 그래프의 spanning tree T를 (V', E')라고 표현하면 V = V'이고 E' ⊆ E이다.

(b) vertex의 수가 n개인 graph의 minimum cost spanning tree의 edge의 수는 n-1개이다.

(c) Depth-first spanning tree는 depth-first search를 이용해서 얻어지는 minimum cost spanning tree이다.

(d) Minimum cost spanning tree를 구하는 알고리즘은 breadth-first spanning tree를 구하는 알고리즘보다 더 많은 계산 시간을 요구한다.