<Discrete Mathematics>

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a partial order
an equivalent relation를 배울 것이다.

-오늘 배울꺼-
Prim`s Algorithm, Kruskal`s Algorithm
-> Minimum spanning tree

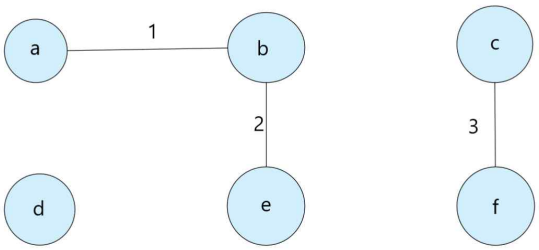
a Tree
a spanning tree
a min spanning tree

an undirected graph G=(V, E)
V: a finite set of nodes(=vertices) $\neq \varnothing$
E: a finite set of unordered pairs of nodes in V

A tree : ?

Definition) A forest:
an undirected graph
acyclic (There is no cycle)

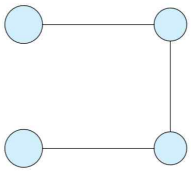
ex)

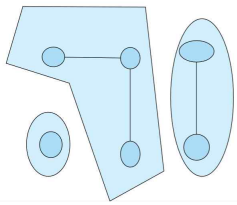


E = {1, 2, 3}
V = {a, b, c, d, e, f}

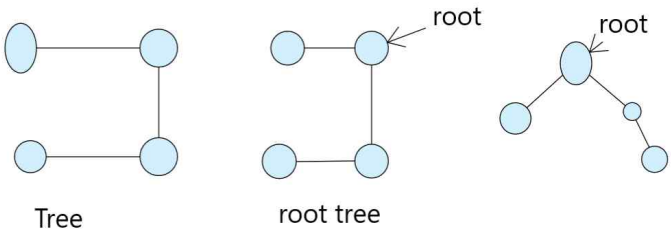
Definition) A tree:
an undirected graph
acyclic
connected (any pair of node has a path)

every tree are forests


: a forest with one tree


: a forest with three trees

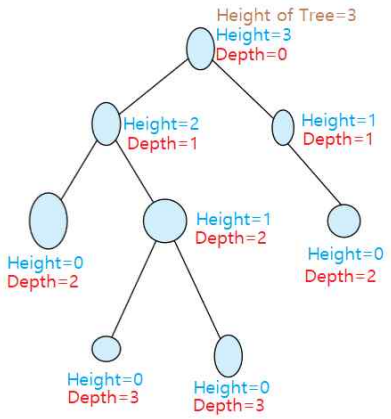
Definition of a rooted tree)
a tree whose root is designated



-> leaf라는 개념이 있다.
a leaf: a node with no child
root-> has a hierarchy

Definition of a binary tree)
a rooted tree where each node has at most 2 children

Given a binary tree T,
1. The height of a node -> all leaves height = 0
2. The depth fo a node -> The root is at depth 0.
3. the height of T -> the height of the root



Height는 더 큰 것을 선택한다.

-> uniquely defined

“a spanning tree” (G)
a graph-> 1. undirected, 2. connected

Definition)
Given an undirected, connected graph G = (V, E),
a spanning tree T = (V`, E`) of G is a subgraph of G such that
1. V` = V
2. T is a tree

(V⊆V`, E⊆E`)

node의 수가 n개이면 정확히 n-1개만큼의 edge를 가져야 한다.
적으면 connected가 안되고, 아니면 cycle이 생긴다.
-> 답이 여러 개가 나올 수도 있다.

-a minimum spanning tree-
undirected
connected
weighted

a spanning tree whose sum of edge weights is minimized.

-> Prim`s Algorithm
-> Kruskal`s Algorithm

로 찾는다.

a singleton? a set with single element

1. Kruskal`s Algorithm (G, w) (w is weight assinged to edges)
(1) Create n singletons (n = number of V)
-> {a}, {b}, {c}, {d}, {e}, {f}
(2) sort all edges in a non-decreasing order
-> (a, e), (c, f), (b, c), (a, d), (e, f), (b, e), (a, b)
(3)
for each edge (u, v)
if u, v belong to different regions, then (u, v) connected
(이러면 set의 갯수가 줄어든다.)

kruskal`s algorithm은 greedy algorithm의 예시이다.

p. 704

2. Prim`s Algorithm = (G, w, S) ex) S=e라고하자
마크 10
select a node such that connected with “e” by least weight
There are two sets of nodes
{S} | V-{S}
{S, 4} | V-{S, 4}
{S, 4, 2} | V-{S, 4, 2}
…
-> Dijkstra`s algorithm과 비슷하다.
(1)

p. 707
1. Let T={S}
2. for i = 1 to n-1 do
(1) select an edge with min weight from edges between T & V-T
(2) update T