MST / (Minimum Spanning Tree) : $G(V, E)$ & for each edge $(u,v) \in E$, we have a weight $w(u,v)$ specifying the cost to connect u and v. We want to find an acyclic subset $T \subseteq E$ that connects all the vertices & whose total weight $w(T) = \sum_{(u,v) \in T} w(u,v)$ is minimized.

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MST-KRUSKAL(G, w)
   A = ∅                      O(1)  → is a forest whose vertices are all those of given graph.
   for each vertex v ∈ G.V
       MAKE-SET(v)            A: → (a)  (b)  (c)——(i)  ......  (h)—1—(g)
   sort the edges of G.E into nondecreasing order by weight w      O(E log E)
   for each edge (u, v) ∈ G.E, taken in nondecreasing order by weight
       if FIND-SET(u) ≠ FIND-SET(v)
           A = A ∪ {(u, v)}
           UNION(u, v)
   return A
```

$\{h,g\}$ $\{i,c\}$

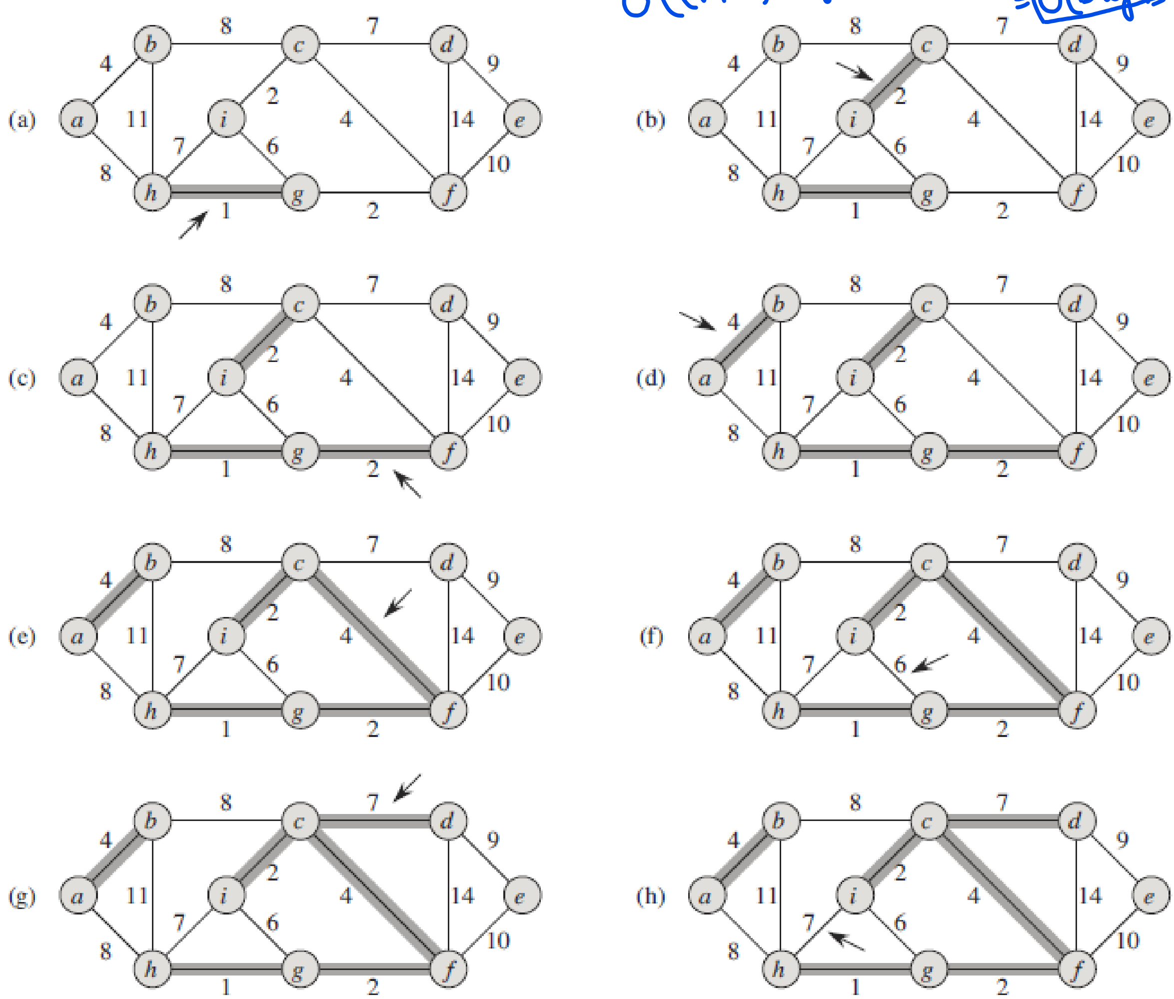
$O(E) \rightarrow$ FIND-SET & UNION

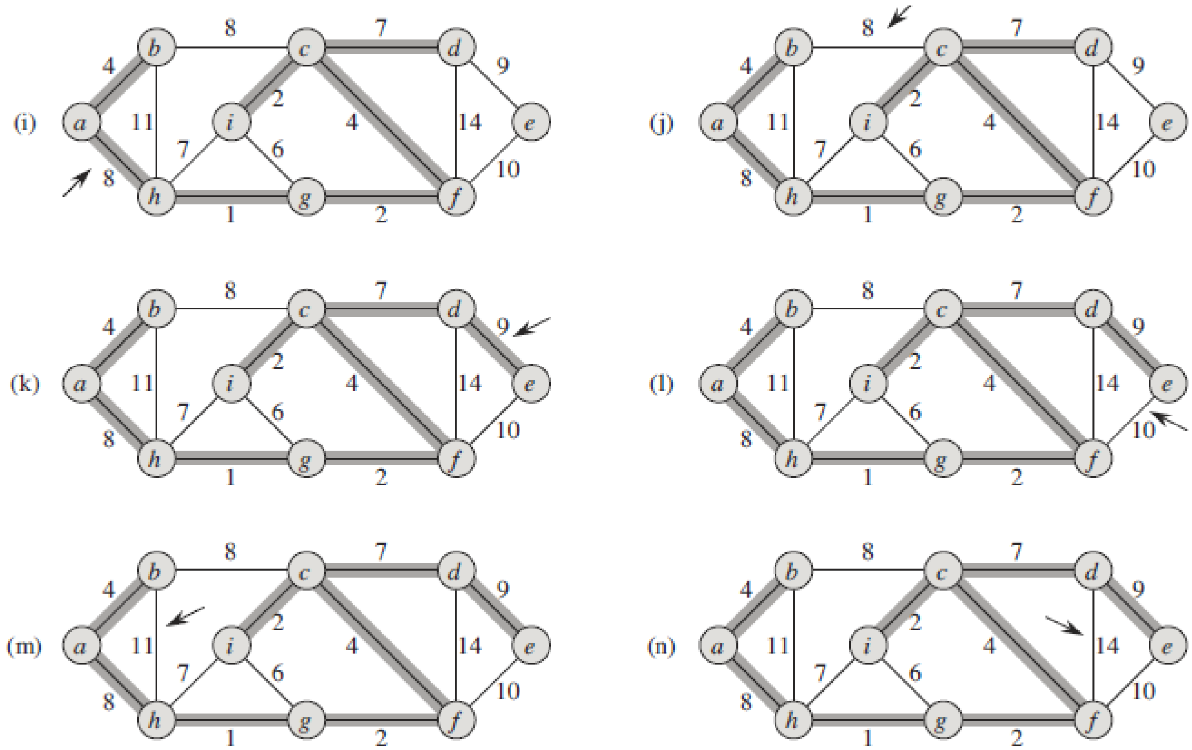
V no. of MAKE-SET

$O((V+E)\,\alpha(V))$ → very slow growing fun^n log E.

$O((V+E) \log E) = \boxed{O(E \log E)} = \boxed{O(E \log V)}$

G is connected, $|E| \geq |V|-1$, $|E| \leq |V|^2$, $\log E = 2 \log V = O(\log V)$





MST:

Total Weight = 37