KRUSKAL MST$(G=(V,E);\ w: E \to R^+)$

Let $V := \{x_1, x_2, \ldots, x_n\}$; $E = \{e_1, e_2, \ldots, e_m\}$.

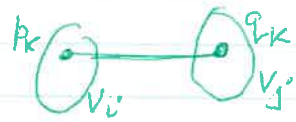
1. SORT E w.r.t weight

WLOG, Let $w(e_1) \le w(e_2) \le w(e_3) \le \cdots \le wt(e_m)$

2. For $i := 1$ to n do [$V_i := \{x_i\}$; $Label[x_i] := i$; $size[V_i] := 1$; $T_i := \phi$;

3. For $k := 1$ to m do [edges in sorted order]

   Let $e_k = (p_k, q_k)$;



   $i :=$ Label$[p_k]$; $j :=$ Label$[q_k]$;

   If $i \ne j$ then {Edge connects two forests}

      If size$[V_i] \ge$ size$[V_j]$ then

         For each vertex $z \in V_j$ $\boxed{\{V_i := V_i \cup V_j\}}$

            [Label$[z]$:= Label$[p_k]$;

         SIZE$[V_i]$ = Size$[V_i]$ + Size$[V_j]$;

         $T_i := T_i \cup T_j \cup \{e_k = (p_k, q_k)\}$

         $T_j := \phi$;

         $V_j := \phi$;

      else [repeat with roles of i & j reversed.

4. Return (T)

PRIM MST $(G=(V,E), w: E \to \mathbb{R}^+)$

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1. r := Arbitrary vertex of V;
   A := {r};   T := φ;

2. INITIALIZE   ∀y ∈ V\{r} do [ minwt(y) := ∞;
                                closest(y) := NIL;

   For each edge (r,y) ∈ E do
        [ minwt(y) := ω(r,y);
          closest(y) := r;

3. Q := V \ {r};     k := 1;
   (Q is a min-heap w.r.t. minwt)

4. While k ≠ n do
   [ v := Extract-MIN [Q];    u := closest(v);
     A := A ∪ {v};  Q := Q \ {v};
     T := T ∪ {(u,v)};  k := k+1;
     For each edge (v,y) ∈ E do
        [ if y ∈ Q and wt(v,y) < minwt(y) then
                [ minwt(y) := wt(v,y);
                  closest(y) := v;

5. Return (T)
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