Prim's Algorithm

g

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```
MST-PRIM(G, w, r)
        1. for each u \in G.V
                                   O(|V|)
             u. key = ∞
        2.
             u. \pi = NIL
        3.
        4. r. key = 0
       5. Q = G.V //Min. Priority Queue O(|V| * log(|V|)) | O(|V|)
       6. while Q \neq \emptyset
                                       O(|V| * log(|V|))
       7.
              u = EXTRACT-MIN(Q)
       8.
              for each v \in G. Adj[u]
                                          O(|E|)
       9.
                 if v \in Q and w(u, v) < v. key
      10.
                    v. \pi = u
                                          O(|E|*log(|V|))
                    v. key = w(u, v)
      11.
                            O((|E|+|V|)*log(|V|)) = O(|E|*log(|V|))
                                  8
                                                                       14
                                                                              10
Predecessor
                Nil
                        c Nil
                                  Nil
                                         c Nil
                                                  Nil
                                                                   Nil
                                                                          Nil
                                                          c Nil
                                                                                  c Nil
Node
Selected
                       b. key c. key
                                         d. key e. key
                                                          f. key g. key
                                                                         h. key i. key
               a. key
                          ∞
                                   0
                                           ∞
                                                                    ∞
                                                                                    ∞
                ∞
                                                   \infty
                                                           \infty
                                                                            ∞
                                           7
                          8
                                   0
                                                           4
                                                                                    2
   С
                ∞
                                                   \infty
                                                                   ∞
                                                                            ∞
                                                                                    2
                          8
                                   0
                                           7
                                                                    6
                                                                            7
   i
                                                           4
                 ∞
                                                   ∞
                                                                                    2
   f
                          8
                                   0
                                           7
                                                   10
                                                                    2
                                                                            7
```