Dijakstra's Algorithm (G, S)

i/p: A weighted connected graph $G = (V, E)$

o/p: shortest path from source to all other vertices

```
for i ← 0 to n-1 do
    d[i] ← cost [source, i]
    S[i] ← 0
End for
S [source] ← 1
for i ← 1 to n-1 do
    find Adjacency vertex 'u' & distance 'd[u]' such that
d[u] is minimum.
add u to S
S[u] ← 1
for Every V ∈ V-S do
    if (d[u] + w(u,v) < d[v])
        d[v] ← d[u] + w[u,v]
    End if
End for
End for
```

The time complexity = $O(V^2)$

prim's algorithm

* Algorithm prim's (G_i)

i/p :- A connected weighted graph $G(V,E)$

o/p: E_T, the set of edges comparing min spanning tree of G.

$V_T \leftarrow \{v_0\}$

$E_T \leftarrow \phi$

for $i \leftarrow 1$ to $|V|-1$ do

find the min-weight edge $e^* = (v^*, u^*)$ among all the edges (v,u) such that $v \in V_T$ & $u \in V - V_T$

$V_T \leftarrow V_T \cup \{u^*\}$

$E_T \leftarrow E_T \cup \{e^*\}$

return E_T

The time complexity of prim's alg $\Rightarrow$ $\boxed{O(|E| \log(|V|))}$