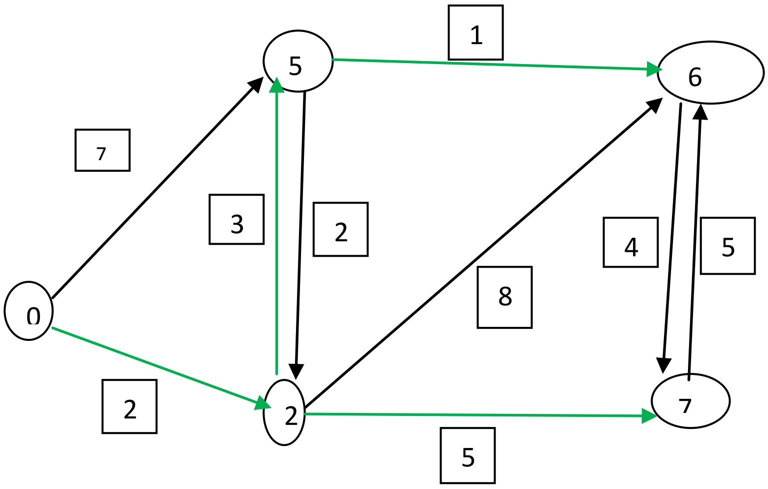


Dijktra's Algorithm: single source shortest path finding algorithm

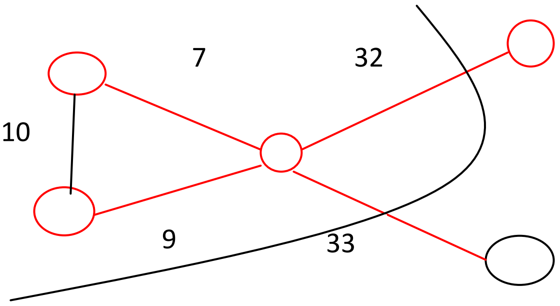
Now Prim's Algorithm

Greedy Algorithm

Graph is undirected

For finding minimum spanning tree (MST).

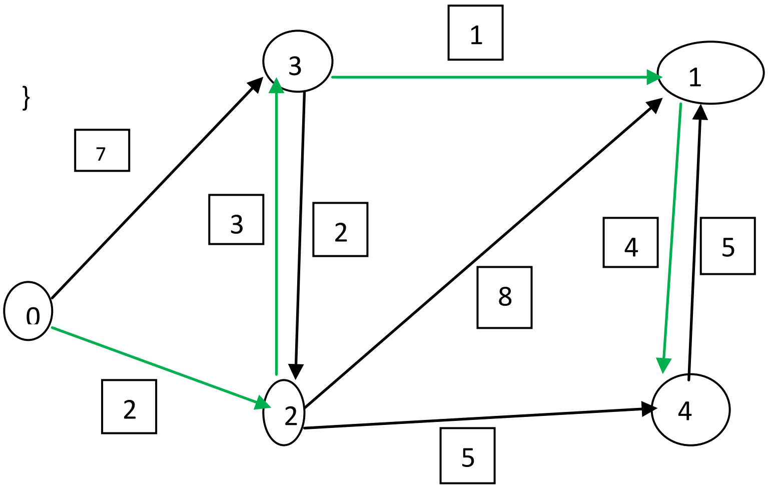
Applications: Data clustering



lightest edge crossing the cut

```
 Prim ( G, w, s)

{  for (each u$\epsilon$V)

   { d[u]=inf;    color[u]=white;}

 d[s]=0;  pred[s]=NiL;   X={s};   pred[s]=NIL;   /* X is maintaining the visited nodes*/

   Q={queue with all vertices}

   while (non-empty(Q))
   {
        u= extract-min(Q);
        for (each v $\epsilon$ adj[u] && v $\epsilon$ $V - X$)  /* V-X: vertices not visited so far*/
         { if (w(u,v) <d[v])    d[v]=   w[u,v]; insert (Q, v, d[v]); pred[v]=u;}
                     color[u]=black; X={X  ∪  u};
   }
```

}



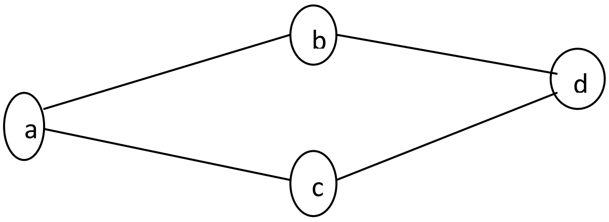
v={a,b}

w[u,v] < d[a]

current: u= vertex a

Q: b(3), c(8), d(5)

v	c	d
D[v]	1	5



Adjacency matrix representation of a graph

	a	b	c	d
a	0	1	1	0
b	1	0	0	1
c				
d				

Adjacency list

a--->{(b,1),(c)}
b-->{a,d}
c->{a,d}
d->{b.c}