# Prim in C++ #include <bits/stdc++.h> using namespace std; class Solution public: //Function to find sum of weights of edges of the Minimum Spanning Tree. int spanningTree(int V, vector<vector<int>> adj∏) priority\_queue<pair<int, int>, vector<pair<int, int>>, greater<pair<int, int>>> pq; vector $\leq$ int $\geq$ vis(V, 0); // {wt, node} $pq.push({0, 0});$ int sum = 0;while (!pq.empty()) { auto it = pq.top(); pq.pop(); int node = it.second; int wt = it.first; if (vis[node] == 1) continue; // add it to the mst vis[node] = 1;sum += wt;for (auto it : adj[node]) { int adjNode = it[0];int edW = it[1];if (!vis[adjNode]) { pq.push({edW, adjNode}); } return sum; **}**; int main() { int V = 5; vector<vector<int>> edges = $\{\{0, 1, 2\}, \{0, 2, 1\},$ $\{1, 2, 1\}, \{2, 3, 2\}, \{3, 4, 1\}, \{4, 2, 2\}\};$ vector<vector<int>> adj[V]; for (auto it : edges) { vector<int> tmp(2); tmp[0] = it[1];tmp[1] = it[2];adj[it[0]].push\_back(tmp); tmp[0] = it[0];tmp[1] = it[2];adj[it[1]].push\_back(tmp); Solution obj;

#### **Input Edges**

```
edges = {
    {0, 1, 2},
    {0, 2, 1},
    {1, 2, 1},
    {2, 3, 2},
    {3, 4, 1},
    {4, 2, 2}
}
```

### Adjacency List

Node	Neighbors
0	[1,2], [2,1]
1	[0,2], [2,1]
2	[0,1], [1,1], [3,2], [4,2]
3	[2,2], [4,1]
4	[3,1], [2,2]

## Prim's MST Logic (Min-Heap)

We track:

- pg: min-heap for {weight, node}
- vis∏: visited array
- sum: total MST weight

## **■** Dry Run Table

Step	pq (Min- Heap)	node	wt	vis	sum	Action Taken
1	{(0, 0)}	0	0	[1, 0, 0, 0, 0, 0, 0]	0	Add node 0, add neighbors 1 (wt=2), 2 (wt=1) to pq
2	{(1, 2), (2, 1)}	2	1	[1, 0, 1, 0, 0]	1	Add node 2, add unvisited neighbors: 1(wt=1), 3(wt=2), 4(wt=2)
3	{(1, 1), (2, 1), (2, 3), (2, 4)}	1	1	[1, 1, 1, 0, 0]	2	Add node 1, skip already visited 0 & 2
4	{(2, 1), (2, 3), (2, 4)}	1	2	Already visited	-	Skip

int sum = obj.spanningTree(V, adj);
cout << "The sum of all the edge weights: " <<
sum << endl;
return 0;
}
,

Step	pq (Min- Heap)	node	wt	vis	sum	Action Taken
5	{(2, 3), (2, 4)}	3	2	[1, 1, 1, 1, 0]	4	Add node 3, add neighbor 4 (wt=1)
6	{(1, 4), (2, 4)}	4	1	[1, 1, 1, 1, 1]	5	Add node 4, skip visited 3, 2
7	{(2, 4)}	4	2	Already visited	-	Skip

# **∜** Final Result:

Variable	Value
sum	5
vis	[1,1,1,1,1] (All visited)

# **⊘** Output:

The sum of all the edge weights: 5

Output:-The sum of all the edge weights: 5