

Python Code :-

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from collections import defaultdict

# Class to represent a graph
class Graph:

    def __init__(self, vertices):
        self.V = vertices # No. of vertices
        self.graph = [] # default dictionary
        # to store graph

    # function to add an edge to graph
    def addEdge(self, u, v, w):
        self.graph.append([u, v, w])

    # A utility function to find set of an element i
    # (uses path compression technique)
    def find(self, parent, i):
        if parent[i] == i:
            return i
        return self.find(parent, parent[i])

    # A function that does union of two sets of x and y
    # (uses union by rank)
    def union(self, parent, rank, x, y):
        xroot = self.find(parent, x)
        yroot = self.find(parent, y)

        # Attach smaller rank tree under root of
        # high rank tree (Union by Rank)
        if rank[xroot] < rank[yroot]:
            parent[xroot] = yroot
        elif rank[xroot] > rank[yroot]:
            parent[yroot] = xroot

        # If ranks are same, then make one as root
        # and increment its rank by one
        else:
            parent[yroot] = xroot
            rank[xroot] += 1

    # The main function to construct MST using Kruskal's
    # algorithm
    def KruskalMST(self):
```

```

result = [] # This will store the resultant MST

# An index variable, used for sorted edges
i = 0

# An index variable, used for result[]
e = 0

# Step 1: Sort all the edges in
# non-decreasing order of their
# weight. If we are not allowed to change the
# given graph, we can create a copy of graph
self.graph = sorted(self.graph,
                    key=lambda item: item[2])

parent = []
rank = []

# Create V subsets with single elements
for node in range(self.V):
    parent.append(node)
    rank.append(0)

# Number of edges to be taken is equal to V-1
while e < self.V - 1:

    # Step 2: Pick the smallest edge and increment
    # the index for next iteration
    u, v, w = self.graph[i]
    i = i + 1
    x = self.find(parent, u)
    y = self.find(parent, v)

    # If including this edge doesn't
    # cause cycle, include it in result
    # and increment the index of result
    # for next edge
    if x != y:
        e = e + 1
        result.append([u, v, w])
        self.union(parent, rank, x, y)
    # Else discard the edge

minimumCost = 0
print ("Edges in the constructed MST")

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    for u, v, weight in result:
        minimumCost += weight
        print("%d -- %d == %d" % (u, v, weight))
    print("Minimum Spanning Tree" , minimumCost)

# Driver code
g = Graph(4)
g.addEdge(0, 1, 10)
g.addEdge(0, 2, 6)
g.addEdge(0, 3, 5)
g.addEdge(1, 3, 15)
g.addEdge(2, 3, 4)

# Function call
g.KruskalMST()
```

Output:-

Following are the edges in the constructed MST

2 -- 3 == 4

0 -- 3 == 5

0 -- 1 == 10

Minimum Cost Spanning Tree: 19