Minimum Spanning Tree

Problem Statement: Given a connected, undirected and weighted graph G, select a subset of edges E’ such that graph G is connected and total weight of selected edges E’ is minimum.

V-1 edges are required to form MST and keep the graph connected.

Real Life Example:

Building Road for Villages

* Connecting remote villages via roads, each village is a vertex and each edge is road. Minimise the total cost of building road.

MST Algorithm

* Prims
* Kruskal

**Prims Algorithm**

It’s a greedy algorithm which uses priority queue

**Terms**

MST Set: This set includes nodes which have been included in MST so far

Active Edge: edge from a vertex in MST set to other remaining nodes

MST Edge: Edges included so far in MST

**Algorithm**

1. Start from any source vertex.
2. Out of all active edges, pick the one with smallest weight.
   1. Put the new node in MST set
   2. Add active edges starting from new node in active edge list.

**Kruskal Algorithm**

Greedy Algorithm which uses DSU

**Algorithm**

1. Sort all the edges based upon weight
2. Pick an edge add it to your MST if it isn’t forming cycle.