

# CS2023 - Data Structures and Algorithms

## In-class Lab Exercise - Week 11

May 23, 2023

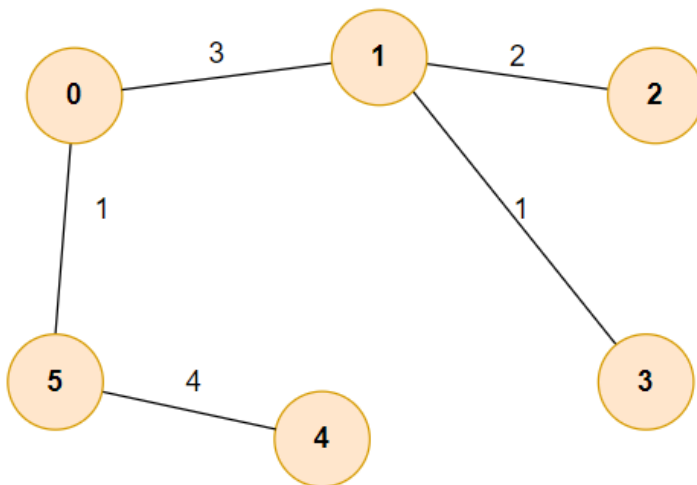
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### 1. Adjacency list representation

	0	1	2	3	4	5
0	0	3	0	0	0	1
1	3	0	2	1	10	0
2	0	2	0	3	0	5
3	0	1	3	0	5	0
4	0	10	0	5	0	4
5	1	0	5	0	4	0

### 2. Minimum spanning tree starting from node 3



### 3. Output of Prim's Algorithm (starting from node 0)

Adjacency matrix of MST

	0	1	2	3	4	5
0	0	3	0	0	0	1
1	3	0	2	1	0	0
2	0	2	0	0	0	0
3	0	1	0	0	0	0
4	0	0	0	0	0	4
5	1	0	0	0	4	0

4. Yes, they are the same

To always have only one MST, the graph must be a tree.

5.

Prim's algorithm – at each step, pick a vertex and iterate through its neighbours

Time complexity =  $O(V \cdot V) = O(V^2)$

Kruskal's algorithm – at each step, pick an edge and check if its vertexes are already included.

Time complexity =  $O(E \log V)$

Complete GitHub repository for code: <https://github.com/Anuki16/cs2023-data-structures-algorithms>