CS2023 - Data Structures and Algorithms

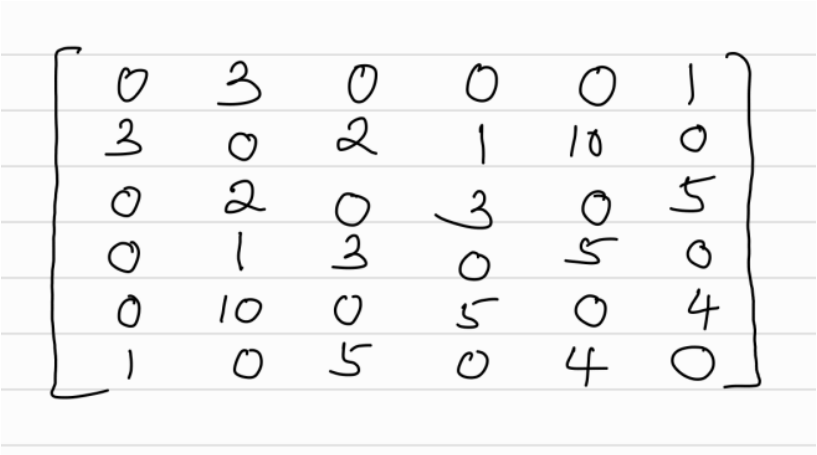
In Class Lab Exercise

Week 11

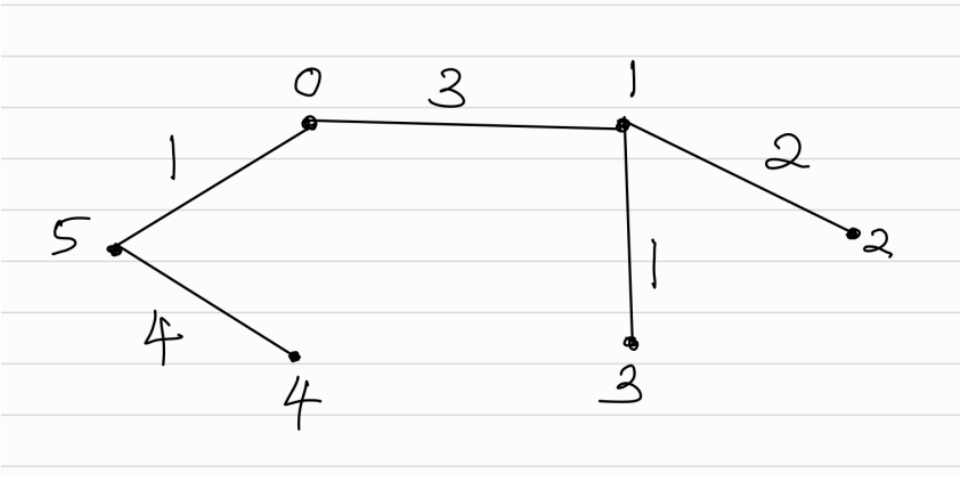
Index Number: 200105F

GitHub Link: https://github.com/UlinduP/CS2023/tree/main/In%20Class%20Labs/Lab%2011

1.



2.



Minimum wiring cost = 1+3+2+1+4 = 11

3.

```
 11\" ; if ($?) { g++ prims_MST.cpp -o prims_MST } ; if ($?) { .\prims_MST }
Edge   Weight
0 - 1    3
1 - 2    2
1 - 3    1
5 - 4    4
0 - 5    1
```

4. Yes, the MST does not depend on the starting node.

If each edge has a distinct weight, then the graph is guaranteed to have only one MST.

5. Kruskal's algorithm has a time complexity of O((E+V) log(V)). Prim's algorithm has a time complexity of O(E log(V)). Kruskal's algorithm has a time complexity dominated by the sorting of edges. Prim's algorithm has a time complexity dominated by the operations in the priority queue. Each vertex is inserted and extracted once, and the priority queue operations take O(log V) time. Therefore, the overall time complexity is O(E log V). Overall Prim's algorithm has a better time complexity.