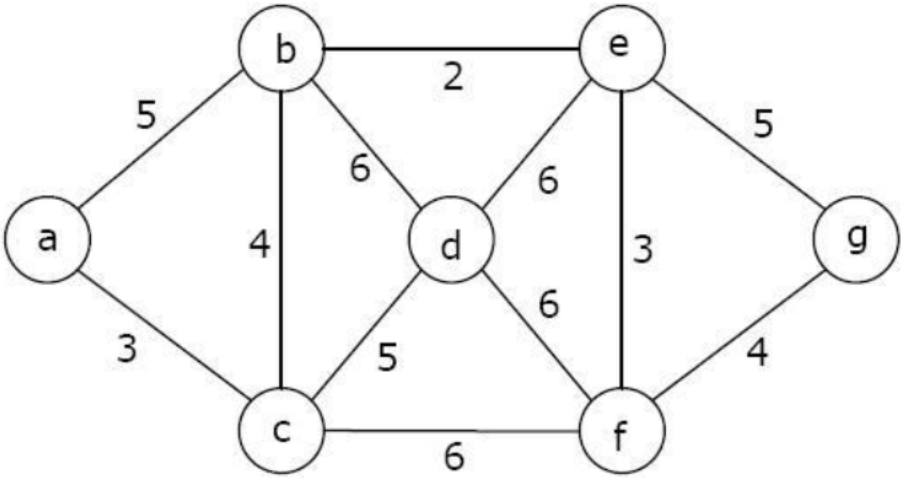
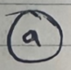
Week5-Q1



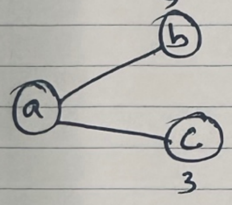
Weeks – Q1

Prim

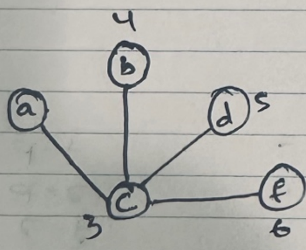
Step1: we select vertex as initial = a



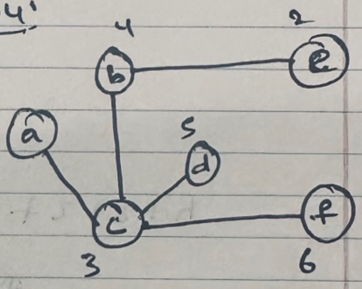
step2:



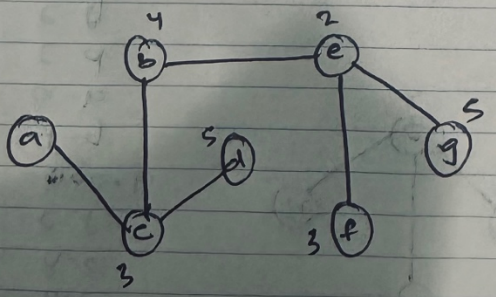
steps:



step4:

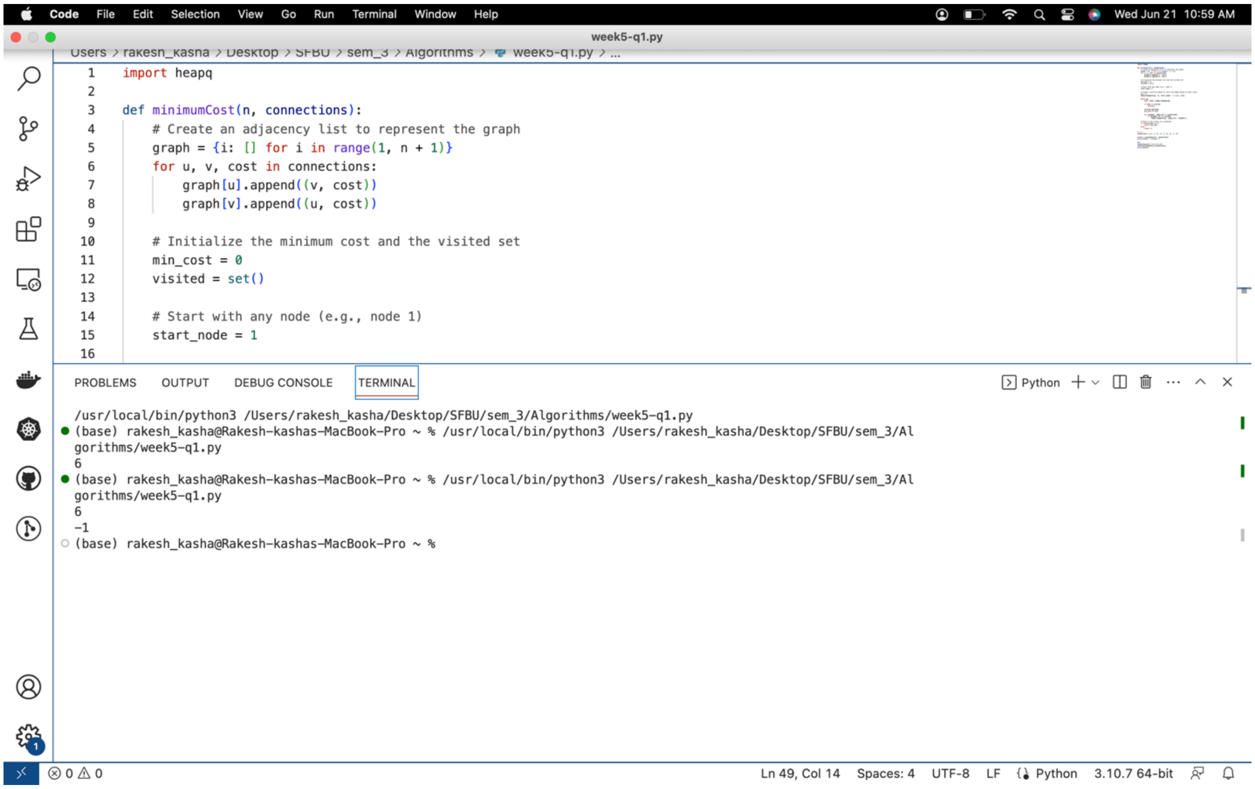


steps:



Total weight: 3 + 4 + 5 + 2 + 3 + 4
= 21

```
import heapq

def minimumCost(n, connections):
    # Create an adjacency list to represent the graph
    graph = {i: [] for i in range (1, n + 1)}
    for u, v, cost in connections:
        graph[u]. append ((v, cost))
        graph[v]. append ((u, cost))

    # Initialize the minimum cost and the visited set
    min_cost = 0
    visited = set()

    # Start with any node (e.g., node 1)
    start_node = 1

    # Create a priority queue to store the edges based on their costs
    pq = []
    heapq.heappush(pq, (0, start_node))  # (cost, node)

    while pq:
        cost, node = heapq.heappop(pq)

        if node in visited:
            continue

        visited.add(node)
        min_cost += cost

        for neighbor, edge_cost in graph[node]:
            if neighbor not in visited:
                heapq.heappush(pq, (edge_cost, neighbor))

    # Check if all cities are connected
    if len(visited) == n:
        return min_cost
    else:
        return -1

n = 3
connections = [[1, 2, 5], [1, 3, 6], [2, 3, 1]]

result = minimumCost (n, connections)
print(result)  # Output: 6
```


Code File Edit Selection View Go Run Terminal Window Help
Wed Jun 21 10:59 AM
week5-q1.py
Users > rakesh_kasha > Desktop > SFBU > sem_3 > Algorithms > week5-q1.py > ...
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Python
Ln 49, Col 14 Spaces: 4 UTF-8 LF Python 3.10.7 64-bit

```python
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```
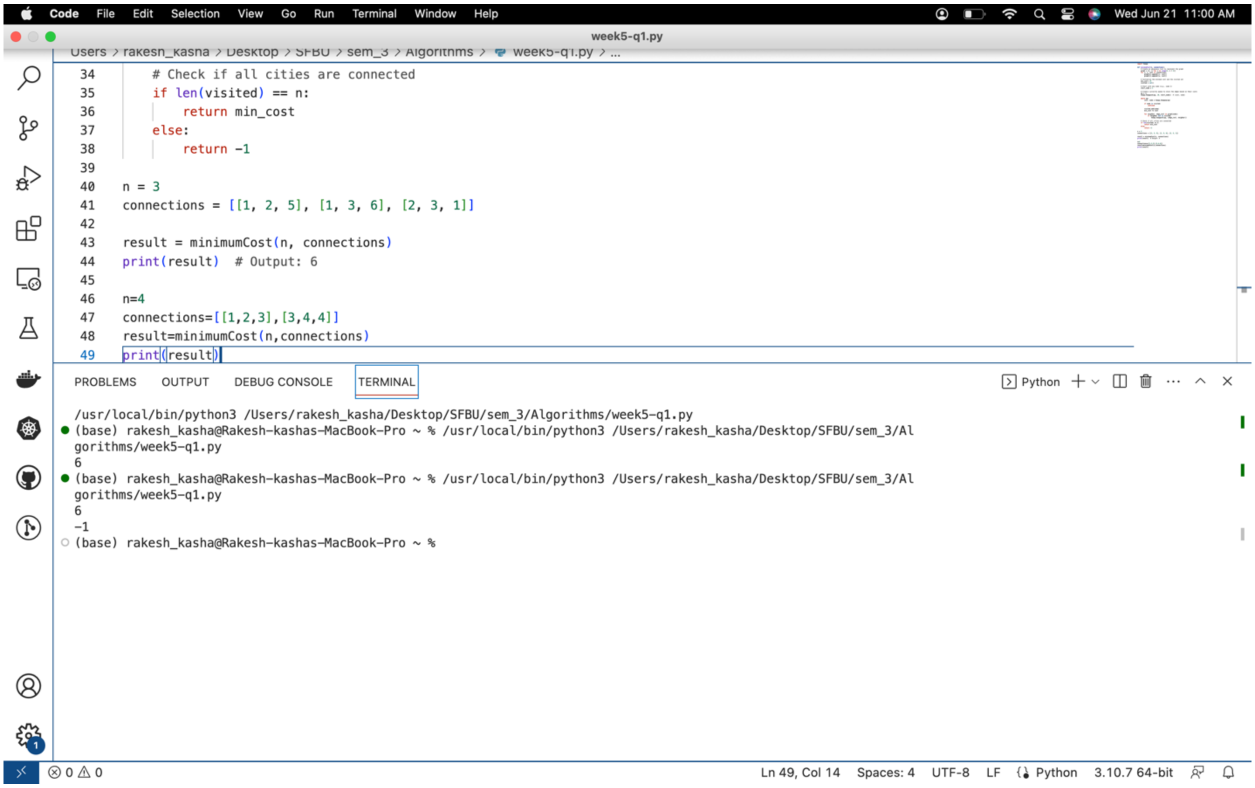

```
/usr/local/bin/python3 /Users/rakesh_kasha/Desktop/SFBU/sem_3/Algorithms/week5-q1.py
● (base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ % /usr/local/bin/python3 /Users/rakesh_kasha/Desktop/SFBU/sem_3/Al
gorithms/week5-q1.py
6
● (base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ % /usr/local/bin/python3 /Users/rakesh_kasha/Desktop/SFBU/sem_3/Al
gorithms/week5-q1.py
6
-1
○ (base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ %
```


Code File Edit Selection View Go Run Terminal Window Help
Wed Jun 21 11:00 AM
week5-q1.py
Users > rakesh_kasha > Desktop > SFBU > sem_3 > Algorithms > week5-q1.py > ...
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Python
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```python
    # Check if all cities are connected
    if len(visited) == n:
        return min_cost
    else:
        return -1

n = 3
connections = [[1, 2, 5], [1, 3, 6], [2, 3, 1]]

result = minimumCost(n, connections)
print(result)  # Output: 6

n=4
connections=[[1,2,3],[3,4,4]]
result=minimumCost(n,connections)
print(result)
```

```
/usr/local/bin/python3 /Users/rakesh_kasha/Desktop/SFBU/sem_3/Algorithms/week5-q1.py
● (base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ % /usr/local/bin/python3 /Users/rakesh_kasha/Desktop/SFBU/sem_3/Al
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6
● (base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ % /usr/local/bin/python3 /Users/rakesh_kasha/Desktop/SFBU/sem_3/Al
gorithms/week5-q1.py
6
-1
○ (base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ %
```