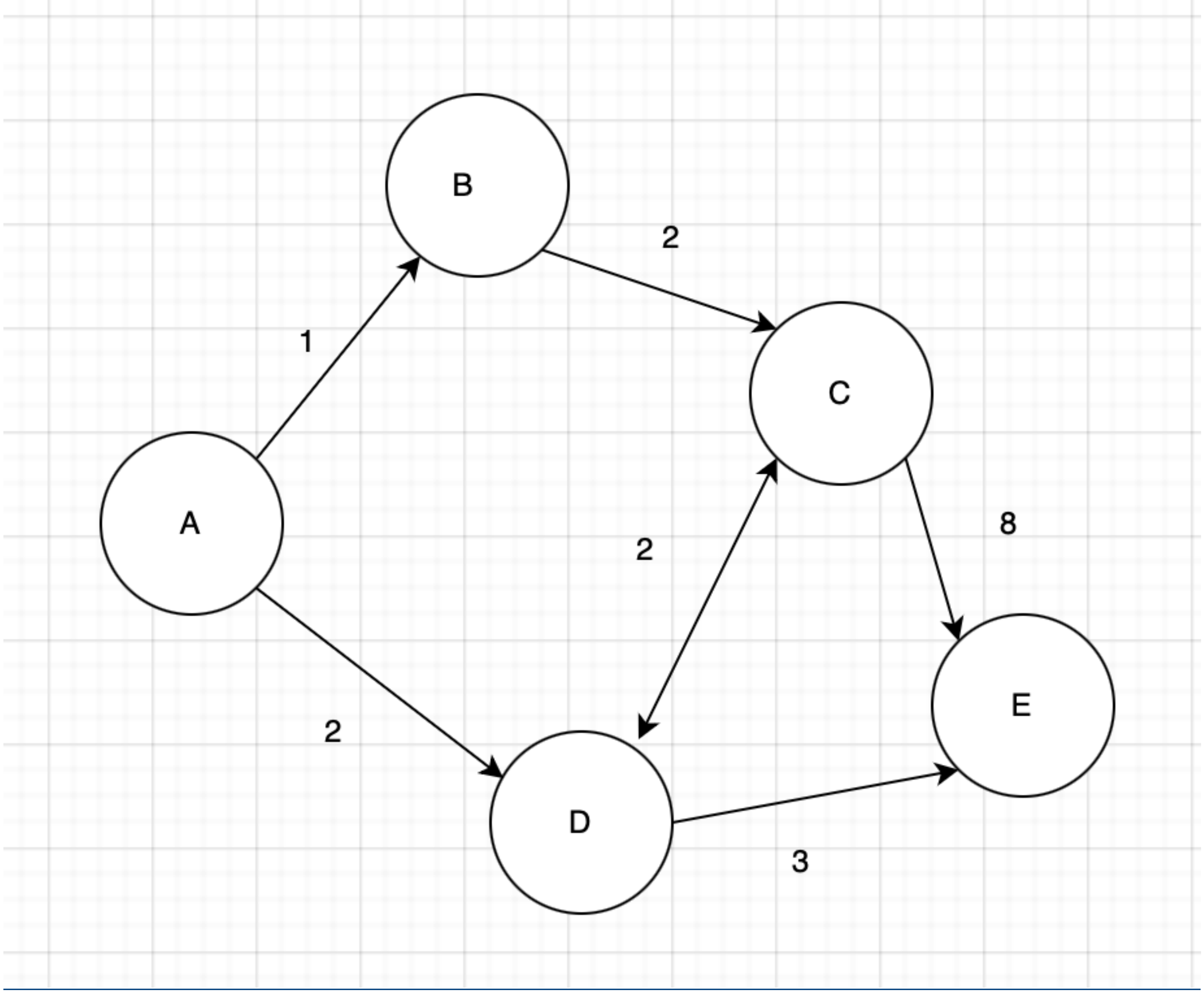
Week6_Q1



Intial	NEXT NODE A	NEXT NODE B	NEXT NODE D	NEXT NODE D
A=∞	A=0	A=0	A=0	A=0
B=∞	B=∞	B=1	B=1	B=1
C=∞	C=∞	C=∞	C=3	C=3
D=∞	D=∞	D=2	D=2	D=2
E=∞	E=∞	E=∞	E=∞	E=5

```
import heapq;


def networkDelayTime(times, n, k):
    # Step 1: Create the graph
    graph = {}
    for u, v, w in times:
        if u not in graph:
            graph[u] = []
        graph[u].append((v, w))

    # Step 2: Perform Dijkstra's Algorithm
    distances = [float('inf')] * (n + 1)
    distances[k] = 0
    heap = [(0, k)]

    while heap:
        distance, node = heapq.heappop(heap)

        # If the current distance is greater than the stored distance, skip the node
        if distance > distances[node]:
            continue

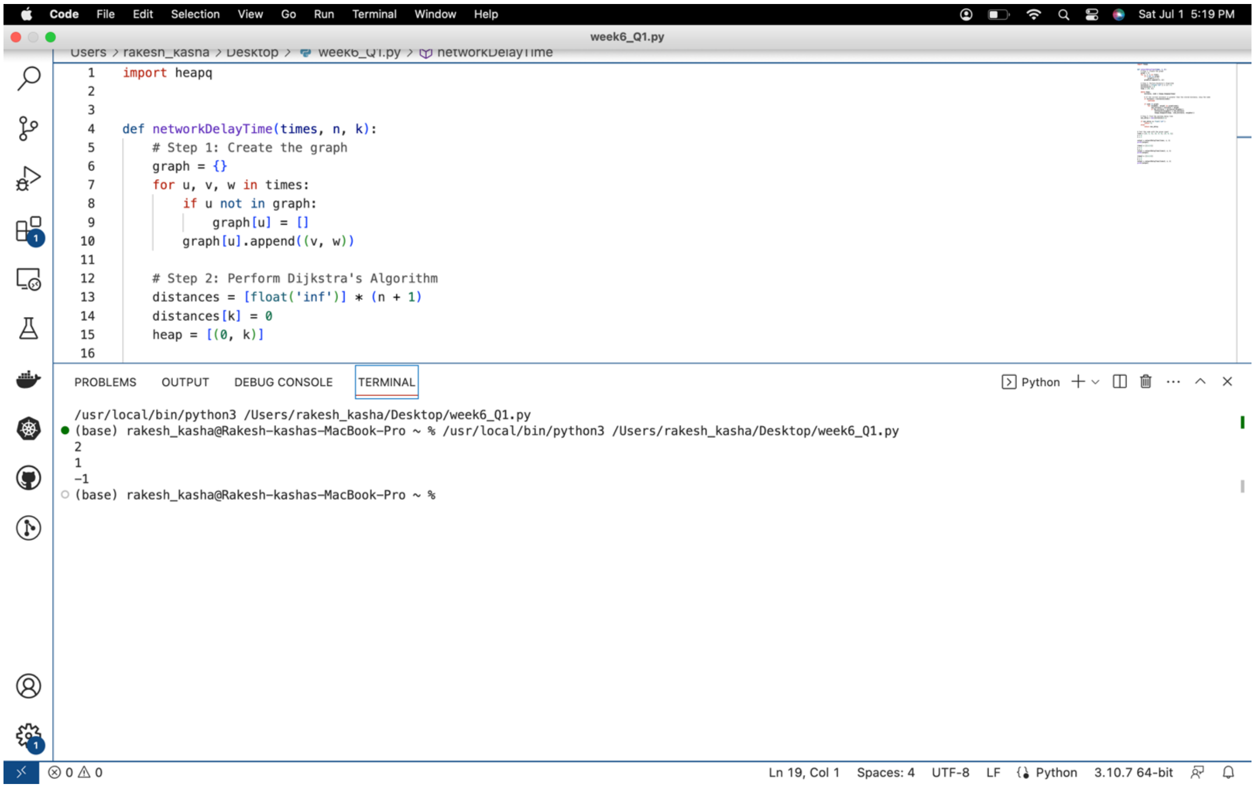
        if node in graph:
            for neighbor, weight in graph[node]:
                new_distance = distance + weight
                if new_distance < distances[neighbor]:
                    distances[neighbor] = new_distance
                    heapq.heappush(heap, (new_distance, neighbor))

    # Step 3: Find the maximum delay time
    max_delay = max(distances[1:])

    if max_delay == float('inf'):
        return -1
    else:
        return max_delay


# Test the code with the given input
times = [[2, 1, 1], [2, 3, 1], [3, 4, 1]]
n = 4
k = 2

output = networkDelayTime(times, n, k)
print(output)
```


Code File Edit Selection View Go Run Terminal Window Help
Sat Jul 1 5:19 PM
week6_Q1.py
Users > rakesh_kasha > Desktop > week6_Q1.py > networkDelayTime
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Python
Ln 19, Col 1 Spaces: 4 UTF-8 LF Python 3.10.7 64-bit
0 0

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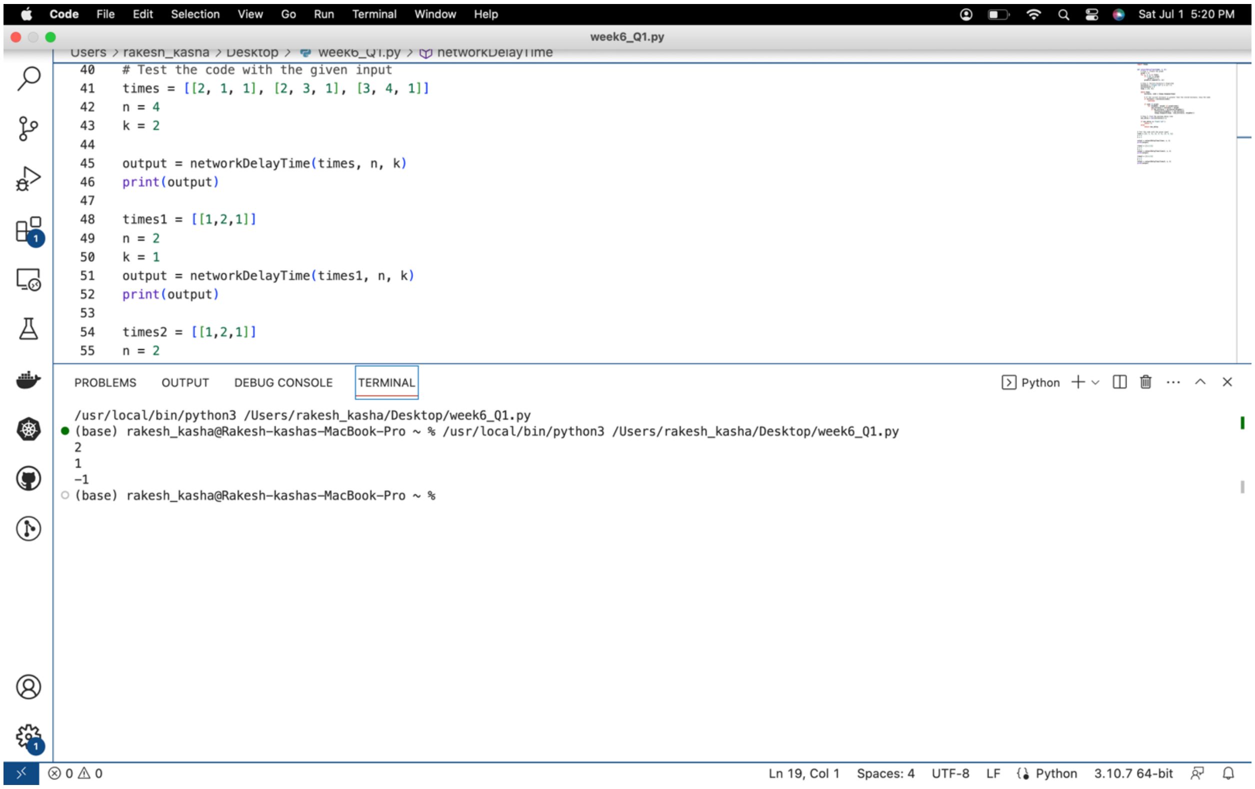
```

```
/usr/local/bin/python3 /Users/rakesh_kasha/Desktop/week6_Q1.py
(base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ % /usr/local/bin/python3 /Users/rakesh_kasha/Desktop/week6_Q1.py
2
1
-1
(base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ %
```


Code File Edit Selection View Go Run Terminal Window Help
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week6_Q1.py
Users > rakesh_kasha > Desktop > week6_Q1.py > networkDelayTime
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Python
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```python
# Test the code with the given input
times = [[2, 1, 1], [2, 3, 1], [3, 4, 1]]
n = 4
k = 2

output = networkDelayTime(times, n, k)
print(output)

times1 = [[1,2,1]]
n = 2
k = 1
output = networkDelayTime(times1, n, k)
print(output)

times2 = [[1,2,1]]
n = 2
```

```
/usr/local/bin/python3 /Users/rakesh_kasha/Desktop/week6_Q1.py
(base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ % /usr/local/bin/python3 /Users/rakesh_kasha/Desktop/week6_Q1.py
2
1
-1
(base) rakesh_kasha@Rakesh-kashas-MacBook-Pro ~ %
```