CN DVR ASSIGNMENT
BT20CSE087
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Instructions to run the code:

Install the following python package in your environment:

- pip install tabulate
- With python installed in your machine, run the following command:
  python dvr.py "input1.txt"

You will see the following as output:

Working of the code

The flow of the code starts with the main function which is then followed by parsing the input given in the text file. Then the initial routing table, adjacent routers, queues and locks are initialized.Then the main threading part is done. For each router a separate thread is made. And in each thread the main work of updating the routes and cost values are done using a shared queue which is locked at proper instances to prevent bugs while implementing concurrent threads.

- main():
- creates
1. routingTable
2. adjacentRouter table
3. queues
4. locks
5. barrier
6. dictionary and reverse dictionary
- launches
- router threads with arguments
- waits for threads to finish and join
- router():
_ waits(2)
_ sendsData 1. acquires lock corresponding to queue to send
2.queue.put(routingTable, routerId)
3. releases lock
_ waits for all threads to synchronize
_ receivesData 1. receives data from queue
2. re-calculates self routingTable
_ waits for all threads to synchronize
_ prints log

The following is the output of the code:

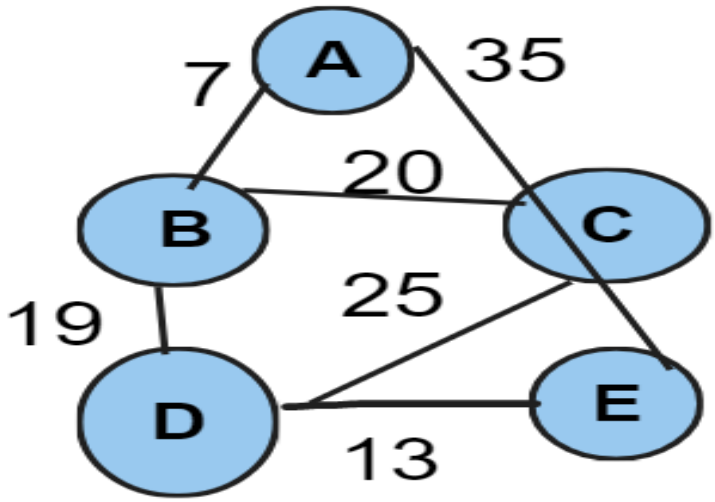
Results

For the following input:
Where, the first line is the number of routers and the next one describes the names of the routers. The following lines are edges with the certain edge cost mentioned.
The routing tables along with next hops after iteration number |routerCount| - 1 are:

```
PROBLEMS    OUTPUT    TERMINAL    DEBUG CONSOLE

PS C:\Users\naman\OneDrive\Documents\college\6th sem\cn\assgn3> python cn.py "input1.txt"


Routers:
{0: 'A', 1: 'B', 2: 'C', 3: 'D', 4: 'E'}


Adjacent routers:       [[1, 4], [0, 2, 3], [1, 3], [2, 4, 1], [3, 0]]


Routing Tables :
[[ 0.  7. inf inf 35.]
 [ 7.  0. 20. 19. inf]
 [inf 20.  0. 25. inf]
 [inf 19. 25.  0. 13.]
 [35. inf inf 13.  0.]]
```

```
---------------Routing table of router D after ITERATION :4--------------

  Cost  NextHop
------  ---------
    26  B
    19  B
    25  C
     0  D
    13  E

---------------Routing table of router E after ITERATION :4--------------

  Cost  NextHop
------  ---------
    35  A
    32  D
    38  D
    13  D
     0  E
---------------Routing table of router B after ITERATION :4--------------

  Cost  NextHop
------  ---------
     7  A
     0  B
    20  C
    19  D
    32  D
```

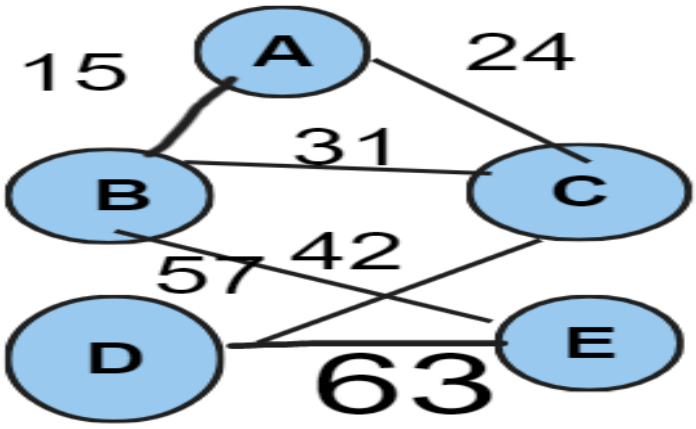
```
---------------Routing table of router A after ITERATION :4--------------

  Cost  NextHop
------  ---------
     0  A
     7  B
    27  B
    26  B
    35  E


---------------Routing table of router C after ITERATION :4--------------

  Cost  NextHop
------  ---------
    27  B
    20  B
     0  C
    25  D
    38  D

PS C:\Users\naman\OneDrive\Documents\college\6th sem\cn\assgn3>
```



For input2:

The output after iteration 4th is:

```
PS C:\Users\naman\OneDrive\Documents\college\6th sem\cn\assgn3> python cn.py "input2.txt"


Routers:
{0: 'A', 1: 'B', 2: 'C', 3: 'D', 4: 'E'}


Adjacent routers:       [[1, 2], [0, 2, 4], [0, 1, 3], [2, 4], [1, 3]]


Routing Tables :
[[ 0. 15. 24. inf inf]
 [15.  0. 31. inf 57.]
 [24. 31.  0. 42. inf]
 [inf inf 42.  0. 63.]
 [inf 57. inf 63.  0.]]
```

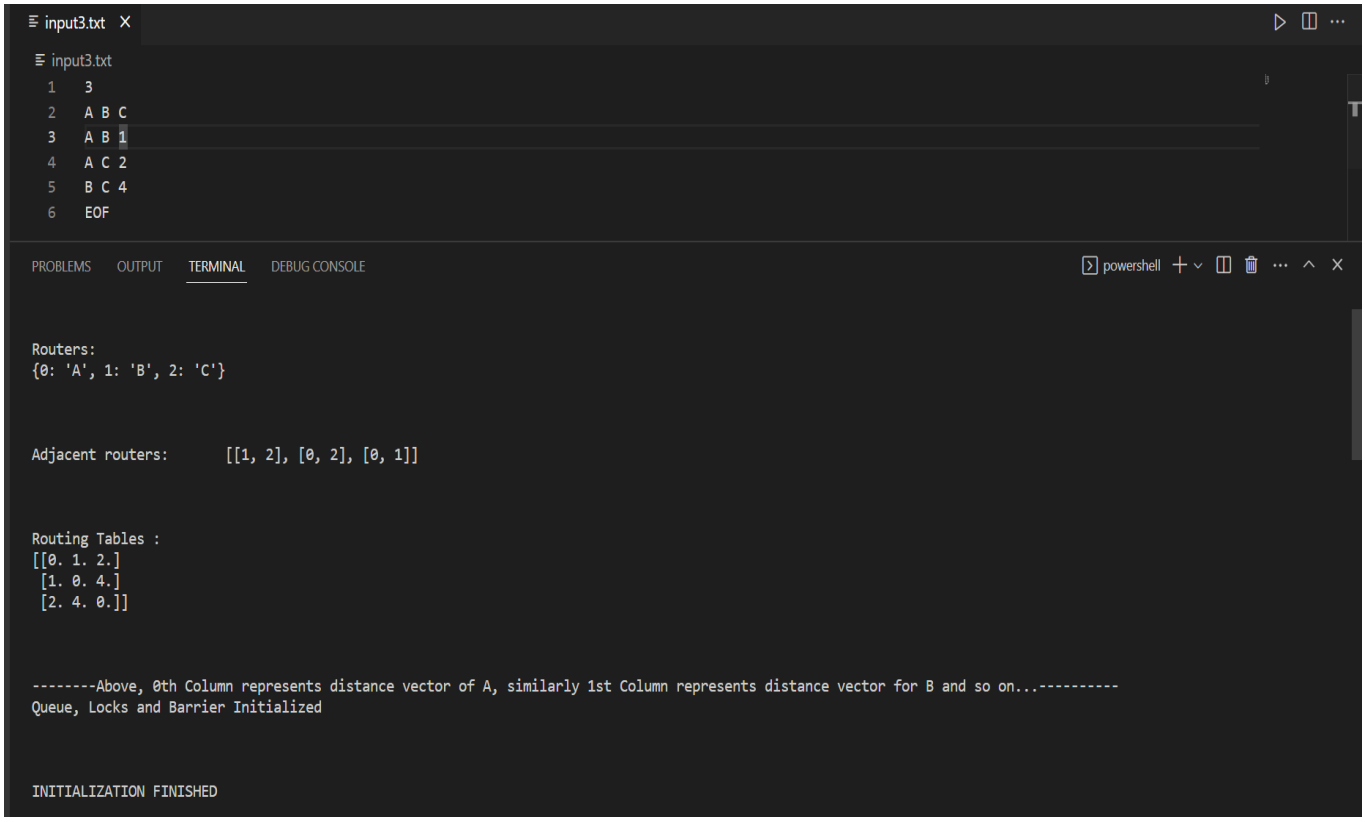


```
--------------Routing table of router E after ITERATION :4--------------

  Cost  NextHop
------  ---------
    72  B
    57  B
    88  B
    63  D
     0  E

--------------Routing table of router D after ITERATION :4--------------

  Cost  NextHop
------  ---------
    66  C
    73  C
    42  C
     0  D
    63  E
--------------Routing table of router B after ITERATION :4--------------

  Cost  NextHop
------  ---------
    15  A
     0  B
    31  C
    73  C
    57  E
```

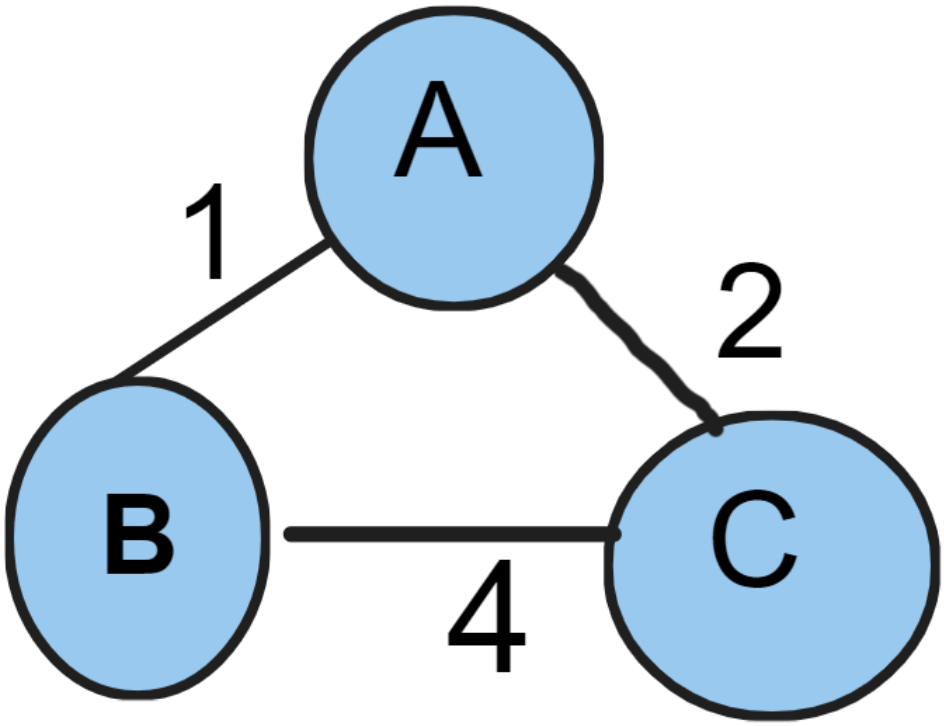
```
---------------Routing table of router A after ITERATION :4--------------

  Cost  NextHop
------  ---------
     0  A
    15  B
    24  C
    66  C
    72  B


---------------Routing table of router C after ITERATION :4--------------

  Cost  NextHop
------  ---------
    24  A
    31  B
     0  C
    42  D
    88  B
PS C:\Users\naman\OneDrive\Documents\college\6th sem\cn\assgn3>
```

For input3:

The output after 2 iterations is:




```
---------------Routing table of router B after ITERATION :2--------------

  Cost  NextHop
------  ---------
     1  A
     0  B
     3  A
---------------Routing table of router C after ITERATION :2--------------

  Cost  NextHop
------  ---------
     2  A
     3  A
     0  C


---------------Routing table of router A after ITERATION :2--------------

  Cost  NextHop
------  ---------
     0  A
     1  B
     2  C
PS C:\Users\naman\OneDrive\Documents\college\6th sem\cn\assgn3>
```



THANK YOU