



Assignment - 3

COMPUTER NETWORK

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How to run the code?

- Use cmd or ubuntu
- for cmd: python DVR.py
- for ubuntu: python3 DVR.py

EXECUTION FLOW:

- The program starts by reading a file 'inp.txt' which contains the information about the network topology.
- A dictionary 'router' is created which stores the router information for each node, where each node is represented by a dictionary having keys 'neighbours' and 'dvr'.
- A function 'print_init' is called to print the initial state of the routers.
- A function 'task' is created which takes in the router information, shared queue and the id of the thread.
- Within 'task', a loop runs for 4 iterations and calls two functions 'update_queue' and 'bellman_ford'.
- The 'update_queue' function updates the shared dictionary by copying the DVR table of each node to its neighbours' queues.
- The 'bellman_ford' function implements the Bellman Ford algorithm to update the DVR table of the router.
- The updated DVR table is printed after each iteration using the 'print' function.
- At the end of each iteration, the thread waits until all other threads have completed the iteration.

WORKING :

- **Router: A dictionary with keys as 'node names'.**
 - o Neighbours: to store list of neighbours of that node.
 - o Dvr: to store the distance vector table.

- **Shared: A dictionary with keys.**
 - o Node-names: for each node name there is a tuple of the queue and its lock.
 - o Counter: to store a list of nodes that have computed the new table.
 - o Printlock: lock for appending the update dvr table of each node to the final string.
 - o Finalstring: string that has the final information after each Iteration.

Testing Of Code:

For Following inp.txt :

```
inp.txt
1 4
2 A B C D
3 A B 10
4 B C 30
5 C D 110
6 A D 10
7 D B 70
8 EOF
9
```

Output :

```
PS C:\Users\LENOVO\Desktop\Komputer_Science\6th_sem\CN\Assignments\Assignment3> python DVR.py
-----INITIAL-----
ROUTER: A
Destination Cost Next Hop
A 0 A
B 10.0 B
C inf NA
D 10.0 D

ROUTER: B
Destination Cost Next Hop
A 10.0 A
B 0 B
C 30.0 C
D 70.0 D

ROUTER: C
Destination Cost Next Hop
A inf NA
B 30.0 B
C 0 C
D 110.0 D

ROUTER: D
Destination Cost Next Hop
A 10.0 A
B 70.0 B
C 110.0 C
D 0 D

-----ITERATION 1-----
ROUTER: A
Destination Cost Next Hop
A 0 A
B 10.0 B
* C 40.0 B
D 10.0 D
```

-----ITERATION 1-----

| ROUTER: A | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 0 | A |
| B | 10.0 | B |
| * C | 40.0 | B |
| D | 10.0 | D |

| ROUTER: B | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 10.0 | A |
| B | 0 | B |
| C | 30.0 | C |
| * D | 20.0 | A |

| ROUTER: C | | |
|-------------|-------|----------|
| Destination | Cost | Next Hop |
| * A | 40.0 | B |
| B | 30.0 | B |
| C | 0 | C |
| * D | 100.0 | B |

| ROUTER: D | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 10.0 | A |
| * B | 20.0 | A |
| Destination | Cost | Next Hop |
| A | 10.0 | A |
| B | 20.0 | A |
| * C | 50.0 | A |
| D | 0 | D |

```
-----ITERATION 3-----
```

| ROUTER: A | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 0 | A |
| B | 10.0 | B |
| C | 40.0 | B |
| D | 10.0 | D |

| ROUTER: B | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 10.0 | A |
| B | 0 | B |
| C | 30.0 | C |
| D | 20.0 | A |

| ROUTER: C | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 40.0 | B |
| B | 30.0 | B |
| C | 0 | C |
| D | 50.0 | B |

| ROUTER: D | | |
|-------------|------|----------|
| Destination | Cost | Next Hop |
| A | 10.0 | A |
| B | 20.0 | A |
| C | 50.0 | A |
| D | 0 | D |

```
-----ITERATION 4-----
```

-----ITERATION 4-----

ROUTER: A

| Destination | Cost | Next Hop |
|-------------|------|----------|
| A | 0 | A |
| B | 10.0 | B |
| C | 40.0 | B |
| D | 10.0 | D |

ROUTER: B

| Destination | Cost | Next Hop |
|-------------|------|----------|
| A | 10.0 | A |
| B | 0 | B |
| C | 30.0 | C |
| D | 20.0 | A |

ROUTER: C

| Destination | Cost | Next Hop |
|-------------|------|----------|
| A | 40.0 | B |
| B | 30.0 | B |
| C | 0 | C |
| D | 50.0 | B |

ROUTER: D

| Destination | Cost | Next Hop |
|-------------|------|----------|
| A | 10.0 | A |
| B | 20.0 | A |
| C | 50.0 | A |
| D | 0 | D |