

## CS536 Lab2: Distance Vector Routing

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### Part A:

Compile: `gcc mainA.c -o mainA`

Execute : `./mainA kmax [Input topo file path]`

Example: `./mainA 10 topo_4.txt`

Output:

```
• (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 % gcc mainA.c -o mainA
• (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 % ./mainA 10 topo_4.txt
k=0:
node-0: 0 10 5 2
node-1: 10 0 1 -1
node-2: 5 1 0 2
node-3: 2 -1 2 0
k=1:
node-0: 0 6 4 2
node-1: 6 0 1 3
node-2: 4 1 0 2
node-3: 2 3 2 0
k=2:
node-0: 0 5 4 2
node-1: 5 0 1 3
node-2: 4 1 0 2
node-3: 2 3 2 0
k=3:
node-0: 0 5 4 2
node-1: 5 0 1 3
node-2: 4 1 0 2
node-3: 2 3 2 0
k=4:
node-0: 0 5 4 2
node-1: 5 0 1 3
node-2: 4 1 0 2
node-3: 2 3 2 0
k=10:
node-0: 0 5 4 2
node-1: 5 0 1 3
node-2: 4 1 0 2
node-3: 2 3 2 0
○ (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 %
```

Part B:

Compile: `gcc mainB.c -o mainB`

Execute : `./mainB kmax [Input topo file path] [Input traffic file path]`

Example: `./mainB 10 topo_4.txt traffic_4.txt`

Output:

```
• (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 % gcc mainB.c -o mainB
• (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 % ./mainB 10 topo_4.txt traffic_4.txt
```

```
k=0:
0 1 5 0>1
2 0 4 2>0
3 2 10 3>2
1 3 3 1>3
k=1:
0 1 5 0>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=2:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=3:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=4:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=5:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=6:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=7:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=8:
```

```
3 2 10 3>2
1 3 3 1>2>3
k=3:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=4:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=5:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=6:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=7:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=8:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=9:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=10:
0 1 5 0>3>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
```

```
○ (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 %
```

Part C :

Compile: gcc mainC.c -o mainC

Execute : ./mainC kmax [Input topo file path] [Input traffic file path]

Example: ./mainC 10 topo\_4.txt traffic\_4.txt

Output:

```
• (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 % gcc mainC.c -o mainC
• (base) mansishinde@Mansis-MacBook-Air Lab2_34784153 % ./mainC 10 topo_4.txt traffic_4.txt
k=0:
0 1 5 0>1
2 0 4 2>0
3 2 10 3>2
1 3 3 1>3
k=1:
0 1 5 0>2>1
2 0 4 2>3>0
3 2 10 3>2
1 3 3 1>2>3
k=2:
0 1 5 0>1
2 0 4 2>0
3 2 10 3>0>1>0(drop)
1 3 3 1>0>3
k=3:
0 1 5 0>2>1
2 0 4 2>1>0
3 2 10 3>2
1 3 3 1>2>3
k=4:
0 1 5 0>2>1>1(drop)
2 0 4 2>0
3 2 10 3>0>2
1 3 3 1>0>3
k=5:
0 1 5 0>1
2 0 4 2>1>0
3 2 10 3>2
1 3 3 1>2>3
k=6:
0 1 5 0>2>1
2 0 4 2>0
3 2 10 3>0>2
1 3 3 1>2>3
k=7:
```

```

3 2 10 3>2
1 3 3 1>2>3
k=4:
0 1 5 0>2>1>1(drop)
2 0 4 2>0
3 2 10 3>0>2
1 3 3 1>0>3
k=5:
0 1 5 0>1
2 0 4 2>1>0
3 2 10 3>2
1 3 3 1>2>3
k=6:
0 1 5 0>2>1
2 0 4 2>0
3 2 10 3>0>2
1 3 3 1>2>3
k=7:
0 1 5 0>2>1
2 0 4 2>1>0
3 2 10 3>2
1 3 3 1>0>3
k=8:
0 1 5 0>1
2 0 4 2>0
3 2 10 3>0>2
1 3 3 1>0>3
k=9:
0 1 5 0>1
2 0 4 2>1>0
3 2 10 3>2
1 3 3 1>2>3
k=10:
0 1 5 0>2>0(drop)
2 0 4 2>0
3 2 10 3>0>2
1 3 3 1>2>3
(base) mansishinde@Mansis-MacBook-Air Lab2_34784153 %

```

Q. Have you observed the oscillation? Please run your Part C when k max is small or large enough (for convergence). If yes, what do they look like? If no, please explain why not. Please answer this question in your report.

The oscillation is observed in k=8 and k=9 as below:

For k = 8:

0 1 5 0>2>1

2 0 4 2>0

3 2 10 3>0>2

1 3 3 1>2>0>3

Where, while going from source 0 to destination 1, it follows 0>2>1 path and then again 2>0 for source 2 to destination 0. Similarly, for source 3 to destination 2, it follows 3>0>2 and then again 1>2>0>3 for source 1 to destination 3.

For k = 9:

0 1 5 0>1

2 0 4 2>3>2(drop)

3 2 10 3>2

1 3 3 1>0>1(drop)

Here, the Oscillation is observed while going from source 0 to destination 1 and source 1 to destination 3, where the path are  $0 \rightarrow 1$  and  $1 \rightarrow 0 \rightarrow 1$  respectively. Similarly for path  $2 \rightarrow 3 \rightarrow 2$  and  $3 \rightarrow 2$ .

We see such oscillations due to repeatedly changes in the routing table leading to unstable network.