Networks Lab 6.2

S Mohana Prasad CS12B025

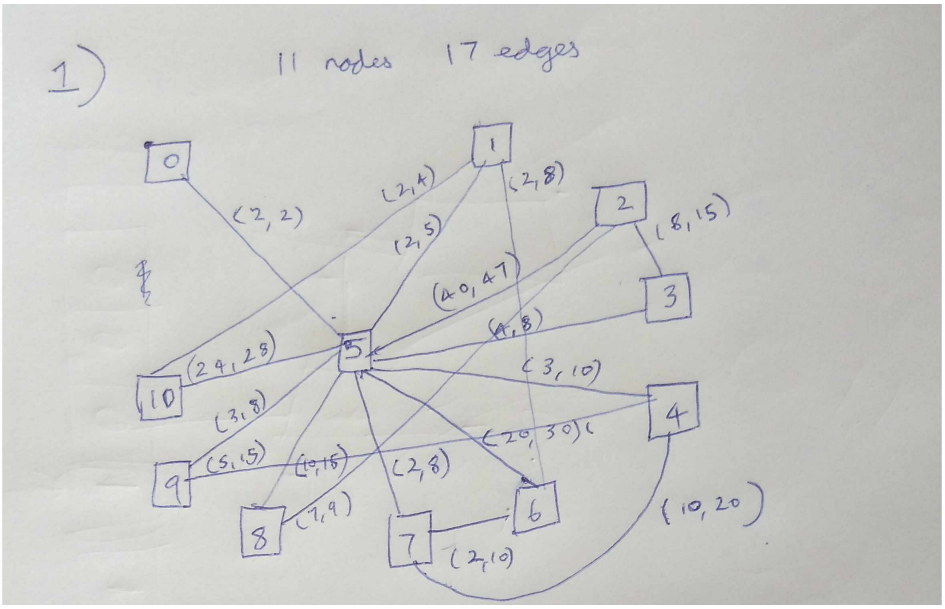
April 18, 2015

OSPF is an interior gateway protocol (IGP) for routing Internet Protocol (IP) packets solely within a single routing domain, such as an autonomous system. It gathers link state information from available routers and constructs a topology map of the network. The topology is presented as a routing table to the Internet Layer which routes datagrams based solely on the destination IP address found in IP packets. OSPF detects changes in the topology, such as link failures, and converges on a new loop-free routing structure within seconds. It computes the shortest path tree for each route using a method based on Dijkstra's algorithm, a shortest path first algorithm.

In our exercise we randomly decide on the link cost within the given range and have tried OSPF by running multiple processes on a single local host.

The OSPF protocol was coded up. The following test cases were tried. The working of djikstra's algorithm was tested by setting both the min and max to the same value. I am presenting two test cases that I have checked. I have attached 3 other test cases in my submission.

The first network had 11 nodes and 17 edges. The following is the topology.



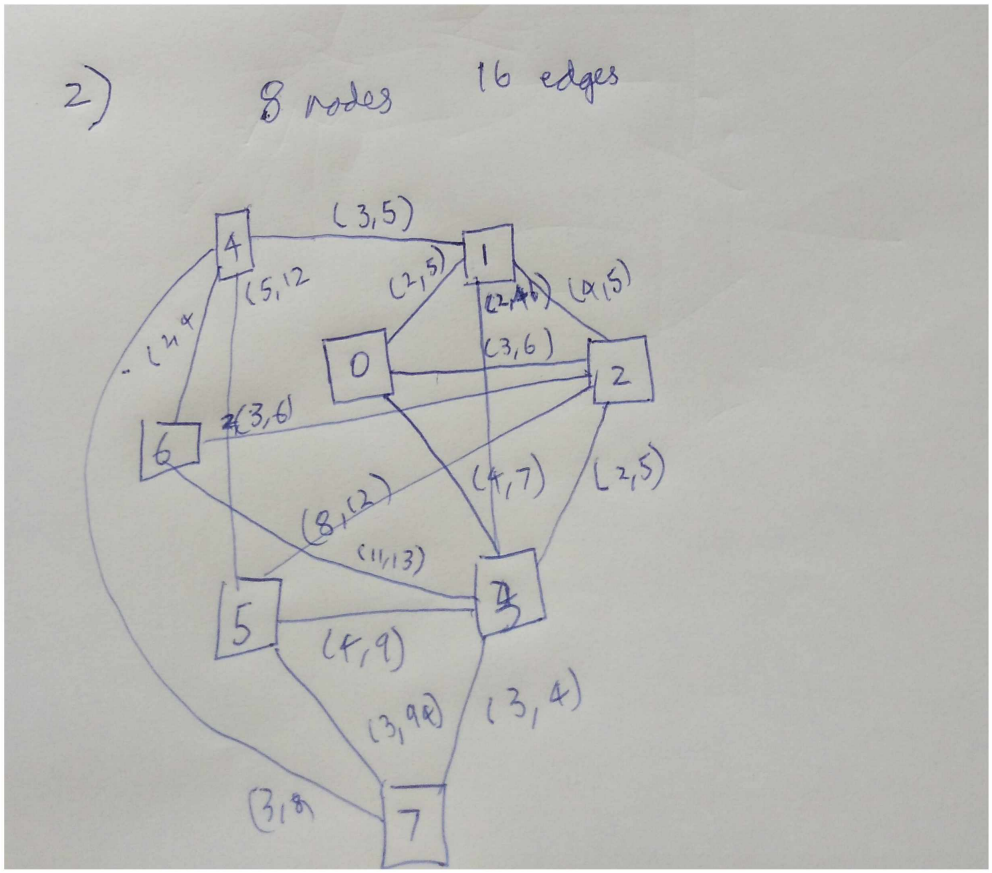
The following were the outputs. For lack of space, I am presenting the last output for some of the nodes. The entire output can be seen in sample folder

```
Routing table for Node Id 0 Time = 460 seconds
Destination   Path   Cost
1               0-5-1    7
2               0-5-8-2  19
3               0-5-3    9
4               0-5-4    11
5               0-5      2
6               0-5-1-6  13
7               0-5-7    10
8               0-5-8    12
9               0-5-9    7
10               0-5-1-10 11

Routing table for Node Id 1 Time = 460 seconds
Dest Path   Cost
0  1-5-0   7
2  1-5-8-2 22
3  1-5-3   12
4  1-5-4   14
5  1-5     5
6  1-6     4
7  1-6-7   12
8  1-5-8   15
9  1-5-9   10
10  1-10    4

Routing table for Node Id 2 Time = 460 seconds
Dest Path  Cost
0  2-8-5-0    21
1  2-8-5-1    24
3  2-3        14
4  2-8-5-4    28
5  2-8-5      19
6  2-8-5-1-6  30
7  2-8-5-7    27
8  2-8        8
9  2-8-5-9    24
10  2-8-5-1-10 28

Routing table for Node Id 5 Time = 460 seconds
Dest Path Cost
0  5-0    2
1  5-1    2
2  5-8-2  17
```

```
3  5-3    7
4  5-4    10
6  5-1-6  8
7  5-7    4
8  5-8    10
9  5-9    4
10  5-1-10 6

Routing table for Node Id 7 Time = 460 seconds
Dest Path  Cost
0  7-5-0    10
1  7-5-1    13
2  7-5-8-2  25
3  7-5-3    15
4  7-4      13
5  7-5      8
6  7-6      7
8  7-5-8    18
9  7-5-9    13
10  7-5-1-10 17
```

The second case has 8 nodes and 16 edges. Again due to lack of space I present only a few of the output here. entire output can be seen in sample 1

The input is the following:




```
Routing table for Node Id 0 Time = 120.024 seconds
Dest Path Cost
1  0-1     2
2  0-2     6
3  0-3     7
4  0-1-4   6
5  0-3-5   12
6  0-1-4-6 8
7  0-3-7   11

Routing table for Node Id 1 Time = 20.0121 seconds
Dest Path Cost
0  1-0     4
2  1-2     5
3  1-4-7-3 9
4  1-4     3
```

```
5  1-4-5   9
6  1-4-6   5
7  1-4-7   6

Routing table for Node Id 2 Time = 120.029 seconds
Dest Path Cost
0  2-0    3
1  2-1    4
3  2-3    4
4  2-1-4  8
5  2-3-5  9
6  2-6    4
7  2-3-7  8

Routing table for Node Id 3 Time = 120.025 seconds
Dest Path Cost
0  3-0     7
1  3-2-1   9
2  3-2     5
4  3-7-4   11
5  3-5     8
6  3-2-6   9
7  3-7     3

Routing table for Node Id 4 Time = 120.024 seconds
Dest Path Cost
0  4-1-0  7
1  4-1    4
2  4-6-2  8
3  4-7-3  10
5  4-5    11
6  4-6    3
7  4-7    6

Routing table for Node Id 5 Time = 120.116 seconds
Dest Path  Cost
0  5-2-0   14
1  5-3-1   13
2  5-2     10
3  5-3     9
4  5-4     9
6  5-4-6   11
7  5-3-7   13

Routing table for Node Id 6 Time = 120.2 seconds
Dest Path Cost
0  6-2-0  10
1  6-4-1  9
2  6-2    6
3  6-3    11
```

```
4  6-4    4
5  6-4-5  14
7  6-4-7  10

Routing table for Node Id 7 Time = 120.024 seconds
Dest Path Cost
0  7-3-0  11
1  7-3-1  8
2  7-3-2  9
3  7-3    4
4  7-4    7
5  7-3-5  9
6  7-4-6  9
```

The OSPF implementation works properly. We can also see that, the OSPF protocol takes less time to recognize changes in links.