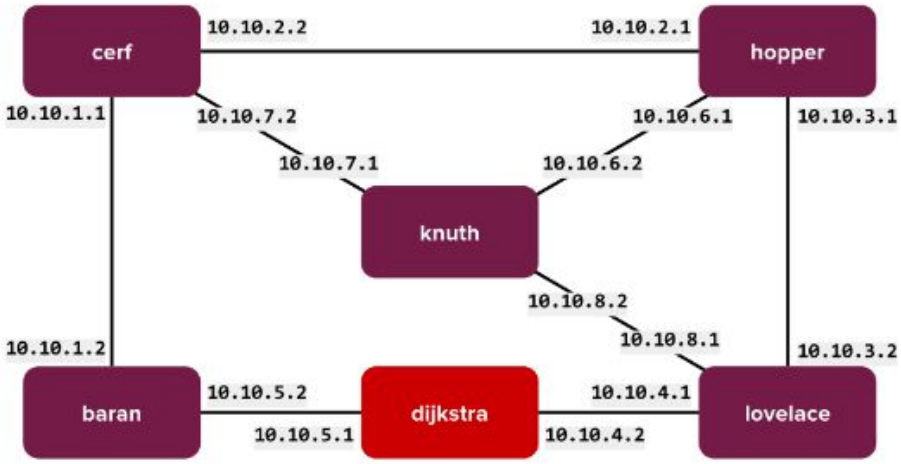
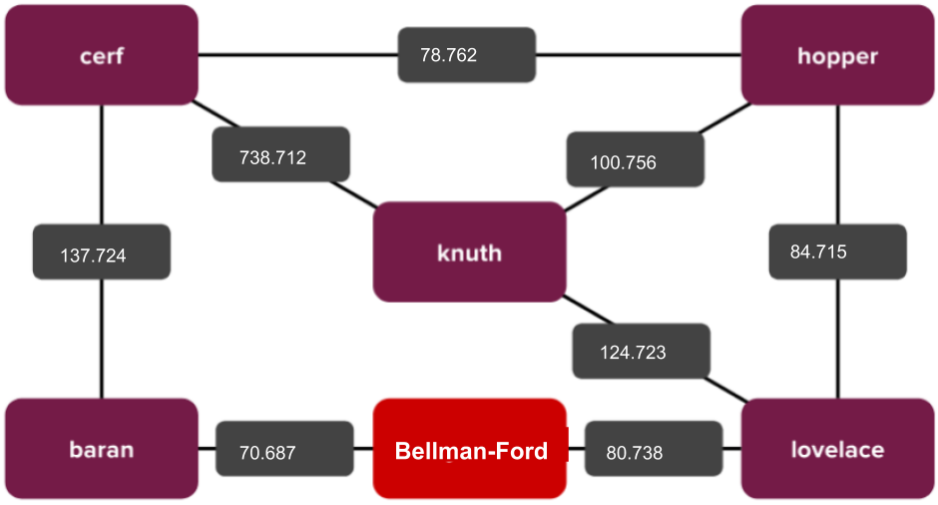
David Margolin - Project Report

1. Include two pictures of IP addresses defined on each node and cost on each links.

The IP addresses are the same as Lab 3 so i'm pasting that same picture (dijkstra should be replaced with bellman-ford)



Costs:



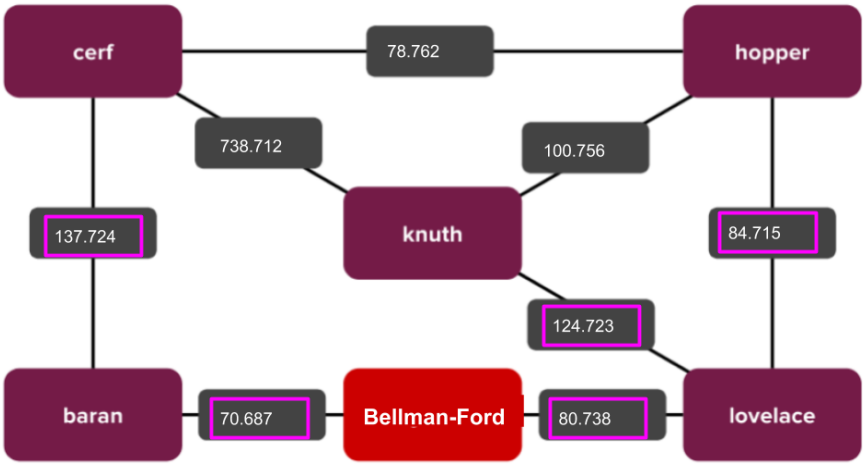
2. After running Bellman–Ford algorithm, include the screenshot of your output.

Output is in csv format

```
(env) davidm@bellman-ford:~$ python3 cli.py traverse bellman-ford graph.csv
bellman-ford,lovelace,baran,knuth,hopper,cerf
0,inf,inf,inf,inf,inf
0,80.738,70.687,205.461,165.453,208.411
0,80.738,70.687,205.461,165.453,208.411
0,80.738,70.687,205.461,165.453,208.411
0,80.738,70.687,205.461,165.453,208.411
0,80.738,70.687,205.461,165.453,208.411


bellman-ford: 0 via start
lovelace: 80.738 via bellman-ford
baran: 70.687 via bellman-ford
knuth: 205.461 via lovelace
hopper: 165.453 via lovelace
cerf: 208.411 via baran
```

3. Also include the picture of marking each network interface as being part of the shortest path tree if they are on a "pink" link, and not part of the shortest path tree if they are on a "grey" link. Please refer to Lab#3.



4. Screenshot of interface script output.

The output of the mtr script displays the next hop and the node it goes through. For example, the next hope for lovelace is 10.10.4.1 via bellman-ford.

Lovelace (mtr script):

```
(env) davidm@bellman-ford:~$ python3 cli.py mtr lovelace
1.      bellman-ford    10.10.4.1       80.738ms
```

Lovelace (actual mtr):

```
(env) davidm@bellman-ford:~$ mtr 10.10.4.1 --report --no-dns
Start: 2020-05-23T17:45:56-0500
HOST: bellman-ford.davidm-qv72388 Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- 10.10.4.1                 0.0%    10   81.0  80.8  80.7  81.0   0.1
```

Knuth (mtr script):

```
(env) davidm@bellman-ford:~$ python3 cli.py mtr knuth
1.      bellman-ford    10.10.4.1       80.738ms
2.      lovelace        10.10.8.2       205.461ms
```

Knuth (actual mtr):

```
(env) davidm@bellman-ford:~$ mtr 10.10.8.2 --report --no-dns
Start: 2020-05-23T17:47:18-0500
HOST: bellman-ford.davidm-qv72388 Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- 10.10.4.1                 0.0%    10   80.7  80.8  80.7  81.0   0.1
  2.|-- 10.10.8.2                 0.0%    10  205.4 205.5 205.2 205.7   0.2
```

Hopper (mtr script):

```
(env) davidm@bellman-ford:~$ python3 cli.py mtr hopper
1.      bellman-ford    10.10.4.1       80.738ms
2.      lovelace        10.10.3.1       165.453ms
```

Hopper (actual mtr):

```
(env) davidm@bellman-ford:~$ mtr 10.10.3.1 --report --no-dns
Start: 2020-05-23T17:48:21-0500
HOST: bellman-ford.davidm-qv72388 Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- 10.10.4.1                 0.0%    10   80.9  80.8  80.7  81.0   0.1
  2.|-- 10.10.3.1                 0.0%    10  165.6 165.5 165.3 165.6   0.1
```

Baran (mtr script):

```
(env) davidm@bellman-ford:~$ python3 cli.py mtr baran
1.      bellman-ford    10.10.5.2       70.687ms
```

Baran (actual mtr):

```
(env) davidm@bellman-ford:~$ mtr 10.10.5.2 --report --no-dns
Start: 2020-05-23T17:51:10-0500
HOST: bellman-ford.davidm-qv72388 Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- 10.10.5.2                 0.0%    10   70.9  70.9  70.7  71.0   0.1
```

Cerf (mtr script):

```
(env) davidm@bellman-ford:~$ python3 cli.py mtr cerf
1.      bellman-ford    10.10.5.2       70.687ms
2.      baran   10.10.1.1       208.411ms
```

Cerf (actual mtr):

```
(env) davidm@bellman-ford:~$ mtr 10.10.1.1 --report --no-dns
Start: 2020-05-23T17:52:21-0500
HOST: bellman-ford.davidm-qv72388 Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- 10.10.5.2                 0.0%    10   70.9  70.8  70.7  70.9   0.1
  2.|-- 10.10.1.1                 0.0%    10  208.6 208.5 208.3 208.7   0.1
```

Instructions to install and run both scripts are in README.md