Homework 4

Problem 4.1
Solution:
a) look ping-a.txt and ping-b.txt and conf files.

b)
ISP "F":

```
a1 traceroute 2001:638:709:a2::1
traceroute to 2001:638:709:a2::1 (2001:638:709:a2::1), 30 hops max, 80 byte packets
 1  _gateway (2001:638:709:a1::f1)  0.073 ms  0.022 ms  0.024 ms
 2  2001:638:709:f::f1:f2 (2001:638:709:f::f1:f2)  0.047 ms  0.029 ms  0.027 ms
 3  2001:638:709:a2::1 (2001:638:709:a2::1)  0.044 ms  0.035 ms  0.033 ms

 link f1 f2 down

 a1 traceroute 2001:638:709:a2::1
traceroute to 2001:638:709:a2::1 (2001:638:709:a2::1), 30 hops max, 80 byte packets
 1  _gateway (2001:638:709:a1::f1)  0.072 ms  0.022 ms  0.019 ms
 2  2001:638:709:f::f1:f4 (2001:638:709:f::f1:f4)  0.047 ms  0.030 ms  0.028 ms
 3  2001:638:709:f::f4:f3 (2001:638:709:f::f4:f3)  0.054 ms  0.038 ms  0.037 ms
 4  2001:638:709:f::f3:f2 (2001:638:709:f::f3:f2)  0.059 ms  0.044 ms  0.058 ms
 5  2001:638:709:a2::1 (2001:638:709:a2::1)  0.065 ms  0.054 ms  0.054 ms
```

ISP "E"

```
b1 traceroute 2001:638:709:b2::1
traceroute to 2001:638:709:b2::1 (2001:638:709:b2::1), 30 hops max, 80 byte packets
 1  _gateway (2001:638:709:b1::e1)  0.073 ms  0.023 ms  0.020 ms
 2  2001:638:709:e::e1:e2 (2001:638:709:e::e1:e2)  0.045 ms  0.029 ms  0.026 ms
 3  2001:638:709:b2::1 (2001:638:709:b2::1)  0.044 ms  0.035 ms  0.034 ms


link e1 e2 down

b1 traceroute 2001:638:709:b2::1
traceroute to 2001:638:709:b2::1 (2001:638:709:b2::1), 30 hops max, 80 byte packets
 1  _gateway (2001:638:709:b1::e1)  0.083 ms  0.023 ms  0.018 ms
 2  2001:638:709:e::e1:e4 (2001:638:709:e::e1:e4)  0.050 ms  0.029 ms  0.028 ms
 3  2001:638:709:e::e4:e3 (2001:638:709:e::e4:e3)  0.048 ms  0.038 ms  0.036 ms
 4  2001:638:709:e::e3:e2 (2001:638:709:e::e3:e2)  0.060 ms  0.045 ms  0.046 ms
 5  2001:638:709:b2::1 (2001:638:709:b2::1)  0.060 ms  0.049 ms  0.051 ms
```

c)
Examples of the connection to clients networks and internal hosts. You can test yourself, by commenting all the filters.

```
a2 ping -6 2001:638:709:e::e1:e2
PING 2001:638:709:e::e1:e2(2001:638:709:e::e1:e2) 56 data bytes
64 bytes from 2001:638:709:e::e1:e2: icmp_seq=1 ttl=62 time=0.182 ms
64 bytes from 2001:638:709:e::e1:e2: icmp_seq=2 ttl=62 time=0.102 ms
64 bytes from 2001:638:709:e::e1:e2: icmp_seq=3 ttl=62 time=0.111 ms
64 bytes from 2001:638:709:e::e1:e2: icmp_seq=4 ttl=62 time=0.109 ms
--- 2001:638:709:e::e1:e2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3076ms
rtt min/avg/max/mdev = 0.102/0.126/0.182/0.032 ms
```

d)
We can test that we still can ping from any Ai host to any Bi host and vice versa.

```
a2 ping -6 -c 1 2001:638:709:b2::1
PING 2001:638:709:b2::1(2001:638:709:b2::1) 56 data bytes
64 bytes from 2001:638:709:b2::1: icmp_seq=1 ttl=61 time=0.083 ms
```

```
--- 2001:638:709:b2::1 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.083/0.083/0.083/0.000 ms

a1 ping -6 -c 1 2001:638:709:b4::1
PING 2001:638:709:b4::1(2001:638:709:b4::1) 56 data bytes
64 bytes from 2001:638:709:b4::1: icmp_seq=1 ttl=60 time=0.233 ms
--- 2001:638:709:b4::1 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.233/0.233/0.233/0.000 ms

b2 ping -6 -c 1 2001:638:709:a2::1
PING 2001:638:709:a2::1(2001:638:709:a2::1) 56 data bytes
64 bytes from 2001:638:709:a2::1: icmp_seq=1 ttl=61 time=0.155 ms
--- 2001:638:709:a2::1 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.155/0.155/0.155/0.000 ms

b1 ping -6 -c 1 2001:638:709:a4::1
PING 2001:638:709:a4::1(2001:638:709:a4::1) 56 data bytes
64 bytes from 2001:638:709:a4::1: icmp_seq=1 ttl=60 time=0.237 ms
--- 2001:638:709:a4::1 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.237/0.237/0.237/0.000 ms
```

However, we cannot ping anymore to internal hosts of the other AS.

```
mininet> b1 traceroute  -6  2001:638:709:f::f2:f1
traceroute to 2001:638:709:f::f2:f1 (2001:638:709:f::f2:f1), 30 hops max, 80 byte pac
 1  _gateway (2001:638:709:b1::e1)  0.774 ms  0.673 ms  0.625 ms
 2  _gateway (2001:638:709:b1::e1)  3048.349 ms !H  3048.291 ms !H  3048.262 ms !H

mininet> a3 traceroute  -6  2001:638:709:e::e4:e3
traceroute to 2001:638:709:e::e4:e3 (2001:638:709:e::e4:e3), 30 hops max, 80 byte pac
 1  _gateway (2001:638:709:a3::f3)  0.744 ms  0.643 ms  0.596 ms
 2  _gateway (2001:638:709:a3::f3)  3050.857 ms !H  3050.806 ms !H  3050.777 ms !H
```