TOPOLOGY CODE:

```
from mininet.topo import Topo
from mininet.net import Mininet
from mininet.util import dumpNodeConnections
from mininet.log import setLogLevel
from mininet.cli import CLI
from mininet.node import RemoteController

class lab3_topo(Topo):
  def build(self):
    s1 = self.addSwitch('s1')
    h1 = self.addHost('h1',mac='00:00:00:00:00:01',ip='10.0.1.10/24')
    h2 = self.addHost('h2',mac='00:00:00:00:00:02',ip='10.0.1.20/24')
    h3 = self.addHost('h3',mac='00:00:00:00:00:03',ip='10.0.1.30/24')
    h4 = self.addHost('h4',mac='00:00:00:00:00:04',ip='10.0.1.40/24')
    self.addLink(h1,s1)
    self.addLink(h2,s1)
    self.addLink(h3,s1)
    self.addLink(h4,s1)

def configure():
  topo = lab3_topo()
  net = Mininet(topo=topo, controller=RemoteController)
  net.start()
  h1, h2, h3, h4 = net.get('h1', 'h2', 'h3', 'h4')

  CLI(net)

  net.stop()


if __name__ == '__main__':
  configure()
```

POX CONTROLLER CODE:

```
from pox.core import core
import pox.openflow.libopenflow_01 as of

log = core.getLogger()

class Firewall (object):
  """
  A Firewall object is created for each switch that connects.
  A Connection object for that switch is passed to the __init__ function.
  """
  def __init__ (self, connection):
    # Keep track of the connection to the switch so that we can
```

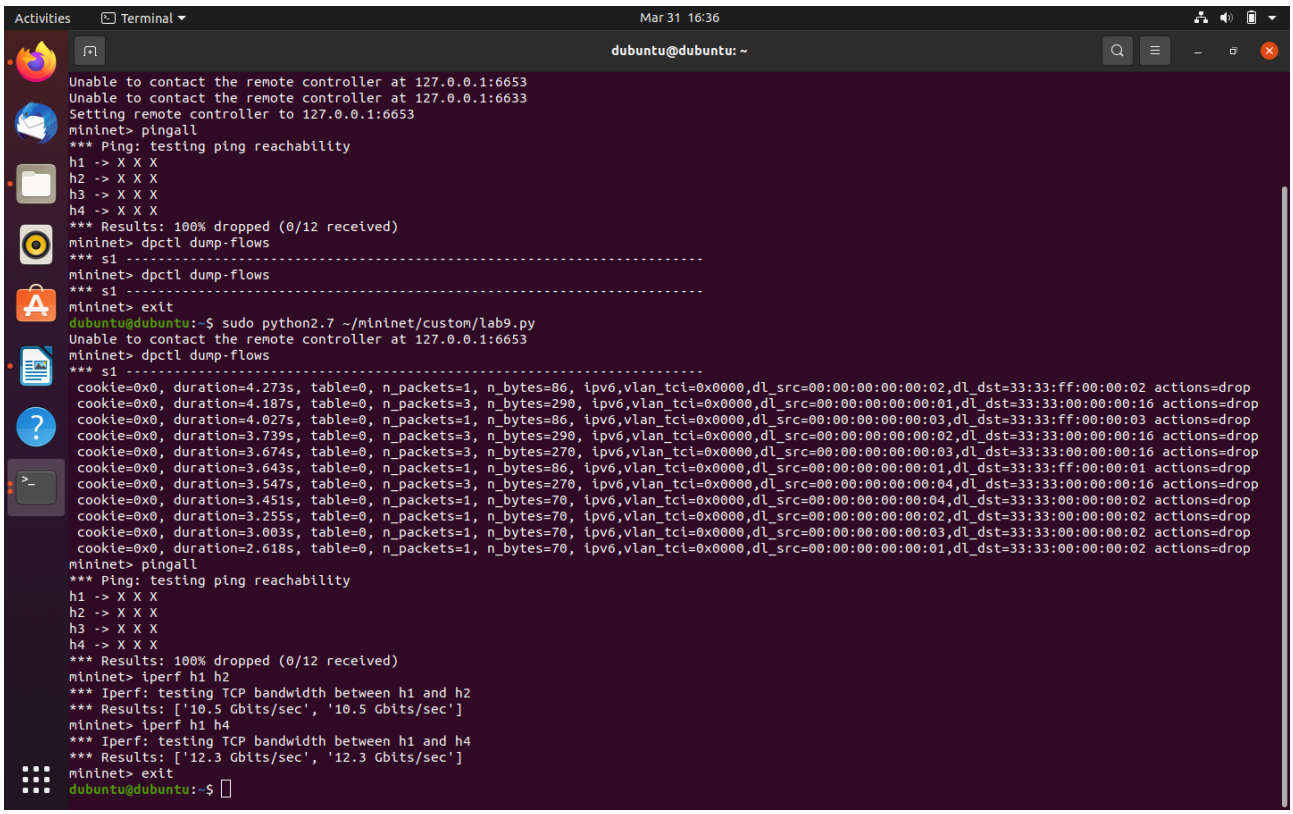
```
    # send it messages!
    self.connection = connection

    # This binds our PacketIn event listener
    connection.addListeners(self)

  def do_firewall (self, packet, packet_in):
    msg = of.ofp_flow_mod()
    msg.match = of.ofp_match.from_packet(packet)
    msg.data = packet_in


    if((packet.find('tcp')is not None)or(packet.find('arp')is not None)):
        msg.actions.append(of.ofp_action_output(port = of.OFPP_FLOOD))
        self.connection.send(msg)
    else:
        self.connection.send(msg)

  def _handle_PacketIn (self, event):
    """
    Handles packet in messages from the switch.
    """

    packet = event.parsed # This is the parsed packet data.
    if not packet.parsed:
      log.warning("Ignoring incomplete packet")
      return

    packet_in = event.ofp # The actual ofp_packet_in message.
    self.do_firewall(packet, packet_in)

def launch ():
  """
  Starts the component
  """
  def start_switch (event):
    log.debug("Controlling %s" % (event.connection,))
    Firewall(event.connection)
  core.openflow.addListenerByName("ConnectionUp", start_switch)
```

TERMINAL -1

```
dubuntu@dubuntu:~$ sudo ~/pox/pox.py misc.lab9controller
POX 0.7.0 (gar) / Copyright 2011-2020 James McCauley, et al.
WARNING:version:Support for Python 3 is experimental.
INFO:core:POX 0.7.0 (gar) is up.
INFO:openflow.of_01:[00-00-00-00-00-01 2] connected
INFO:openflow.of_01:[00-00-00-00-00-01 2] closed
```

TERMINAL - 2

dubuntu@dubuntu:~$ **sudo python2.7 ~/mininet/custom/lab9.py**
Unable to contact the remote controller at 127.0.0.1:6653
mininet> **dpctl dump-flows**
*** s1 --
 cookie=0x0, duration=4.273s, table=0, n_packets=1, n_bytes=86,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:02,dl_dst=33:33:ff:00:00:02 actions=drop
 cookie=0x0, duration=4.187s, table=0, n_packets=3, n_bytes=290,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=33:33:00:00:00:16 actions=drop
 cookie=0x0, duration=4.027s, table=0, n_packets=1, n_bytes=86,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:03,dl_dst=33:33:ff:00:00:03 actions=drop
 cookie=0x0, duration=3.739s, table=0, n_packets=3, n_bytes=290,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:02,dl_dst=33:33:00:00:00:16 actions=drop
 cookie=0x0, duration=3.674s, table=0, n_packets=3, n_bytes=270,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:03,dl_dst=33:33:00:00:00:16 actions=drop
 cookie=0x0, duration=3.643s, table=0, n_packets=1, n_bytes=86,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=33:33:ff:00:00:01 actions=drop
 cookie=0x0, duration=3.547s, table=0, n_packets=3, n_bytes=270,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:04,dl_dst=33:33:00:00:00:16 actions=drop
 cookie=0x0, duration=3.451s, table=0, n_packets=1, n_bytes=70,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:04,dl_dst=33:33:00:00:00:02 actions=drop
 cookie=0x0, duration=3.255s, table=0, n_packets=1, n_bytes=70,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:02,dl_dst=33:33:00:00:00:02 actions=drop
 cookie=0x0, duration=3.003s, table=0, n_packets=1, n_bytes=70,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:03,dl_dst=33:33:00:00:00:02 actions=drop
 cookie=0x0, duration=2.618s, table=0, n_packets=1, n_bytes=70,
ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=33:33:00:00:00:02 actions=drop
mininet> **pingall**
*** Ping: testing ping reachability
h1 -> X X X
h2 -> X X X
h3 -> X X X
h4 -> X X X
*** **Results: 100% dropped (0/12 received)**
mininet> **iperf h1 h2**
*** Iperf: testing TCP bandwidth between h1 and h2
*** **Results: ['10.5 Gbits/sec', '10.5 Gbits/sec']**
mininet> **iperf h1 h4**
*** Iperf: testing TCP bandwidth between h1 and h4
*** Results: ['12.3 Gbits/sec', '12.3 Gbits/sec']
mininet>


Activities
Terminal
Mar 31 16:36
dubuntu@dubuntu: ~
Unable to contact the remote controller at 127.0.0.1:6653
Unable to contact the remote controller at 127.0.0.1:6633
Setting remote controller to 127.0.0.1:6653
mininet> pingall
*** Ping: testing ping reachability
h1 -> X X X
h2 -> X X X
h3 -> X X X
h4 -> X X X
*** Results: 100% dropped (0/12 received)
mininet> dpctl dump-flows
*** s1 --
mininet> dpctl dump-flows
*** s1 --
mininet> exit
dubuntu@dubuntu:~$ sudo python2.7 ~/mininet/custom/lab9.py
Unable to contact the remote controller at 127.0.0.1:6653
mininet> dpctl dump-flows
*** s1 --
cookie=0x0, duration=4.273s, table=0, n_packets=1, n_bytes=86, ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:02,dl_dst=33:33:ff:00:00:02 actions=drop
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cookie=0x0, duration=3.255s, table=0, n_packets=1, n_bytes=70, ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:02,dl_dst=33:33:00:00:00:02 actions=drop
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cookie=0x0, duration=2.618s, table=0, n_packets=1, n_bytes=70, ipv6,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=33:33:00:00:00:02 actions=drop
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*** Iperf: testing TCP bandwidth between h1 and h2
*** Results: ['10.5 Gbits/sec', '10.5 Gbits/sec']
mininet> iperf h1 h4
*** Iperf: testing TCP bandwidth between h1 and h4
*** Results: ['12.3 Gbits/sec', '12.3 Gbits/sec']
mininet> exit
dubuntu@dubuntu:~$