1. **Task 1 – Read Topology File**
   1. **Mininet Command**

The command to execute mininetTopo.py requires additional parameter “--inputFile”. InputFile parameter takes in the directory of the topology input file. For example,

$ sudo python mininetTopo.py –inputFile=topology.in

* 1. **Read File**

From line 84:159, the program reads every line from the input file. Each host is assigned by an increment counter; e.g. index 1 represent h1 with ip address of 10.0.0.1. Switches are implemented with specific dpid and ports are assigned to various bandwidth – 10Mbps and 100Mbps.

QoS commands are further executed once all links between a host and switch are implemented.

1. **Task 2 – Learning Switch**
   1. **Controller Command**

The following command is executed to start the controller.py. An additional parameter “rule” is required which reads an input policy file.

/pox: $ sudo python pox.py log.level –DEBUG controller --rule=policy.in

* 1. **Learning Table**

Refer to controller.py, the following code describes how the switch learns and build its forwarding table.

self.forwardTable[dpid][packet.next.srcip] = Entry(inport, packet.src)

Forwarding table is a 2D array which holds two keys – switch *DPID* and IP packet *SRCIP* address. It holds the values – incoming port number and current packet source mac address.

1. **Task 3 – Firewall**

Refer to controller.py lines 86:104, controller reads the policy file which holds all firewall rules. From line 173:186, for each incoming IPV4 TCP packet, the program checks against the firewall if the incoming packet source address, destination address and port number is restricted. The program drops the packet if the firewall detects a record from its table.

1. **Task 4 – Quality of Service**

Similarly to Firewall, the controller reads the policy file which indicate the premium hosts. Refer to controller.py lines 211:214, controller checks if destination IP address is premium. Premium queue id is assigned to the flow if the IP address is indicated in premium table.