Assignment #5

NES 580, Fall 2022, Dr. Ahmad T. Al-Hammouri

Due date: Saturday 31/12/2022 at 11:55pm.

Objectives:

To write a SDN control application within the POX SDN controller.

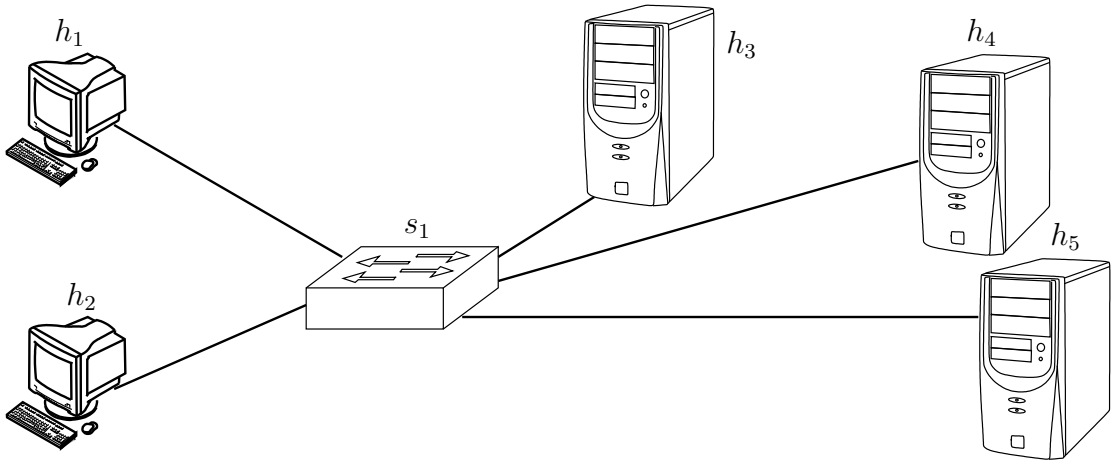
Problem Statement:

In this assignment, you will be developing a SDN control application within the POX controller that turns an Open vSwitch into a simple representative **load balancer**.

Requirements:

Develop a SDN application according to the following requirements (*all occurrences of the word "application" below refers to the SDN application running atop the POX controller*):

1. The network topology under consideration is shown below



2. The OVS switch, s_1, is controlled by the POX controller.
3. The ARP tables of each host is already populated with the necessary information about all other hosts.
4. (**Proactive flows**) When the load balancer application first *starts*, it **installs** a default flow entry that forwards all HTTP requests from either h_1 or h_2 to h_3 to the controller.
5. (**Proactive flows**) Also, upon starting, the application **installs** default flow entry (entries) that **blocks all** traffic from either h_1 or h_2 to any of h_3, h_4 or h_5.
6. (**Reactive flows**) The application listens for incoming events of HTTP requests that have been forwarded to the controller, and performs the following actions:
   (a) The application distributes the HTTP requests between h_4 and h_5 in a **round-robin** fashion: the first HTTP request is forwarded to h_4; the second to h_5; the third to h_4; and so on.
   (b) The application **installs** appropriate flow entries to accomplish the round-robin load balancing.
   (c) These flow entries must be programmed with an appropriate `idle_timeout`, which will cause the entries to be removed after some reasonable period of inactivity.

Grading Policy:

- You must turn in **only working code**. If your code gives compile- or run-time errors, you will receive **zero** credit.
- Partial credit is given only for working code that does not implement all the requirements above.

Deliverables:

- Name the Python script file of the required SDN application as follows `ID-xxxxxx.py`, where '`xxxxxx`' is your student ID.
- Submit **ONLY** the script file to the `elearning` via the provided link. Do **NOT** send it via e-mail or a message from within the `elearning` even before the deadline because it will be deleted tacitly.
- ONLY one student from each group must submit the file.