ASSIGNMENT #3

NES 470, Fall 2023, Dr. Ahmad T. Al-Hammouri

Due date: Tuesday 5/12/2023 at 11:55pm.

Objectives:

To develop a network management application utilizing the SNMP operations provided via the Easy SNMP Python APIs.

Problem Statement:

In this assignment, you will develop a **Python script** that acts as a minimalist network management application. The network management application interrogates the SNMP agent for the information about a list of **processes** and displays it in a convenient, well-formatted manner.

The script requirements are as follows:

1. The script accepts the following **three** command line arguments

   - The read-only community string of the agent, e.g., `public`.
   - The IP address of the CSR1000v router where the agent is running, e.g., `192.168.1.101`.
   - An integer, n, representing the maximum number of processes to display their information.

   For example, the script will be run as follows
   `python3 ./ID-xxxxxx.py  public  192.168.1.101  7`
   where 'xxxxxx' is your students ID.

2. The script will be executed on a Linux machine.

3. The script sends appropriate SNMP requests to the SNMP agent, and retrieves the information about the **processes** running on the CSR1000v router.

4. The script displays on the standard output the following information for each of the n processes: the process ID (PID), the process name, the memory allocated by the virtual process, and the number of times the process has been invoked.

5. The output must be in the following format

   ```
   PID   P. Name         Mem. Allocated    No. Invoked
   ---   -------------   --------------    -----------
   1     Chunk Manager   1297032           26
   2     Load Meter      448               1781
   3     MCP TIPC        0                 61
   ⋮     ⋮               ⋮                 ⋮
   7     EDDRI_MAIN      65632             1
   ```

6. The processes in the output must be ordered based on the PID and in ascending order.

7. *You are allowed to use the two EASY SNMP methods: **get** and **get_next ONLY**,* but **not** any of `walk`, `get_bulk`, or `bulkwalk`.

8. *You are allowed to use **ONLY** the Python Standard Library,* but **not** any other libraries developed by any third party, except the `easysnmp` package.

Hints:

1. Your best friend in this assignment is the vendor-specific MIB module: `CISCO-PROCESS-MIB`. In this CISCO's MIB module, you may need to focus only on **`cpmVirtualProcessTable`**. (The MIB file is posted on `elearning` for your convenience.)

2. Do not assume that the number and the order of the processes and their information are fixed and do not change from one device to another or over time.

Grading Policy:

- You must turn in only **working code**. If your code gives run-time errors, you will receive **zero** credit.

- Partial credit is given only for working code that does not implement all the requirements above.

- *Part of your score will depend on the well formatting of the output.*

Deliverables:

- Name the script file as follows `ID-xxxxxx.py`, where 'xxxxxx' is your students ID.

- Submit **ONLY** the Python 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.