CP367: Assignment 5 – Winter 2024

Due on Mar 25, 2024 (Before 11:59 PM)

This is an **individual** assignment, and we will try to practice bash scripting.

General Instructions:

- For this assignment, your script must run **without errors.**
- If your code does not run, **then you will score zero**. Therefore, ensure you have removed all syntax errors from your code.
- **Gradescope** platform would be used to upload the assignments for grading. The link to the Gradescope assignment is available on Myls course page. Drag and drop your code file(s) for submission into Gradescope. **Make sure your file name is as suggested in the assignment; using a different name may score zero. The question will include parts that would autograded and manually graded.**
- Please note that the submitted code will be checked for plagiarism. Submitting these .sh files would confirm that you have not received unauthorized assistance in preparing the assignment. You also confirm that you are aware of course policies for submitted work.
- Marks will be deducted from any questions where these requirements are not met.
- Multiple attempts will be allowed, but your last submission will be graded before the deadline. Instructors reserve the right to take off points for not following directions.

Question 1

Write a bash script (name it *system_status.sh*) that monitors various system metrics such as CPU utilization, free memory, and disk usage, and provides warnings if any metric exceeds a specified threshold.
You are instructed to complete the implementation of the following functions:

1. *cpu_utilization*: Check CPU utilization and compare it with a threshold percentage.
2. *mem_free*: Check free memory percentage and compare it with a threshold.
3. *disk_usage*: Check disk usage percentage and compare it with a threshold.
4. *send_report*: Send the system status report to the provided email address. This will further call a function *check_all* that would call first three (1-3) functions to generate the report that will be sent to the email mentioned by you in the script. The default value used to call the function are:
   a. cpu_utilization 80
   b. mem_free 95
   c. disk_usage 80

The template to create the structure of the script can be downloaded from Myls (named *system_status_st.sh*) along with function documentation. Once you complete it the above functions.
The script will check:

- If no threshold is provided, functions print prints a usage message:
  - *Usage: cpu_utilization <cpu_threshold_percentage>*
  - *Usage: mem_free <free_memory_threshold_percentage>*
  - *Usage: disk_usage <disk_threshold_percentage>*
  - *Usage: send_report <email_address>*
- If the valid value of threshold is not supplied (out of 0 - 100), the function will prints an error message:
  - *Enter the CPU threshold percentage between 0 to 100*

- *Enter the free memory threshold percentage between 0 to 100*
- *Enter the disk usage threshold percentage between 0 to 100*

The function:

1. cpu_utilization will use top command to extract the information.
2. mem_free will use free command to extract the information.
3. disk_usage will use the df command to extract the information, In case of multiple hard disks, even if one of these is above the threshold, the warning message will be sent.
4. send_report will use mail program on Unix/Linux system to send the report.

Use the following command to run the script:

- *$ sh ./system_status.sh*

The expected output to be shown on the console and sent via email on executing the above command is:

##

Testing CPU utilization, free memory, disk usage status of the system on Mon Mar 11 14:35:59 EDT 2024

##

cpu utilization: 3

cpu ok!!

##

percent memory free is : 90.9454 %

memory warning!!

##

Disk usage: 100

Disk warning!!

##

Capturing the system status

Sending email with the system status to ssehra@wlu.ca

##

Important Note: When submitting a source code file to Gradescope, make sure to name it like:

- *system_status.sh*