Assignment 5 - Memory & CPU Monitoring (Performance Troubleshooting)

Part 1: Memory Analysis

1. Check RAM and swap usage: free -h

2. Identify:

○ Total memory

○ Used memory

○ Available memory

○ Swap usage

```
ubuntu@ip-172-31-25-177:~$ free -h
               total        used        free      shared  buff/cache   available
Mem:           914Mi       694Mi        66Mi       2.7Mi       310Mi       220Mi
Swap:             0B          0B          0B
```

Part 2: System Statistics

1. Run: vmstat 5 5

2. Observe: ○ Memory usage ○ Swap in/out ○ CPU idle time

```
ubuntu@ip-172-31-25-177:~$ vmstat 5 5
procs -----------memory---------- ---swap-- -----io---- -system-- -------cpu-------
 r  b   swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa st gu
 0  0      0  68312  11908 306308    0    0   222    23  270    2  0  0 99  0  0  0
 0  0      0  68312  11908 306348    0    0     0     0  218  349  0  0 100  0  0  0
 0  0      0  68312  11908 306348    0    0     0     0  216  347  0  0 100  0  0  0
 0  0      0  68312  11908 306348    0    0     0     0  211  344  0  0 100  0  0  0
 0  0      0  68312  11908 306352    0    0     0     0  251  397  0  0 100  0  0  0
```

Part 3: Load Average Interpretation

1. Run: uptime

2. Note the: ○ 1-minute ○ 5-minute ○ 15-minute load averages

```
ubuntu@ip-172-31-25-177:~$ uptime
 15:21:32 up 29 min,  1 user,  load average: 0.02, 0.02, 0.00
```

Part 4: Correlation Exercise

● High load but low CPU usage → what could be the cause?

This means processes are waiting but not executing. This might be due to tasks stuck in sleep, lack of ram memory which causes processes to wait, or processes might be waiting for some slow I/O operations.

● High swap usage → what does it indicate?

This means system is running low on RAM. The inactive memory pages are moved from RAM to disk which slowers the system. The processes are caused to wait which can increase load average.

● When does adding RAM help vs optimizing processes?

Adding RAM helps when many apps need memory at the same time and system slows down due to using swap.

Optimise the process when programs use too much memory unnecessarily or keep running in the background when they’re not needed.