

Operating system: Windows 10

Bash version: 5.2

Python version: 3.11

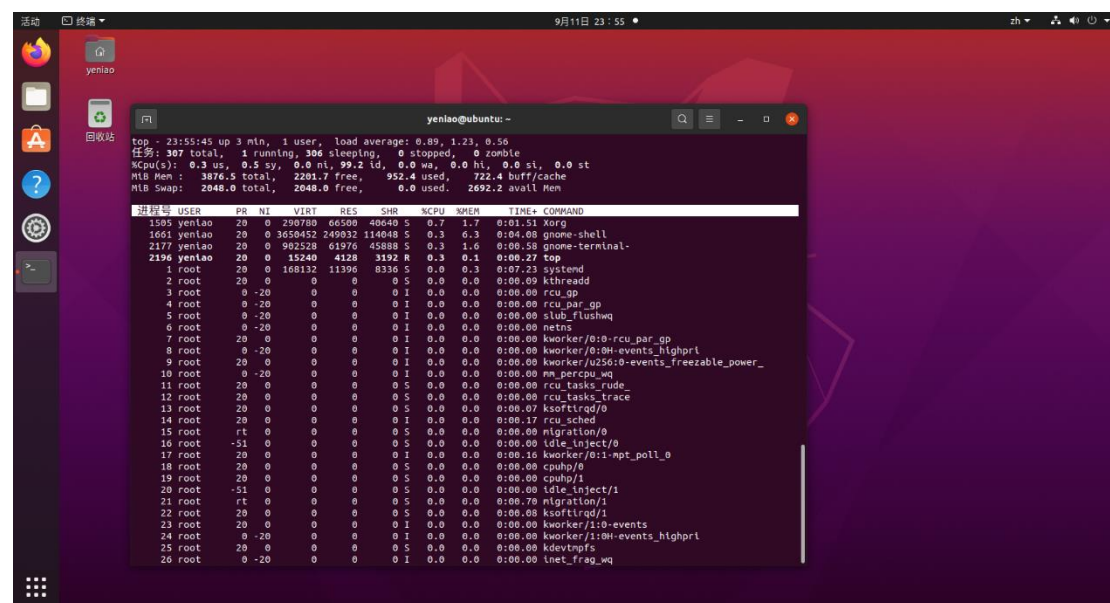
I used Rstudio for writing the python codes in question 3, need to install the [reticulate](#) library;

import xml.etree.ElementTree as ET

import pandas as pd

import re

1.1.



The screenshot shows a terminal window on an Ubuntu desktop. The top part of the terminal displays the output of the 'top' command, showing system statistics like CPU usage (0.3 us, 0.5 sy, 0.0 nt, 99.2 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st), memory usage (3876.5 total, 2201.7 free, 952.4 used, 722.4 buff/cache), and swap usage (2048.0 total, 2048.0 free, 0.0 used, 2692.2 avail Mem). Below this, a table of processes is shown with columns: PID, USER, PR, NI, VIRT, RES, SHR, S, CPU, MEM, TIME+, and COMMAND. The processes listed include 'xorg' (PID 1595), 'gnome-shell' (PID 1661), 'gnome-terminal' (PID 2177), 'top' (PID 2196), and various system processes like 'systemd', 'kthreadd', 'rcu_gp', 'rcu_par_gp', 'slub_flushmq', 'netns', 'kworker/0:0-rcu_par_gp', 'kworker/0:0H-events_highpri', 'kworker/u256:0-events_freezable_power_', 'mm_percpu_wq', 'rcu_tasks_rude', 'rcu_tasks_trace', 'ksoftirqd/0', 'rcu_sched', 'migration/0', 'idle_inject/0', 'kworker/0:1-mpt_poll_0', 'cpuhp/0', 'cpuhp/1', 'idle_inject/1', 'rt', 'migration/1', 'ksoftirqd/1', 'kworker/1:0-events', 'kworker/1:0H-events_highpri', 'kdevtmpfs', and 'inet_frag_wq'.

1.2.

```
yenlao@ubuntu:~$ lsblk
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
loop0       7:0      0     4K  1 loop /snap/bare/5
loop1       7:1      0    55M  1 loop /snap/core18/1705
loop2       7:2      0 218.4M  1 loop /snap/gnome-3-34-1804/93
loop3       7:3      0 240.8M  1 loop /snap/gnome-3-34-1804/24
loop4       7:4      0   62.1M  1 loop /snap/gtk-common-themes/1506
loop5       7:5      0   91.7M  1 loop /snap/gtk-common-themes/1535
loop6       7:6      0   49.8M  1 loop /snap/snap-store/433
loop7       7:7      0   27.1M  1 loop /snap/snapd/7264
loop8       7:8      0   73.9M  1 loop /snap/core22/864
loop9       7:9      0   12.3M  1 loop /snap/snap-store/959
sda         8:0      0    60G  0 disk
├─sda1      8:1      0   512M  0 part /boot/efi
├─sda2      8:2      0     1K  0 part
└─sda5      8:5      0   59.5G  0 part /
sr0        11:0     1  1024M  0 rom
```

```

yenlao@ubuntu:~$ lscpu
架构: x86_64
CPU 运行模式: 32-bit, 64-bit
字节序: Little Endian
Address sizes: 45 bits physical, 48 bits virtual
CPU: 2
在线 CPU 列表: 0,1
每个核的线程数: 1
每个座的核数: 1
座: 2
NUMA 节点: 1
厂商 ID: GenuineIntel
CPU 系列: 6
型号: 158
型号名称: Intel(R) Core(TM) i7-8750H CPU @ 2.20GHz
步进: 10
CPU MHz: 2208.002
BogoMIPS: 4416.00
超管理器厂商: VMware
虚拟化类型: 完全
L1d 缓存: 64 KiB
L1i 缓存: 64 KiB
L2 缓存: 512 KiB
L3 缓存: 18 MiB
NUMA 节点0 CPU: 0,1
Vulnerability Gather data sampling: Unknown: Dependent on hypervisor status
Vulnerability Itlb multihit: KVM: Mitigation: VMX unsupported
Vulnerability L1tf: Mitigation; PTE Inversion
Vulnerability Mds: Mitigation; Clear CPU buffers; SMT Host state unknown
Vulnerability Meltdown: Mitigation; PTI
Vulnerability Mmio stale data: Mitigation; Clear CPU buffers; SMT Host state unknown
Vulnerability Retbleed: Mitigation; IBRS
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; IBRS, IBPB conditional, STIBP disabled, RSB filling, PBRSE-eIBRS No

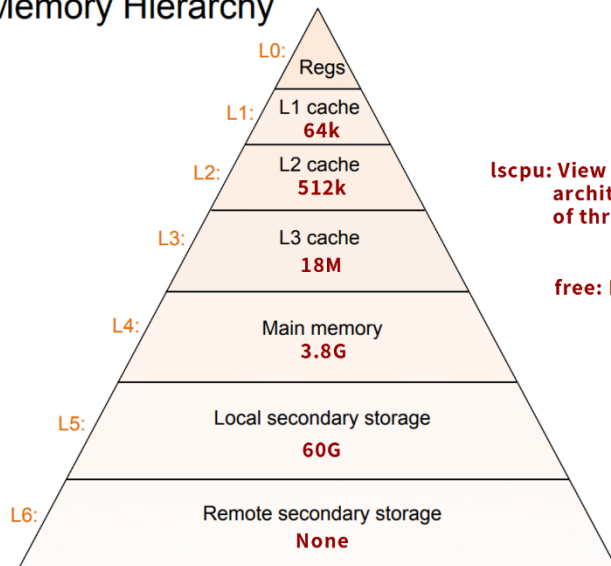
```

```

yenlao@ubuntu:~$ free -m
              总计          已用          空闲          共享          缓冲/缓存          可用
内存:         3876          982          1826           3          1067          2658
交换:         2047           0          2047
yenlao@ubuntu:~$ free -h
              总计          已用          空闲          共享          缓冲/缓存          可用
内存:         3.8Gi          982Mi          1.8Gi          3.0Mi          1.0Gi          2.6Gi
交换:         2.0Gi           0B          2.0Gi

```

Memory Hierarchy



CODES

lscpu: View CPU related information, such as CPU architecture, model, number of cores, number of threads, etc.

free: Display system memory status, including system physical memory, virtual memory (swap swap partition), shared memory and system cache usage

lsblk: List block device information such as hard disks, SSDs, flash drives, etc.

1.3. Open the cdvar path and view the last 50 lines of the tree diagram:

```
yenlao@ubuntu: /var

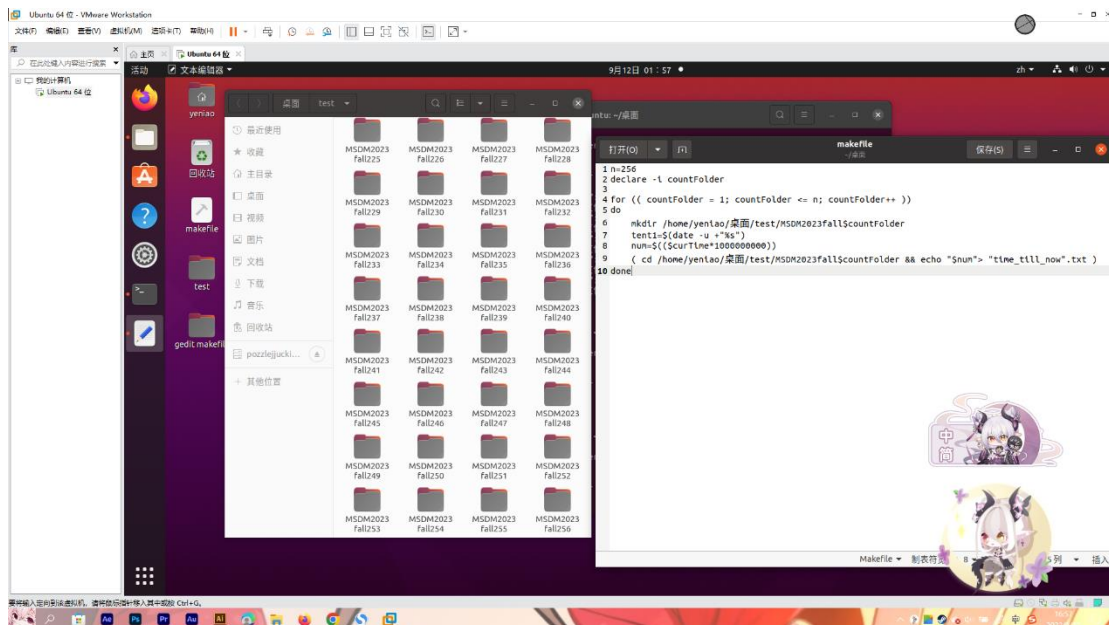
a96c133a-8ff0-4cc9-937f-febcee0bec12-le64.cache-7
b2e13027-b5d8-4153-af60-bdfb08211f27-le64.cache-7
b4bdf721-e8fb-4f4f-adcc-f7bac34056c6-le64.cache-7
b98127a5-af49-4aa6-b9b1-edbef33050a3-le64.cache-7
bd3bd303-5e81-4b4f-840b-8b89e911a8f7-le64.cache-7
bf1288d8-635e-4a42-a01b-064d61d20f97-le64.cache-7
c0939e10-77d0-4d8f-b2bf-dd16aaba1173-le64.cache-7
c1857972-f616-49d7-8654-72e3cb3cb73f-le64.cache-7
c40d4192-abbd-4da6-bee9-65f22533c6cc-le64.cache-7
c5e89ee3-9f70-4633-be03-fa22a946e49a-le64.cache-7
c69d7809-c854-4925-9280-c11e6c3ad769-le64.cache-7
ca8f8835-7fad-4b1a-9cea-873cf12bf18f-le64.cache-7
CACHEDIR.TAG
cc6c2e9c-c5e1-4c74-9156-727372028ffa-le64.cache-7
d14936aa-06ec-48cb-981e-bc3d210b7031-le64.cache-7
d18b1a34-fc80-48b1-9627-112c4d3cac6d-le64.cache-7
d53e5830-5240-4cf6-83bd-79d3c05491ce-le64.cache-7
d9408873-8ad5-4f7c-a228-a6bc6b384a54-le64.cache-7
da3b23ac-95c2-4a2b-b5f7-493fc72c5403-le64.cache-7
e35e87b6-a436-45fd-a089-5ef63024c9b-le64.cache-7
e40be831-de27-42f3-9dac-8df9842e88b8-le64.cache-7
eb2711d3-ab89-4b65-9cb4-8300ae823344-le64.cache-7
fd290ba8-5bd2-481b-a31a-902fa62a1757-le64.cache-7
fonts.conf
current -> 959

spool
├── anacron
│   ├── cron.daily
│   ├── cron.monthly
│   └── cron.weekly
├── cron
│   └── crontabs [error opening dir]
├── cups [error opening dir]
├── mail -> ../mail
└── rsyslog [error opening dir]

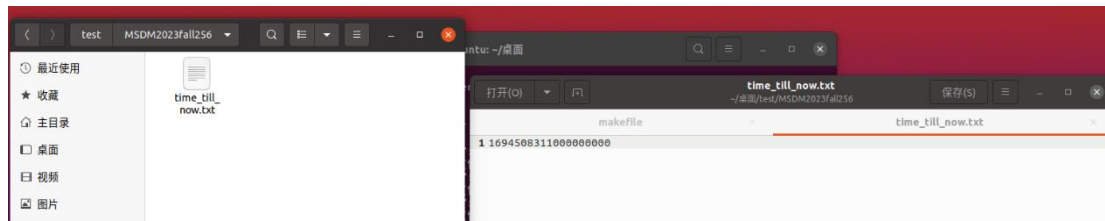
tmp
├── systemd-private-7870aa55e6634110a1321db1a000f79f-colord.service-B90RRh [error opening dir]
├── systemd-private-7870aa55e6634110a1321db1a000f79f-ModemManager.service-2UyCeg [error opening dir]
├── systemd-private-7870aa55e6634110a1321db1a000f79f-switcheroo-control.service-mk8xtf [error opening dir]
├── systemd-private-7870aa55e6634110a1321db1a000f79f-systemd-logind.service-05YYJl [error opening dir]
├── systemd-private-7870aa55e6634110a1321db1a000f79f-systemd-resolved.service-J18Bui [error opening dir]
├── systemd-private-7870aa55e6634110a1321db1a000f79f-systemd-timesyncd.service-IDCMjj [error opening dir]
├── systemd-private-7870aa55e6634110a1321db1a000f79f-ubuntu-advantage-desktop-daemon.service-RdHyXg [error opening dir]
└── systemd-private-7870aa55e6634110a1321db1a000f79f-upower.service-WQqszf [error opening dir]

418 directories, 11666 files
yenlao@ubuntu: /var$
```

2. codes:



Each file's content



3. Please check the **hw1.q3.py** and **hw1.q3.html** files in the zip.

4. <https://ksye6.github.io/ksye6/>