

МІНІСТЕРСТВО ОСВІТИ УКРАЇНИ
ЗАХІДНОУКРАЇНСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
ФАКУЛЬТЕТ КОМП'ЮТЕРНИХ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ

Звіт про

Лабораторну роботу №3

Із дисципліни «Основи Комп'ютерних наук»

Тема: Управління процесами у операційних системах

Кафедра

інформаційно-обчислювальних

систем та управління

Виконав : Слюсарчин Василь Віталійович

Група : КН-11

vasiaslyusarchyn@gmail.com

Перевірів: Домбровський М.З

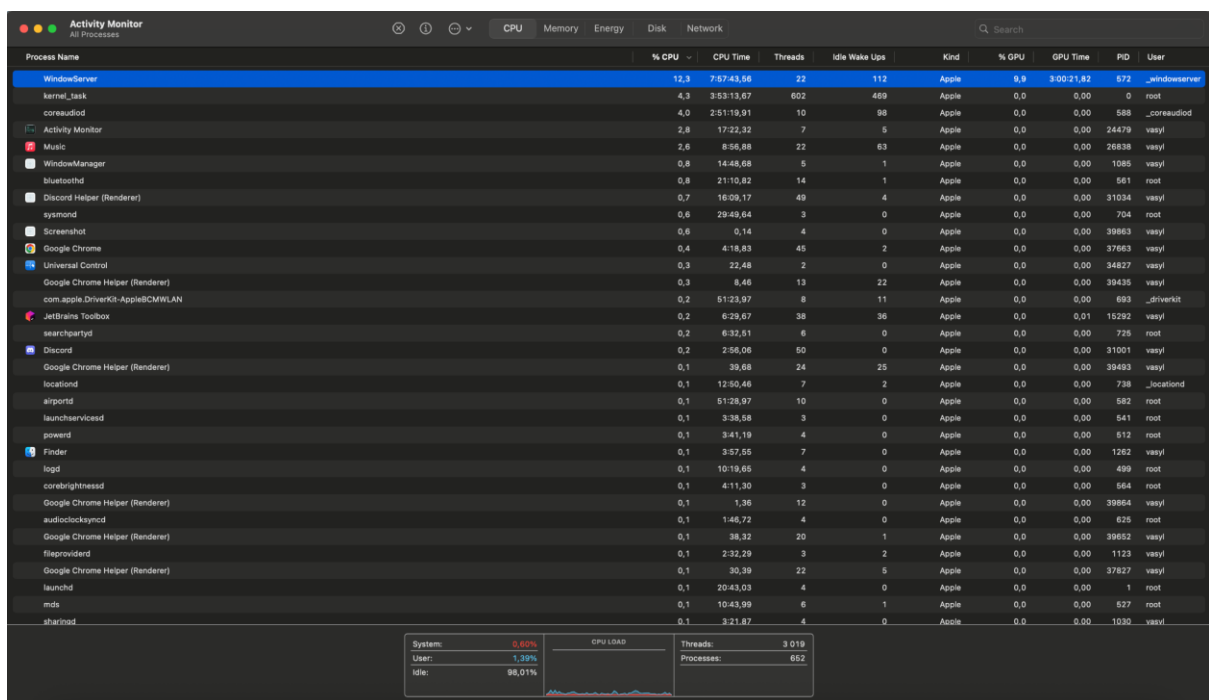
Тернопіль 2025

Мета: Вивчити основні принципи роботи з операційними системами — програмним забезпеченням, яке координує внутрішню роботу комп'ютера а також його взаємозв'язок з зовнішнім світом.

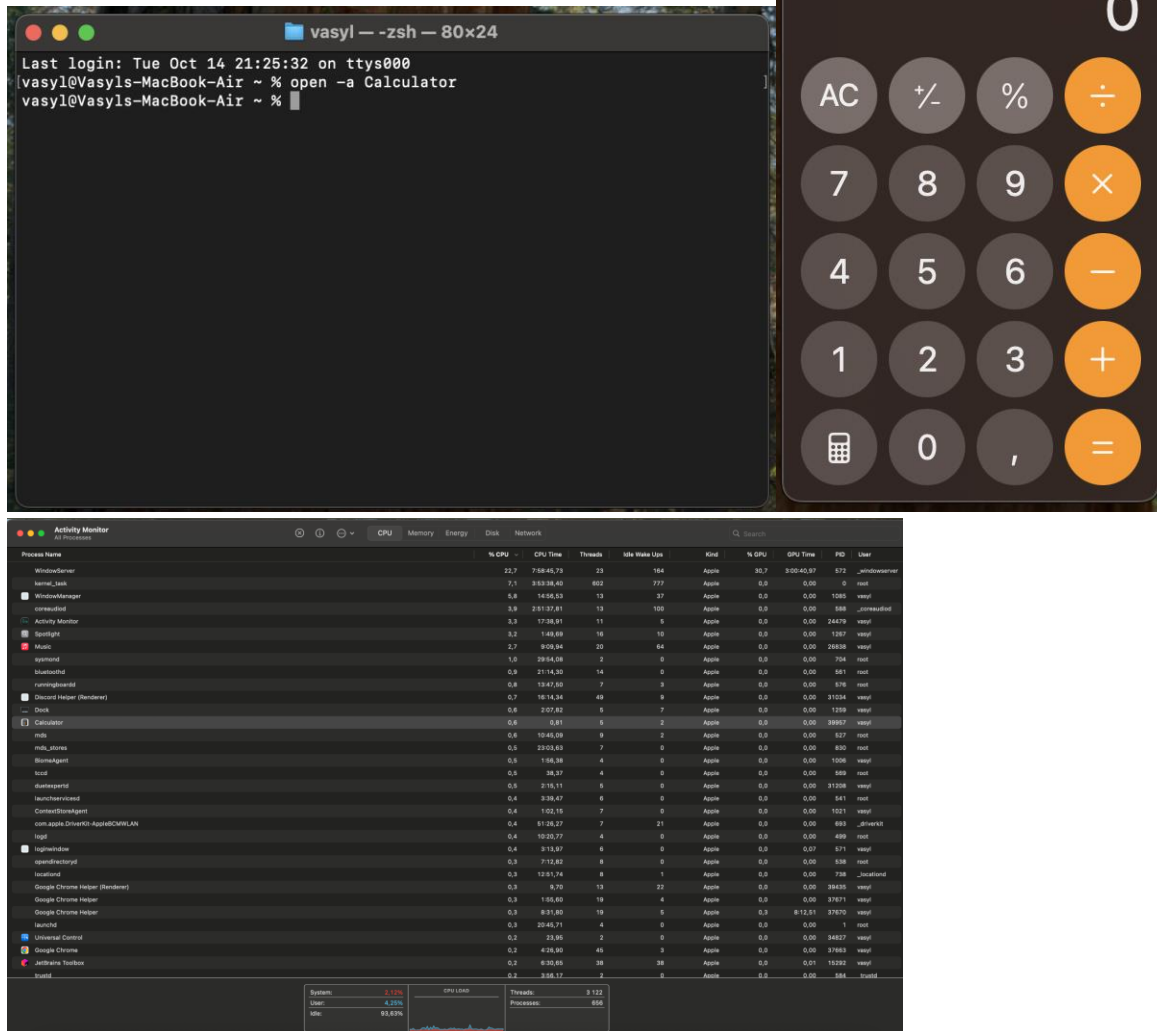
Хід роботи

Використайте диспетчер задач Windows(Activity Monitor на MacOS), для виконання наступних завдань:

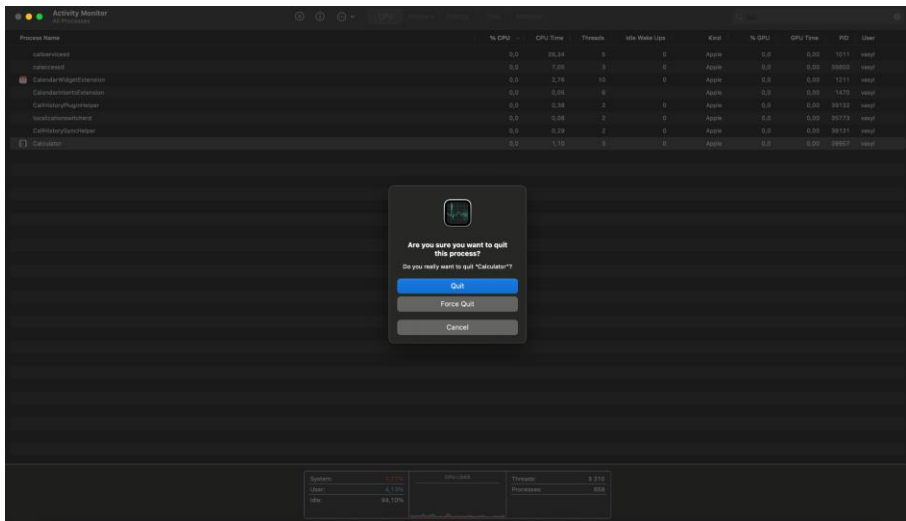
1. В пошуку відкриваю Activity Monitor, там переходжу на вкладку CPU, тут можна побачити загальну статистику системи



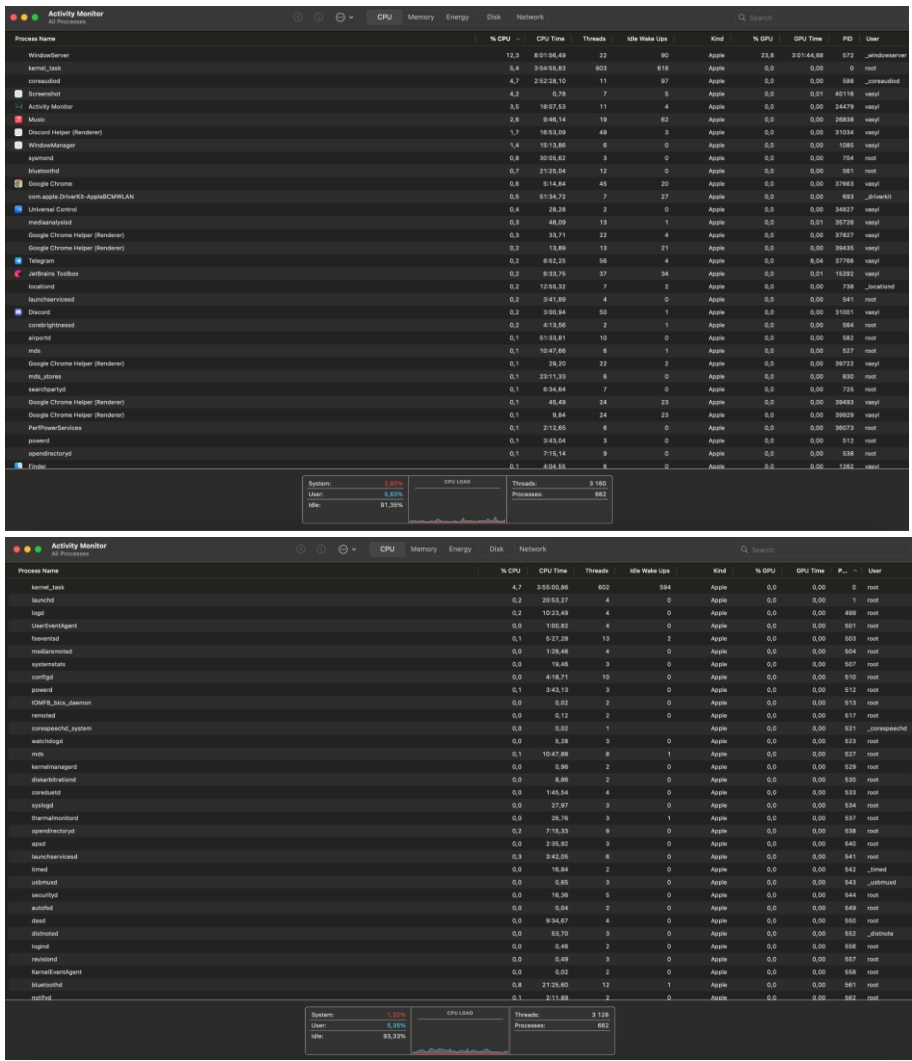
2. Відкриваю термінал, вписую команду “open -a Calculator” тисну Enter і відкривається калькулятор.



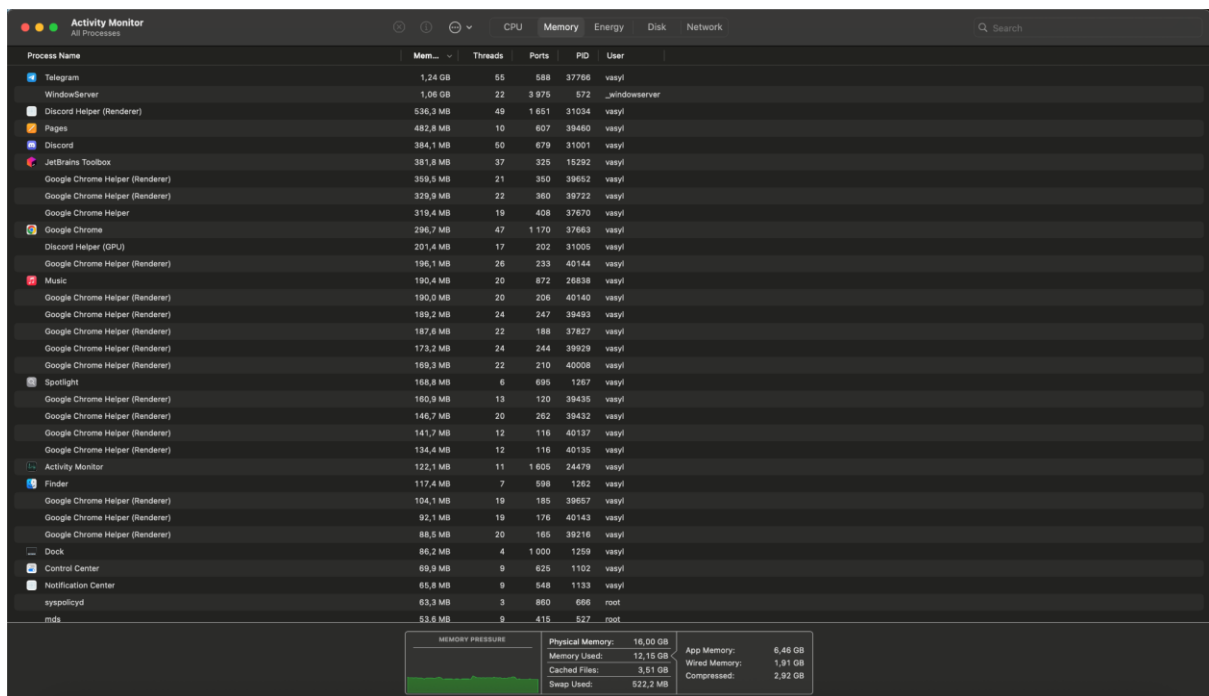
3. Вибираємо калькулятор і закриваємо в лівому верхньому куті екрану



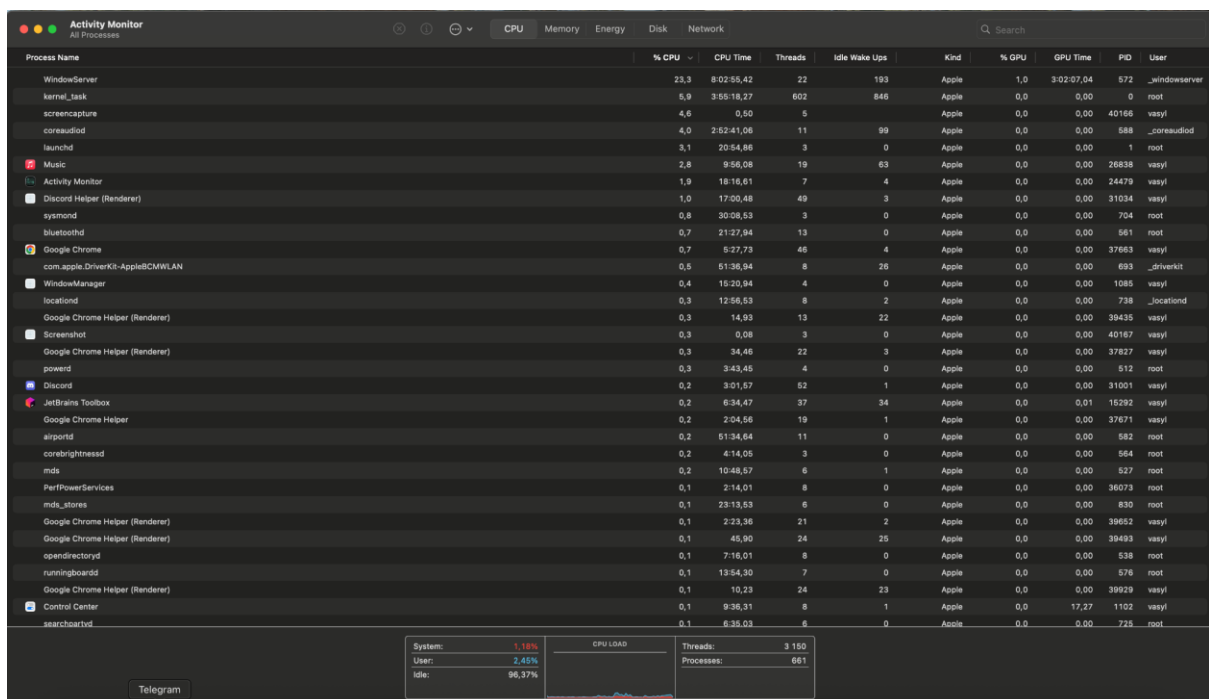
4. У панелі “ім’я” вибираю ідентифікатор процесу (PID)



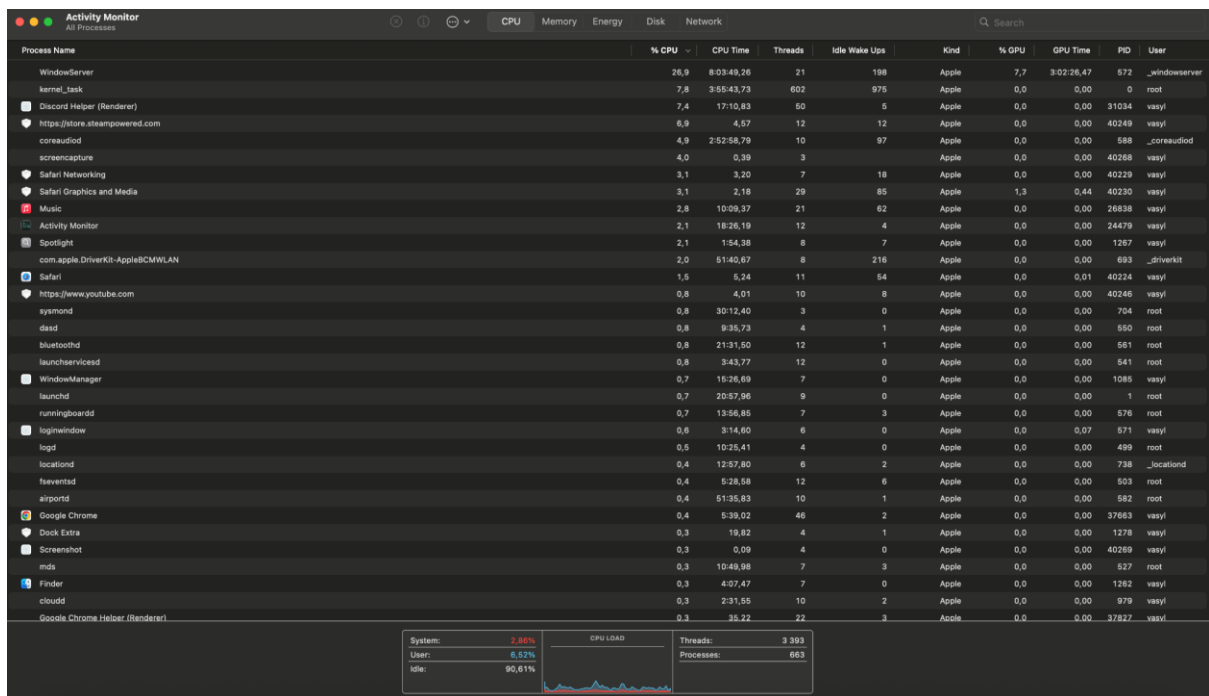
5. Найбільшим навантаженням на пам'ять є месенджер “Telegram”



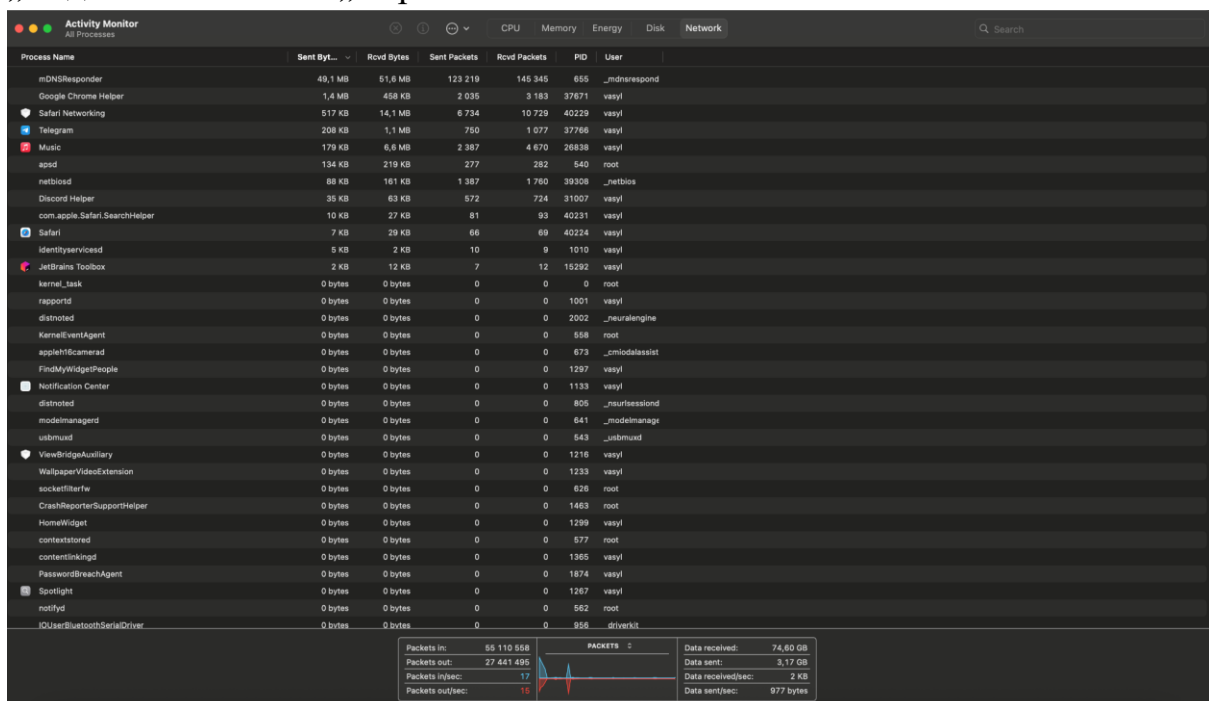
6. Найбільшим навантаженням на процесор є WindowServer, тому що багато вкладок працює, у віконному режимі, на фоні диспетчера завдань.



7. Запустив декілька вкладок в Safari і подивився на зміни в навантаженні



8. Відкриваєм вкладку *Мережа* у диспетчері задач та занотуйте поля „Надіслано Байт“ та „Отримано Байт“



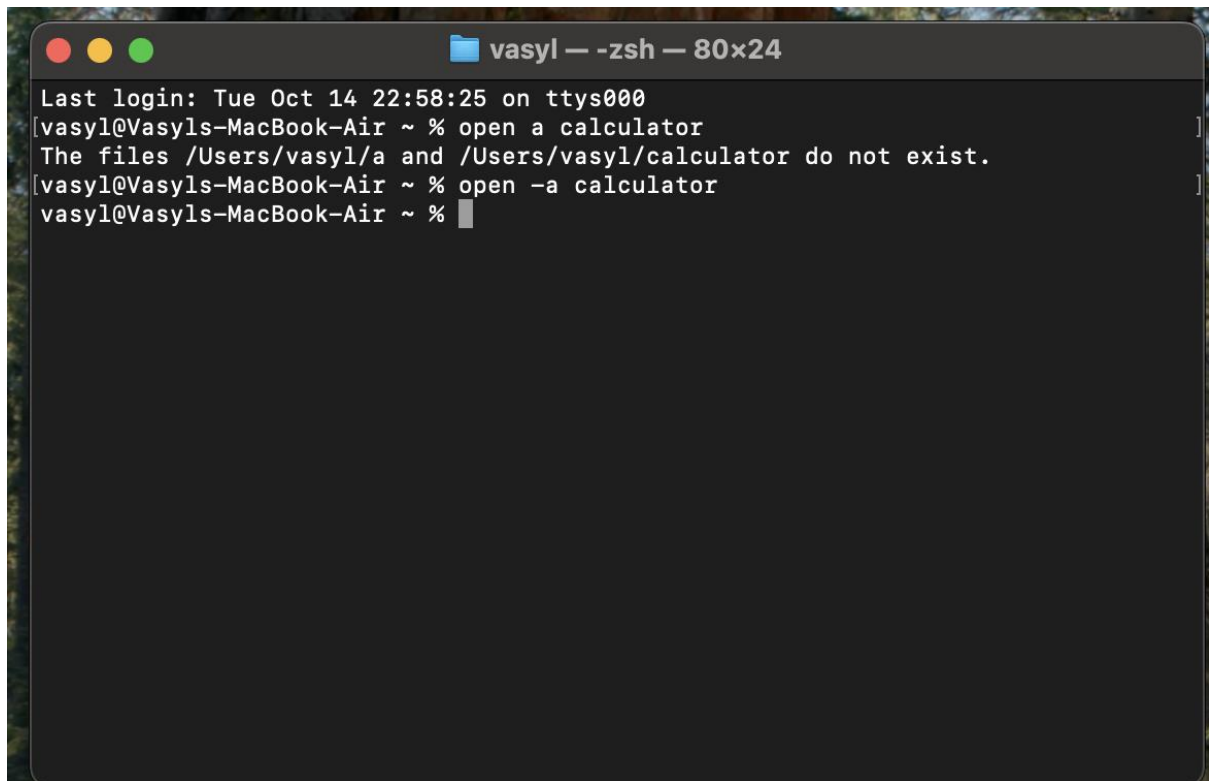
9. Linux та MacOS обоє на UNIX, тому можна вписувати команди прямо в терміналі тас

10. Запустив програму *ps aux* для моніторингу використання пам'яті програми

| | | | | | | | | | |
|-------------------------------------------|-------|------|-----|------------|---------|----|------|---------|------------------------------|
| Last login: Tue Oct 14 22:58:15 on tty000 | | | | | | | | | |
| vsrvly@vsrvly-MacBook:~\$ | PID | NCPU | MEM | VSZ | RSS | TT | STAT | STARTED | TIME COMMAND |
| vsrvly | 572 | 27.9 | 0.9 | 41538648 | 148852 | ?? | Ss | 10c125 | 08:00:25.00 /System/Library/ |
| vsrvly | 573 | 0.1 | 0.1 | 43574576 | 24992 | ?? | Ss | 10c125 | 0:15:10 /usr/libexec/ |
| vsrvly | 1888 | 5.4 | 0.3 | 41286665 | 48224 | ?? | Ss | 10c125 | 16:10:41 /System/Library/ |
| vsrvly | 580 | 3.7 | 0.1 | 42712152 | 22208 | ?? | Ss | 10c125 | 17:45:49 /usr/sbin/crowd |
| vsrvly | 3561 | 3.7 | 0.1 | 420949128 | 15824 | ?? | Ss | 10c125 | 0:12:34 /System/Library/ |
| vsrvly | 1824 | 2.7 | 0.2 | 42721568 | 36352 | ?? | Ss | 10c125 | 3:38:43 /System/Library/ |
| vsrvly | 24868 | 1.9 | 0.2 | 42729296 | 143676 | ?? | Ss | 10c125 | 0:00:00 /System/Library/ |
| vsrvly | 48664 | 1.9 | 0.7 | 412153216 | 117344 | ?? | Ss | 10c125 | 0:01:17 /System/Applicat |
| vsrvly | 24479 | 1.6 | 0.8 | 41217120 | 151424 | ?? | Ss | 10c125 | 17:41:20 /System/Applicat |
| vsrvly | 39448 | 1.4 | 0.8 | 410116896 | 33856 | ?? | Ss | 9:84PM | 1:31:21 /Applications/ |
| vsrvly | 499 | 0.8 | 0.2 | 42692988 | 41288 | ?? | Ss | 10c125 | 52:08:43 /System/Library/ |
| vsrvly | 561 | 0.8 | 0.2 | 41267888 | 23088 | ?? | Ss | 10c125 | 22:04:15 /usr/libexec/ |
| vsrvly | 39652 | 0.6 | 2.9 | 427425664 | 493680 | ?? | Ss | 9:84PM | 3:21:74 /Applications/ |
| vsrvly | 37663 | 0.5 | 2.2 | 478685344 | 368784 | ?? | Ss | Mon81PM | 6:34:18 /Applications/ |
| vsrvly | 584 | 0.1 | 0.1 | 426982192 | 13184 | ?? | Ss | 10c125 | 3:16:47 /usr/libexec/ |
| vsrvly | 37671 | 0.4 | 0.6 | 444484368 | 99728 | ?? | Ss | Mon81PM | 2:14:49 /Applications/ |
| vsrvly | 39435 | 0.3 | 0.9 | 186177152 | 164240 | ?? | Ss | 8:31PM | 6:27:51 /Applications/ |
| vsrvly | 1838 | 0.2 | 0.2 | 426949264 | 27424 | ?? | Ss | 10c125 | 3:25:78 /usr/libexec/ |
| vsrvly | 1259 | 0.2 | 0.2 | 412883488 | 41376 | ?? | Ss | 10c125 | 2:16:34 /System/Library/ |
| vsrvly | 31802 | 0.1 | 1.0 | 186892736 | 101212 | ?? | Ss | 10c125 | 18:09:58 /Applications/ |
| root | 784 | 0.1 | 0.0 | 426932736 | 3888 | ?? | Ss | 10c125 | 38:44:48 /usr/libexec/sys |
| root | 499 | 0.1 | 0.2 | 427129448 | 33328 | ?? | Ss | 10c125 | 18:38:48 /usr/libexec/ |
| vsrvly | 31834 | 0.1 | 3.3 | 187428224 | 55328 | ?? | Ss | 10c125 | 18:51:45 /Applications/ |
| vsrvly | 1801 | 0.1 | 0.1 | 426978656 | 20880 | ?? | Ss | 10c125 | 0:53:42 /usr/libexec/ |
| vsrvly | 580 | 0.1 | 0.0 | 426989744 | 9856 | ?? | Ss | 10c125 | 5:52:50 /System/Library/ |
| vsrvly | 37766 | 0.1 | 7.8 | 414525280 | 1389088 | ?? | Ss | Mon81PM | 23:25:55 /Applications/ |
| vsrvly | 39929 | 0.1 | 1.3 | 186747492 | 214496 | ?? | Ss | 9:28PM | 8:24:49 /Applications/ |
| vsrvly | 39765 | 0.8 | 0.0 | 426949928 | 8176 | ?? | Ss | 9:11PM | 8:00:15 /System/Library/ |
| vsrvly | 39764 | 0.8 | 0.0 | 426977216 | 7456 | ?? | Ss | 9:11PM | 8:00:41 /System/Library/ |
| vsrvly | 37673 | 0.8 | 0.0 | 418794488 | 2976 | ?? | Ss | 9:18PM | 8:00:42 /System/Library/ |
| vsrvly | 39768 | 0.1 | 0.0 | 413041312 | 13128 | ?? | Ss | 9:18PM | 8:00:25 /System/Library/ |
| vsrvly | 39759 | 0.8 | 0.5 | 415689888 | 84744 | ?? | Ss | 9:18PM | 8:04:48 /System/Library/ |
| vsrvly | 39762 | 0.1 | 0.0 | 413041312 | 13128 | ?? | Ss | 9:18PM | 8:00:48 /System/Library/ |
| vsrvly | 39657 | 0.8 | 0.9 | 1868497680 | 149936 | ?? | Ss | 9:84PM | 8:07:13 /Applications/ |
| vsrvly | 39618 | 0.8 | 0.0 | 426983712 | 3448 | ?? | Ss | 9:18PM | 8:00:04 /System/Library/ |
| vsrvly | 3961 | 0.8 | 0.0 | 426983712 | 3424 | ?? | Ss | 9:18PM | 8:00:09 /System/Library/ |
| vsrvly | 39652 | 0.8 | 0.2 | 426985696 | 20448 | ?? | Ss | 9:18PM | 8:00:83 /usr/libexec/ |
| vsrvly | 3961 | 0.8 | 0.0 | 413041312 | 13128 | ?? | Ss | 9:18PM | 8:00:48 /System/Library/ |
| vsrvly | 39643 | 0.8 | 1.0 | 1807589936 | 295536 | ?? | Ss | 8:48PM | 1:38:47 /Applications/ |
| vsrvly | 39643 | 0.8 | 0.1 | 426973184 | 16876 | ?? | Ss | 8:48PM | 8:00:51 /System/Library/ |
| vsrvly | 39643 | 0.8 | 0.1 | 413041312 | 13128 | ?? | Ss | 8:48PM | 8:00:48 /System/Library/ |
| vsrvly | 39645 | 0.8 | 0.1 | 426995232 | 15936 | ?? | Ss | 8:48PM | 8:00:44 /System/Library/ |
| vsrvly | 39632 | 0.8 | 1.1 | 186845432 | 188448 | ?? | Ss | 8:31PM | 6:13:48 /Applications/ |
| vsrvly | 39634 | 0.8 | 0.0 | 426946416 | 7088 | ?? | Ss | 8:31PM | 8:00:19 /System/Library/ |
| vsrvly | 39636 | 0.8 | 0.1 | 427813296 | 21136 | ?? | Ss | 8:37PM | 8:00:19 /System/Library/ |
| vsrvly | 39634 | 0.8 | 0.0 | 426995232 | 15936 | ?? | Ss | 8:37PM | 8:00:03 /usr/libexec/ |
| vsrvly | 39332 | 0.8 | 0.0 | 426928796 | 1648 | ?? | Ss | 8:37PM | 8:00:01 /System/Library/ |
| vsrvly | 39332 | 0.8 | 0.0 | 426933648 | 2464 | ?? | Ss | 8:37PM | 8:00:42 /System/Library/ |
| vsrvly | 39329 | 0.8 | 0.0 | 426929824 | 2488 | ?? | Ss | 8:37PM | 8:00:42 /usr/libexec/ |
| vsrvly | 39329 | 0.8 | 0.0 | 426936692 | 16480 | ?? | Ss | 8:37PM | 8:00:05 /System/Library/ |
| vsrvly | 39325 | 0.8 | 0.1 | 426977824 | 9288 | ?? | Ss | 8:37PM | 8:00:05 /System/Library/ |
| vsrvly | 39322 | 0.8 | 0.2 | 413041312 | 13128 | ?? | Ss | 8:34PM | 8:01:16 /System/Library/ |
| vsrvly | 39322 | 0.8 | 0.0 | 426942416 | 6864 | ?? | Ss | 8:34PM | 8:00:48 /System/Library/ |
| vsrvly | 39282 | 0.8 | 0.1 | 426989616 | 14224 | ?? | Ss | 8:33PM | 8:00:11 /System/Library/ |
| vsrvly | 39281 | 0.8 | 0.2 | 427125656 | 26688 | ?? | Ss | 8:33PM | 8:00:27 /System/Library/ |
| vsrvly | 39279 | 0.8 | 0.1 | 426978568 | 9288 | ?? | Ss | 8:33PM | 8:00:78 /System/Library/ |
| root | 39269 | 0.8 | 0.1 | 426957792 | 12328 | ?? | Ss | 8:32PM | 8:00:68 /System/Library/ |
| root | 39267 | 0.8 | 0.0 | 426946416 | 2328 | ?? | Ss | 8:32PM | 8:00:46 /System/Library/ |
| root | 39267 | 0.8 | 0.0 | 426933648 | 3248 | ?? | Ss | 8:32PM | 8:00:05 /usr/libexec/ |
| root | 39264 | 0.8 | 0.1 | 426988448 | 19696 | ?? | Ss | 8:32PM | 8:00:48 /usr/sbin/syste |
| root | 39264 | 0.8 | 0.1 | 426988448 | 19696 | ?? | Ss | 8:32PM | 8:00:48 /System/Library/ |
| vsrvly | 39214 | 0.8 | 0.7 | 1868527488 | 117728 | ?? | Ss | 8:27PM | 8:08:23 /Applications/ |
| vsrvly | 39214 | 0.8 | 0.7 | 1868527488 | 117728 | ?? | Ss | 8:27PM | 8:08:23 /Applications/ |
| vsrvly | 39212 | 0.8 | 0.1 | 426974168 | 18488 | ?? | Ss | 8:14PM | 8:00:48 /System/Library/ |
| vsrvly | 39131 | 0.8 | 0.1 | 426978264 | 13456 | ?? | Ss | 8:14PM | 8:00:32 /System/Library/ |
| vsrvly | 39131 | 0.8 | 0.1 | 426978264 | 13456 | ?? | Ss | 8:14PM | 8:00:32 /System/Library/ |
| vsrvly | 39048 | 0.8 | 0.0 | 426967184 | 4968 | ?? | Ss | 7:84AM | 8:00:03 /System/Library/ |
| root | 38849 | 0.8 | 0.0 | 426971728 | 6568 | ?? | Ss | 7:46AM | 8:12:00 /System/Library/ |
| root | 38837 | 0.8 | 0.0 | 426967472 | 7776 | ?? | Ss | Mon80PM | 8:00:05 /System/Library/ |
| root | 38832 | 0.8 | 0.0 | 426929888 | 2888 | ?? | Ss | Mon80PM | 8:00:03 /usr/libexec/ |
| vsrvly | 38183 | 0.8 | 0.1 | 426982192 | 16736 | ?? | Ss | Mon82PM | 8:00:04 /usr/libexec/ |

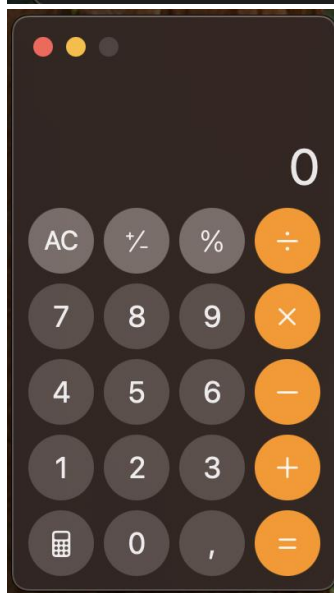
11. Використовуйте *top* для перегляду використання пам'яті програми

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------------------------------|---------|------|-----|-----|--------|-----|-------|------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|----|------|----|------|----|------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|----|------|----|------|----|------|----|-----------------------------------------------|----|------|----|------|----|------|----|------|----|----------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|----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| Processes: 609 total, 3 running, 666 sleeping, 3148 threads | | | | | | | | | | Load Avg: 2.82, 1.16, 0.1 CPU usage: 3.4% user, 3.12% sys, 93.37% idle Shared:lib: 487M resident, 158M data, 142M linked:it. Mem:0% free, 88 resident, 88 private, 298M shared. | | | | | | | | | | PhysMem: 150 used (281M wired, 339M compressed), 739M unused. VM: 291T size, 5782M framework size, 339M(0) swapps, 36492(0) swoutputs. Network: packets: 55244618/790 in, 2782527/3843M out. | | | | | | | | | | Disk: 7822236/2460 read, 14881292/2850 write. | | | | | | | | | | 23/10/21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PID | COMMAND | TIME | WTH | PWD | #PORTS | MEM | DISKS | PGPG | PPID | DATA | ROOTS | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU | HE | NCPU</ |



A terminal window titled "vasyl — -zsh — 80x24" with standard macOS window controls. The terminal shows the following text:

```
Last login: Tue Oct 14 22:58:25 on ttys000
[vasyl@VasyIs-MacBook-Air ~ % open a calculator
The files /Users/vasyl/a and /Users/vasyl/calculator do not exist.
[vasyl@VasyIs-MacBook-Air ~ % open -a calculator
vasyl@VasyIs-MacBook-Air ~ %
```



13. Вбив процес, що який було запущено у завданні № 12.


```
root      589  0.0  0.1 426976608 8768 ?? Ss 10ct25 0:14.59 /usr/libexec/neh
root      586  0.0  0.0 426966288 3184 ?? Ss 10ct25 0:37.30 /usr/libexec/apf
root      584  0.0  0.1 426982192 11376 ?? Ss 10ct25 3:56.97 /usr/libexec/tru
root      583  0.0  0.0 426966416 7392 ?? Ss 10ct25 0:23.40 /System/Library/
root      582  0.0  0.1 426976416 23344 ?? Ss 10ct25 5:53.44 /usr/libexec/air
root      579  0.0  0.1 426978016 14112 ?? Ss 10ct25 0:56.06 /usr/libexec/lxd
root      578  0.0  0.0 426992976 4512 ?? Ss 10ct25 0:04.41 /System/Library/
root      577  0.0  0.1 426977840 14864 ?? Ss 10ct25 2:58.96 /System/Library/
root      576  0.0  0.1 426981136 20752 ?? Ss 10ct25 14:13.33 /usr/libexec/run
root      521  0.0  0.0 418682128 1824 ?? Ss 10ct25 0:00.02 /System/Library/
root      552  0.0  0.0 426933824 3584 ?? Ss 10ct25 0:54.95 /usr/sbin/distno
root      542  0.0  0.0 426967040 4064 ?? Ss 10ct25 0:16.93 /usr/libexec/tir
root      543  0.0  0.0 426976928 3152 ?? Ss 10ct25 0:00.66 /System/Library/
root      571  0.0  0.2 412283824 32144 ?? Ss 10ct25 3:15.21 /System/Library/
root      570  0.0  0.0 426933312 5552 ?? Ss 10ct25 2:40.37 /usr/sbin/cfpref
root      569  0.0  0.1 426977440 11760 ?? Ss 10ct25 0:39.35 /System/Library/
root      513  0.0  0.0 426929040 2640 ?? Ss 10ct25 0:00.02 /usr/libexec/IOM
root      557  0.0  0.0 426967472 6880 ?? Ss 10ct25 0:00.51 /System/Library/
root      550  0.0  0.1 426975008 19408 ?? Ss 10ct25 9:40.31 /usr/libexec/das
root      533  0.0  0.1 426988688 21856 ?? Ss 10ct25 1:46.66 /usr/libexec/cor
root      507  0.0  0.1 426977648 11104 ?? Ss 10ct25 0:19.85 /usr/sbin/system
root      566  0.0  0.1 426998880 12480 ?? Ss 10ct25 0:15.75 /System/Library/
root      534  0.0  0.0 426933728 1968 ?? Ss 10ct25 0:28.04 /usr/sbin/syslog
root      517  0.0  0.0 426966704 2576 ?? Ss+ 10ct25 0:00.12 /usr/libexec/rem
root      537  0.0  0.0 426966288 5568 ?? Ss 10ct25 0:27.42 /usr/libexec/the
root      544  0.0  0.2 426966464 10048 ?? Ss 10ct25 0:29.46 /usr/libexec/cor
root      540  0.0  0.1 427054224 17536 ?? Ss 10ct25 2:37.56 /System/Library/
root      530  0.0  0.0 426966576 5968 ?? Ss 10ct25 0:09.02 /usr/libexec/dis
root      538  0.0  0.1 426972128 12864 ?? Ss 10ct25 7:24.66 /usr/libexec/ope
root      549  0.0  0.0 426928976 2080 ?? Ss 10ct25 0:00.04 autofsd
root      562  0.0  0.0 426932720 3936 ?? Ss 10ct25 2:13.60 /usr/sbin/notify
root      544  0.0  0.0 426968704 7824 ?? Ss 10ct25 0:16.50 /usr/sbin/securi
root      527  0.0  0.1 426975008 30048 ?? Ss 10ct25 0:59.47 /System/Library/
root      558  0.0  0.0 426928992 1168 ?? Ss 10ct25 0:00.02 /usr/sbin/Kernel
root      556  0.0  0.0 426932608 3504 ?? Ss 10ct25 0:00.47 /System/Library/
root      523  0.0  0.0 426933168 2608 ?? Ss 10ct25 0:05.46 /usr/libexec/wat
root      510  0.0  0.1 426972720 10144 ?? Ss 10ct25 4:19.80 /usr/libexec/con
root      512  0.0  0.1 426968560 10864 ?? Ss 10ct25 3:48.69 /System/Library/
root      501  0.0  0.1 426975408 13952 ?? Ss 10ct25 1:01.34 /usr/libexec/Use
root      520  0.0  0.0 426970576 4336 ?? Ss 10ct25 0:00.96 /usr/libexec/ker
root      48865 0.0  0.0 418986432 1952 s000 R+ 11:15PM 0:00.01 ps aux
root      1 0.0  0.1 426852624 18800 ?? Ss 10ct25 21:23.26 /sbin/launchd
vasyl     40864 0.0  0.5 1865448752 81840 ?? S 11:14PM 0:00.05 /Applications/Go
vasyl     40853 0.0  0.0 410762368 3648 s000 S 11:14PM 0:00.01 -zsh
vasyl     40852 0.0  0.9 1865446304 152464 ?? S 11:14PM 0:00.14 /Applications/Go
root      40851 0.0  0.0 410762160 6768 s000 Ss 11:14PM 0:00.01 login -pf vasy
vasyl     40808 0.0  0.7 1867170368 119648 ?? S 11:14PM 0:00.09 /Applications/Go
vasyl     40841 0.0  0.1 426984464 20672 ?? S 11:14PM 0:00.07 /System/Library/
vasyl     40840 0.0  0.1 426984464 18656 ?? S 11:14PM 0:00.07 /System/Library/
vasyl     40839 0.0  0.1 426984464 20736 ?? S 11:14PM 0:00.08 /System/Library/
vasyl     40838 0.0  0.1 426984464 20672 ?? S 11:14PM 0:00.07 /System/Library/
vasyl     40836 0.0  0.1 426984464 20640 ?? S 11:14PM 0:00.08 /System/Library/
vasyl     40834 0.0  0.1 426984464 20720 ?? S 11:14PM 0:00.08 /System/Library/
vasyl     40837 0.0  0.1 426984464 20640 ?? S 11:14PM 0:00.07 /System/Library/
vasyl     40835 0.0  0.1 426984464 18032 ?? S 11:14PM 0:00.07 /System/Library/
vasyl     40832 0.0  1.6 1867154144 260688 ?? S 11:14PM 0:01.75 /Applications/Go
vasyl     40830 0.0  0.2 426986112 27552 ?? S 11:13PM 0:00.12 /System/Library/
vasyl     40826 0.0  0.2 426986112 27472 ?? S 11:13PM 0:00.11 /System/Library/
vasyl     40780 0.0  0.4 411984736 73344 ?? S 11:06PM 0:00.54 /System/Applicat
root      40712 0.0  0.0 426968144 7728 ?? Ss 11:01PM 0:02.96 /System/Library/
vasyl     40709 0.0  0.2 411471952 33168 ?? Ss 11:00PM 0:00.17 /System/Library/
vasyl     40520 0.0  0.0 426933632 6544 ?? S 10:47PM 0:00.06 /usr/libexec/bio
root      40510 0.0  0.0 426933488 3040 ?? SNa 10:45PM 0:00.09 /usr/sbin/netbio
root      40508 0.0  0.0 426968048 6464 ?? Ss 10:45PM 0:00.09 /usr/libexec/cap
vasyl     40407 0.0  0.1 426967648 10704 ?? S 10:24PM 0:00.06 /usr/libexec/icl
vasyl     40337 0.0  0.1 426970384 13984 ?? S 10:11PM 0:00.78 /System/Library/
vasyl     40267 0.0  0.0 431292960 7568 ?? S 10:01PM 0:00.12 /System/Library/
vasyl     40255 0.0  0.2 427311008 26656 ?? S 10:01PM 0:00.14 /System/Cryptex
vasyl     40227 0.0  0.5 427215104 81312 ?? S 10:00PM 0:00.31 /System/Cryptex
vasyl     40157 0.0  0.0 426957808 3584 ?? Ss 9:53PM 0:00.06 /System/Library/
vasyl     40143 0.0  1.0 1865540688 160112 ?? S 9:52PM 0:03.39 /Applications/Go
vasyl     40140 0.0  1.4 1870899376 234944 ?? S 9:52PM 0:09.16 /Applications/Go
vasyl     39866 0.0  0.1 426997136 24304 ?? S 9:23PM 0:01.05 /System/Library/
vasyl@VasyIs-MacBook-Air ~ % kill 40780
vasyl@VasyIs-MacBook-Air ~ %
```

Контрольні запитання:

1. Що таке процес?

Процес — це програма, яка виконується в даний момент у пам'яті комп'ютера. Це активний стан програми.

2. Чим відрізняється процес від програми?

Програма — це просто файл на диску, який ще не запущений.

Процес — це вже запущена програма, яка виконується в оперативній пам'яті.

Коли запускаємо програму, створюється процес.

3. Назвіть основні функції «Диспетчера задач»

Показує, які програми та процеси запущені.

Дозволяє зупиняти завислі програми.

Показує, наскільки завантажений процесор і пам'ять.

Дозволяє керувати автозавантаженням програм.

Показує використання диску, мережі, відеокарти.

4. Поясніть значення індикаторів, які знаходяться на вкладці «Швидкодія» Диспетчера задач.

ЦП (CPU) — показує, наскільки завантажений процесор.

Пам'ять (Memory) — скільки оперативної пам'яті використовується.

Диск (Disk) — наскільки активно працює жорсткий диск або SSD.

Мережа (Wi-Fi або Ethernet) — швидкість передачі та отримання даних.

GPU — навантаження на відеокарту.

5. Яку інформацію виводить програма ps?

Команда ps у Linux показує список запущених процесів — хто їх запустив, їхні номери (PID), скільки вони використовують процесора та пам'яті.

6. Чим відрізняється програма `top` від `ps`?

`ps` показує процеси один раз, а `top` — постійно оновлює список у реальному часі, показуючи, які процеси зараз найбільше навантажують систему.

7. Яким чином можна зупинити процес у ОС Windows та ОС Linux?

У Windows: відкрити Диспетчер задач, вибрати процес і «Завершити завдання».

У Linux: у терміналі ввести `kill <PID>` або примусово `kill -9 <PID>`
Також у програмі `top` можна натиснути **k** і ввести номер процесу.

Висновок:

У ході виконання лабораторної роботи я ознайомився з основними засобами моніторингу процесів операційних систем macOS та UNIX (Linux). За допомогою програми Activity Monitor було переглянуто загальну статистику системи, визначено процеси з найбільшим використанням пам'яті та процесора, а також досліджено мережеву активність.

Я навчився запускати нові процеси через термінал, визначати їхні ідентифікатори (PID) за допомогою команди `ps aux`, а також завершувати процеси за допомогою команд `kill i kill -9`. Крім того, розглянув використання команди `top` для відображення завантаження системи в реальному часі.

У результаті роботи я отримав практичні навички керування процесами, моніторингу системних ресурсів і взаємодії з віддаленим Linux-сервером через SSH. Отримані знання допомагають краще розуміти роботу операційних систем UNIX-подібного типу та ефективно використовувати їх для адміністрування й діагностики.