Завдання для попередньої підготовки.

1. Прочитайте короткі теоретичні відомості до лабораторної роботи та зробіть невеличкий словник базових англійських термінів з питань призначення команд та їх параметрів.

Term	Purpose
Command	A directive given to a computer program to perform a specific task or function.
Parameter	Additional information provided to a command to modify its behavior or specify options.
Process	A program in execution
PID (Process ID)	A unique numerical identifier assigned to each running process in a computer operating system.
Signal	A message sent to a process to notify it of an event or to instruct it to perform a particular action.
Terminate (or Stop)	To end the execution of a process or program.
Root User	The administrative user account with full privileges on a Unix-like operating system.
Runaway Process	A process that consumes an excessive amount of system resources and does not respond to normal termination requests.
Process Status	The current state of a process, such as running, sleeping, stopped, or terminated.
Swap Space	Disk space used by the operating system to temporarily hold data that does not fit into RAM.
Kernel Function	A function within the operating system's kernel that provides essential services to other parts of the operating system and to running processes.

2. На базі розглянутого матеріалу дайте відповіді на наступні питання:

2.1. Які команди для моніторингу стану процесів ви знаєте. Як переглянути їх можливі параметри?

- ps: It can produce lots of information about all the programs running on your system.
- top: displays process information similarly to the ps command, but it does it in real-time mode
- kill: allows you to send signals to processes based on their process ID (PID).

2.2. Чи може команда ps у реальному часі відслідковувати стан процесів?

The ps command can display information only for a specific point in time (not in real time). Instead, the top command can solve this problem. The top command displays process information similarly to the ps command, but it does it in real-time mode.

2.3. За якими параметрами можливе сортування процесів в команді top? Як переключатись між ними?

By default, when you start top, it sorts the processes based on the %CPU value. You can change the sort order by using one of several interactive commands while top is running. Each interactive command is a single character that you can press while top is running and changes the behavior of the program. Pressing f allows you to select the
field to use to sort the output, and pressing d allows you to change the polling interval.

2.4. Які команди для завершення роботи процесів ви знаєте?

kill: Used to send signals to processes by their PID.
killall: Terminates processes by name or by using a pattern.

Контрольні питання

1. Яке призначення директорії /proc в системах Linux. Яку інформацію вона зберігає?

The /proc/ directory (also called the proc file system) contains a hierarchy of special files which represent the current state of the kernel, allowing applications and users to peer into the kernel's view of the system. It stores information in the form of text files

2. Як серед будь-яких трьох процесів динамічно визначати, який з них в поточний момент часувикористовує найбільший обсяг пам'яті? Який відсоток пам'яті він споживає від загального обсягу?

Since we need to determine the information at the current moment, we will use the top command instead of ps. To determine the amount of memory used, we will change the standard %CPU sort to M sort - sort by memory

3. Як отримати ієрархію батьківських процесів в системах Linux? Наведіть її структуру та охарактеризуйте.

Processes can be mapped into a "tree" which can be viewed with the pstree command. Or the ps -H command, which displays processes in a hierarchical format (shows parent processes)
The main elements of the parent process hierarchy:

- Parent Processes: Every process, except for a special process with PID 0, has a parent process. A parent process is spawned when another process creates a new process.
- Child Processes: Child processes are processes that are created by parent processes. They inherit some attributes from their parent processes.

In turn, each of these processes has its own stages:

- Running - the process is either running (the current process in the system) or ready to run (waiting to be transferred to the processor for execution).
- Waiting - the process is waiting for some event to occur (user input, a signal from another process, etc.) or for system resources to be allocated. In addition, the kernel also distinguishes between two types of waiting processes:
  - waiting processes that can be interrupted - can be interrupted by signals;
  - waiting processes that are not interrupted - processes are waiting directly on the hardware level and cannot be interrupted by any event/signal.
- Terminated - the process has been stopped, usually by receiving the normal exit() signal.
- Zombies - sometimes, when a parent process is killed before a child process is completed, the child processes become "orphaned", with the init process being assigned as the new parent (with the corresponding change in PPID). Killed processes, but still displayed in the process table, are called zombie processes (they are dead and not in use).

4. *Чим відрізняється команда top від ps?

The ps command displays information about processes for a certain period of time, while top allows you to track processes in real time.

5. *Які додаткові можливості реалізує htop в порівнянні з top?

Top shows the amount of memory used with the cache. htop shows the amount of memory actually used without cache.

Features.

- Like top, the program works in a console mode, but has a number of features:
- Free vertical and horizontal scrolling of the list of processes;
- You can use the mouse for control;
- To terminate a process or change the execution priority, you do not need to enter the PID, just move the cursor to it;
- Visual tools for evaluating the efficiency of SMPSMP and the use of each processor core, including for systems with a large number of processor cores;
- A tree view of the process list;
- Support for visual themes and flexible interface customization options;

- Support for work on monochrome terminals;
- Ability to filter processes by owners and various parameters;
- Ability to configure CPU affinity

6. **Опишіть компоненти вашої мобільної ОС для здійснення моніторингу запущених в системі процесів?

Components that provide monitoring of running processes in the IOS system

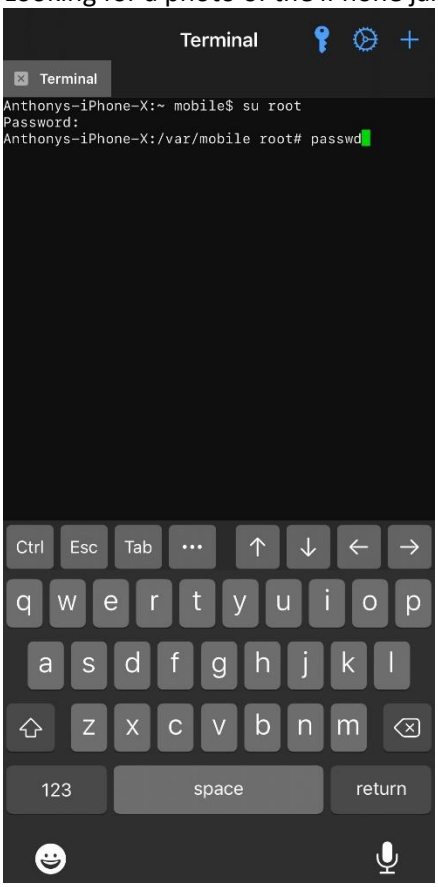
- Process Management: IOS has a process management system that is responsible for starting, pausing, and terminating processes.
- Task Manager: A user interface that allows you to view active processes and perform actions on them.
- Background Execution: IOS allows some apps to perform certain operations in the background, even when they're not active on the screen.
- Application Lifecycle: IOS has a strictly controlled application lifecycle, including starting, suspending, and closing applications.

7. **Чи підтримує Ваша мобільна ОС термінальне керування роботою процесів, опишіть як саме.

IOS, the operating system for Apple devices, does not provide users with direct access to a terminal to control the operation of processes.

There are no terminal in the iPhone, at least not available for the user. You might be able to get a terminal if you jailbreak it. But that is illegal and I do not suggest doing that. For example if you want to update iOS you have to reset your iPhone to fabric data. Then update, and jailbreak again if you want. I got my information from this forum. https://www.quora.com/Is-it-possible-to-use-Terminal-on-iOS-devices

Looking for a photo of the iPhone jailbreak, I found an approximate view of the terminal.



8. **Чи можливо поставити сторонні програмні засоби, що дозволяють організувати управління та моніторинг роботою процесів у Вашому мобільному телефоні. Коротко опишіть їх.

It is possible to install third-party applications from the App Store that allow you to organize the management and monitoring of processes in IOS, here are a few:

- System Status: This is an application that provides detailed information about the use of resources such as CPU, RAM, disk, etc.

- iStat Menus: This application allows users to monitor system performance, including processes, temperature, fan speed, network usage, and more.
- Battery Doctor: This is an application specialized in monitoring and managing the energy efficiency of the device.

An example of one of the apps: