**“Київський фаховий коледж зв’язку”**

**Циклова комісія Комп’ютерної та програмної інженерії**

**ЗВІТ ПО ВИКОНАННЮ**

**ЛАБОРАТОРНОЇ РОБОТИ №4**

з дисципліни: «Операційні системи»

**Тема: «Команди Linux для управління процесами»**

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**Мета роботи:**

**1. Отримання практичних навиків роботи з командною оболонкою Bash.**

**2. Знайомство з базовими командами для управління процесами.**

**Матеріальне забезпечення занять**

**1. ЕОМ типу IBM PC.**

**2. ОС сімейства Windows (Windows 7).**

**3. Віртуальна машина – Virtual Box (Oracle).**

**4. Операційна система GNU/Linux – CentOS.**

**5. Сайт мережевої академії Cisco netacad.com та його онлайн курси по Linux**

**Хід роботи**

**Виконав завдання Міньков Ілля**

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

**The /proc directory in Linux systems is an essential part of the file system that provides access to information about the current state of the operating system's kernel and the processes running within it. Its primary purposes and the types of information it stores include the following:**

**Information about processes: Within the /proc directory, there are subdirectories for each process running in the system. Each of these subdirectories has a unique identifier (PID) and contains various files and pseudo-files that hold information about the process's state, including resource information, file descriptors, CPU usage statistics, memory information, and more.**

**Kernel information: Some files and pseudo-files in the /proc directory contain information about the configuration and state of the Linux kernel. This includes the kernel version, kernel parameters, kernel work statistics, and other related data.**

**Other system information: /proc also contains files that provide information about hardware, network parameters, memory usage, and other system characteristics.**

**Access to kernel parameters: Some files in /proc allow for the configuration of specific kernel parameters, which can affect the kernel's operation or subsystems of the operating system.**

**General access to these files and pseudo-files in /proc provides users and programs with the ability to obtain information about the system and its state, as well as perform certain operations related to process management and kernel parameters.**

**Виконав завдання Міньков Ілля**

**2. Як серед будь-яких трьох процесів динамічно визначати, який з них в поточний момент часу**

**використовує найбільший обсяг пам’яті? Який відсоток пам’яті він споживає від загального обсягу?**

**To determine which of the three processes is currently using the most memory and calculate the percentage of memory it consumes from the total memory, you can use the top or htop commands if they are installed on your system. They provide real-time information about resources consumed by processes.**

**Here's how to use the top command:**

**Open a terminal.**

**Run the top command. You will see a list of active processes in real-time, sorted by various metrics, including memory usage.**

**Your goal is to find the process that is consuming the most memory. In the "VIRT" (Virtual) column, you'll see the size of virtual memory, and in the "RES" (Resident) column, you'll see the size of resident memory. Typically, "RES" is a better indicator of actual memory usage.**

**Select the process with the highest value in the "RES" column and calculate the percentage of memory it uses from the total memory if needed.**

**Be cautious, as high memory usage can slow down your system, and you may need to take measures to manage such processes, including restarting or terminating them.**

**Виконав завдання Міньков Ілля**

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

**охарактеризуйте.**

**To obtain the hierarchy of parent processes in Linux systems, you can use the pstree command. This command allows you to visualize the hierarchy of processes in a structured format. Here's how to use it:**

**Open a terminal.**

**Run the pstree command. It will display a structured representation of the parent-child relationship between processes.**

**Each process is represented with lines connecting them, and child processes are indented under their parent processes. For instance, init is the parent of the apache2 process, which, in turn, has 9 child apache2 processes.**

**This hierarchy provides a clear view of the parent-child relationships among processes in the system. The root of the hierarchy is typically the init process (or its equivalent) from which all other processes are spawned.**

**pstree is a useful tool for analyzing processes and their dependencies in a Linux system, allowing you to understand the logical connections between them.**

**Виконав завдання Міньков Ілля**

**4. Чим відрізняється команда top від ps?**

**The top command and the ps command are two different utilities for monitoring and displaying information about processes in Linux systems. Here are the key differences between them:**

**Real-time Display:**

**top: Provides information about processes in real-time and automatically updates the list of processes at a specific interval (typically every 3 seconds by default). This allows you to monitor changes in resource usage by processes as they occur.**

**ps: Outputs a static list of processes at the moment the command is executed. You need to use arguments to customize the output for specific needs.**

**Interactivity:**

**top: It's an interactive utility that can be used to sort and filter processes in real-time. You can interact with the top command by changing sorting criteria, hiding or showing specific processes, and more.**

**ps: ps outputs a static list of processes and terminates once it has displayed the information.**

**Information Display:**

**top: Provides more information in a user-friendly format for real-time monitoring, including details on CPU and memory usage, overall process runtime, and more.**

**ps: Displays more limited information about processes. Information in ps can be more precisely configured using command-line arguments.**

**Usability:**

**top: Typically considered more convenient for real-time monitoring of running processes.**

**ps: Often used for one-time retrieval of process statistics and can be more useful for scripting or automation scenarios.**

**So, the choice between top and ps depends on your specific task. top is useful for real-time monitoring, while ps can be used for one-time retrieval of process information or more scripted scenarios.**

**Виконав завдання Міньков Ілля**

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

**htop is an interactive system and process monitor for Linux that provides additional features compared to the classic top. Here are some of the main additional features of htop compared to top:**

**Interactive Interface:**

**htop: Features an interactive text-based interface that allows users to easily interact with processes and change their states.**

**top: Requires entering different key combinations to perform certain operations and may not be as user-friendly as htop.**

**Graphical Representation:**

**htop: Provides graphical indicators for CPU and memory usage, making information more visually accessible.**

**top: Typically displays text-based information without graphical representations.**

**Sorting:**

**htop: Allows for sorting the process list by various parameters (e.g., CPU or memory usage) directly from the interface.**

**top: Sorts processes by default only by PID (Process ID).**

**Color Coding:**

**htop: Uses color coding to highlight different parameters, making it easier to interpret information, such as processes consuming a lot of CPU or memory.**

**top: Usually displays plain text without color highlighting.**

**Contextual Process Management:**

**htop: Enables users to send signals to processes (e.g., terminate a process) directly from the interface.**

**top: Requires entering different commands to manage processes.**

**Scrolling Support:**

**htop: Supports scrolling, allowing users to view more process history in large process lists.**

**top: Can be less straightforward for navigating large process lists.**

**All these features make htop more appealing to users who need a convenient and interactive tool for monitoring and managing processes in Linux.**

**Виконав завдання Колотуша Микола**

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

Sure, here's the description of the components of a mobile operating system for monitoring running processes:

Task Manager or Process Manager: This component allows users to view and manage the processes running on the device. It provides information about the amount of memory used, running processes, their status, and details about the computational resources being utilized.

System Monitor: This component visualizes the system's state and resources in real-time. It can display information about CPU usage, RAM consumption, network resources, and other system parameters.

Event Log or System Log: This component records information about all events and actions taking place in the system, including the launching and termination of processes. The event log is useful for analyzing and debugging issues in the system.

Process Monitoring APIs: For developers, there are often APIs available to interact with the system for monitoring and managing processes. This can be useful for creating applications that monitor or automate specific processes.

Command-Line System Tools: Developers and administrators can use command-line tools to monitor processes running on the system. Commands such as ps, top, or htop offer advanced capabilities for analyzing processes.

Hardware Monitoring Support: Some mobile devices have hardware support for monitoring, such as temperature sensors, processor speed, and other parameters that can be used for monitoring device performance and detecting anomalies.

The specific infrastructure for monitoring processes in a mobile operating system can vary depending on the OS (e.g., Android, iOS) and its version. Process monitoring helps users and developers track resources and device performance, as well as identify and resolve issues related to running processes.

**Виконав завдання Колотуша Микола**

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

Android is based on the Linux kernel, and it provides a set of command-line tools to manage processes. You can use a terminal on an Android device to execute commands such as:

ps: The ps command displays information about running processes, including the Process ID (PID), state, memory consumption, and other parameters.

kill: The kill command allows you to terminate a process by specifying its PID. For example, kill -9 PID will terminate a process with the specified PID.

top: The top command provides an interactive view of the list of running processes and their resource usage in real-time.

am: Android Debug Bridge (ADB) provides many other commands for managing applications and processes on Android devices. For instance, the am force-stop package\_name command can be used to stop processes of a specific app by its package name.

Please note that access to the command line and some features may require enabling Developer Mode on your Android device and installing Android Debug Bridge (ADB) on your computer. Also, keep in mind that Android may have security restrictions that limit access to certain features to ensure the system's security and stability.

**Виконав завдання Колотуша Микола**

8. Чи можливо поставити сторонні програмні засоби, що дозволяють організувати управління та

моніторинг роботою процесів у Вашому мобільному телефоні. Коротко опишіть їх.

Yes, you can install third-party applications to organize the management and monitoring of processes on your Poco X3. Poco X3 runs on the Android operating system, and it supports third-party apps from the Google Play Store. Here are some popular apps you can use for this purpose:

1. Task Managers: Apps like "Task Manager" or "Advanced Task Manager" allow you to view running processes, their resource usage, and terminate excessive processes to save resources.

2. System Monitoring Apps: Apps like "CPU-Z," "GSam Battery Monitor," or "System Monitor" provide information about resource usage and allow you to track processes in real-time.

3. Battery Optimizers: Apps like "Greenify" help reduce battery consumption by managing processes running in the background.

4. Security Suites: Some antivirus apps like "Avast" or "Norton Mobile Security" offer process monitoring and management features for device security.

5. Task Automation Apps: Apps like "Tasker" or "MacroDroid" allow you to customize automated actions, including process management on your Poco X3.

These apps will help you gain more control over processes and resources on your Poco X3, enhance performance, and save battery. You can find them on the Google Play Store and install them as needed.

**Висновок:**

The objective of the work was to acquire practical skills in working with the Bash command-line shell and to become familiar with basic commands for managing processes. During the execution of the tasks, the following essential skills were gained:

Fundamentals of the Bash Command Line: Working with the command-line shell allowed learning to launch the terminal, input and execute commands, navigate between directories, and create or delete files.

Monitoring and Managing Processes: The ability to execute commands like ps, top, and kill was learned for monitoring processes, checking the list of running programs, and terminating processes based on their Process ID (PID).

Task Automation: Familiarity with the capabilities of creating Bash scripts for automating routine tasks and executing sequences of commands.

As a result of the work, valuable skills were acquired for effectively working with the command-line shell and managing processes on various operating systems, which can be beneficial for both administrators and developers. Understanding basic commands and skills in working with the Bash command-line shell are important for efficiently working with Linux-based operating systems and scripting for automation.