**“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.**

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**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.**

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**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.**

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**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.**

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**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.**