“Київський фаховий коледж зв’язку”

Циклова комісія Комп’ютерної інженерії

**ЗВІТ ПО ВИКОНАННЮ**

**ЛАБОРАТОРНОЇ РОБОТИ №4**

з дисципліни: «Операційні системи»

**Тема: «Ознайомлення з робочим середовищем віртуальних машин та операційних систем різних сімейств»**

Виконав студент

групи БІКС-13

Когут Ігор Святославович  
Береза Артем

Перевірив викладач

Сушанова В.С.

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**The goal of the work**

1. Acquiring practical skills in working with virtual machine environments and operating systems of various types and families - their graphical shell, logging in and out of the system, familiarization with the structure of the desktop, learning the basic actions and settings when working in the system.

**Material provision of classes**

1. IBM PC type computer.

2. OS family Windows (Windows 7).

3. Virtual machine - Virtual Box (Oracle).

4. GNU/Linux operating system - CentOS.

**Tasks for preliminary preparation.**

2.1. **Commands for Monitoring Process Status: (Когут)**

**ps:** This command displays information about active processes. To view its possible parameters, you can use the man ps command to access its manual page or use ps --help for a brief overview.

**top:** The top command provides real-time information about processes and system usage. You can view its available options and parameters by typing man top or top --help.

2.2. **Can the ps Command Track Process Status in Real-Time?**

**No**, the ps command typically shows a snapshot of the current processes running on the system at the moment it is executed. It does not continuously monitor processes in real-time.

2.3. **Parameters for Sorting Processes in the top Command:**

The top command allows sorting processes based on various parameters, including CPU usage, memory usage, and process ID (PID). You can switch between sorting parameters interactively while running top. Common sorting keys include:

**P:** Sort by CPU usage (default).

**M:** Sort by memory usage.

**N:** Sort by process ID (PID).

To switch between sorting parameters in top, press the corresponding letter key while top is running.

2.4. **Commands for Terminating Processes:**

Some common commands for terminating processes include:

**kill:** Used to send signals to processes. The default signal is SIGTERM (15), which requests termination of the process.

**killall:** Terminates processes by name rather than by process ID.

**pkill:** Sends signals to processes based on name or other attributes.

**xkill:** Allows you to select a window to kill interactively in graphical environments.

kill -9 <PID>: Sends the SIGKILL signal, forcing termination of the process without allowing it to clean up.

To learn more about these commands and their options, you can use the man command followed by the command name (e.g., man kill).

**Progress**

**2. Answer the following questions:(Когут)**

**1.** **Viewing the contents of the /proc directory:**

The /proc directory is located in the root directory of the file system. It is intended to provide information about processes, the kernel, and other system resources.

To view the contents of the /proc directory, you can use the command ls /proc or simply navigate to this directory using cd /proc.

**2. Displaying information about current user sessions:**

Information about current user sessions can be obtained using the who or w command. They display details about logged-in users, login times, and other relevant information.

**3. Actions with Ctrl + C, Ctrl + D, and Ctrl + Z combinations:**

**Ctrl + C:** This combination interrupts the execution of the current command or program and returns control to the shell.

**Ctrl + D:** This combination indicates the end of input in the terminal (EOF). If input is being provided in the terminal without a command or program, Ctrl + D will result in exiting the terminal.

**Ctrl + Z:** This combination suspends the execution of the current process and puts it into the background.

**4. Difference between a background process and a regular process:**

A background process is a process that runs independently of any specific terminal and can continue to work even after the user exits the system or logs out. They are often used for executing tasks in the background without blocking the terminal.

A regular process, on the other hand, is tied to the shell and is suspended when the user logs out or exits the system.

**5. Description of the jobs, bg, and fg commands:**

jobs: Displays a list of background jobs in the current shell.

bg: Moves a background job to the background, allowing it to continue running without interruption.

fg: Brings a background job to the foreground, allowing it to continue running and be visible in the terminal.

**6. Command to view information about running background processes and jobs:**

The jobs command displays information about background processes and jobs running in the current shell.

**7. Suspending, resuming, and restarting a background process:**

To suspend a background process, use the Ctrl + Z command.

After that, the process will be suspended.

To resume a suspended process, use the fg command.

If you need to restart the process, use the bg command, or execute the appropriate command to start the process again.

**Answers to control questions (Когут)**

**1.Purpose of the /proc directory in Linux systems:**

The /proc directory in Linux systems serves as a virtual filesystem that provides information about processes and kernel-related information in real-time.

It contains directories and files that represent running processes, system resources, and configuration parameters.

Information stored in /proc includes process IDs (PIDs), memory usage, CPU utilization, kernel configuration, hardware information, and more.

**2.Determining the process with the highest memory usage**:

You can dynamically determine which process currently uses the most memory by parsing the memory information of each process from the /proc directory.

Compare the memory usage (usually found in the /proc/[PID]/statm file) of each process and identify the one with the highest memory usage.

Calculate the percentage of memory it consumes compared to the total system memory to determine its memory usage relative to the system.

**3.Getting the hierarchy of parent processes in Linux systems:**

The hierarchy of parent processes can be obtained by examining the parent process ID (PPID) of each process in the system.

You can use tools like pstree or traverse the /proc directory to analyze the PPIDs of processes and construct the parent-child relationship.

The structure typically forms a tree-like hierarchy, with the initial process (PID 1) as the root and subsequent processes branching out as children.

**4.Difference between the top command and ps:**

The ps command displays a snapshot of current processes, while top provides a dynamic, real-time view of running processes and system resource usage.

top continuously updates its display, showing CPU and memory usage in real-time, whereas ps shows a one-time snapshot by default.

top provides interactive features for sorting and managing processes, while ps offers various options for filtering and formatting process information.

**5.Additional features of htop compared to top:**

htop offers a more user-friendly interface with colorized display and interactive features.

It allows scrolling vertically and horizontally, supports mouse interaction, and provides tree-view representation of processes.

htop also provides options for sorting processes, filtering by user or process name, and customizable display settings.

**6.Components of a mobile OS for monitoring running processes:**

A task manager or process monitor app: This component provides a user-friendly interface to view and manage running processes, CPU and memory usage, and system resource allocation.

System APIs: These allow access to process-related information programmatically, enabling developers to build monitoring and management features into apps.

Background service: This service continuously monitors system processes and resource usage, providing notifications or alerts when certain thresholds are exceeded.

**7.Terminal management of processes in a mobile OS:**

Some mobile OSs support terminal access via third-party apps or developer options, allowing users to run command-line utilities for managing processes.

Through the terminal, users can view running processes, kill or terminate specific processes, and monitor system resource usage using commands similar to those available in Linux.

**8.Third-party tools for process management and monitoring on mobile phones:**

There are third-party apps available on mobile app stores that provide task management, process monitoring, and system resource optimization features.

These apps offer functionalities such as viewing running processes, analyzing CPU and memory usage, killing background apps, and optimizing system performance.

Examples include Task Manager, Advanced Task Killer, Greenify, and System Monitor, among others.

**Conclusion**

In the course of the laboratory work, I studied the Linux system and its distributions, theoretically studied the issue of the system's operation in more detail. Acquired practical skills of working with the operating system.