**"КИЇВСЬКИЙ ФАХОВИЙ КОЛЕДЖ ЗВ’ЯЗКУ"**

**Лабораторна робота 8**

з дисципліни «Операційні системи»

**Тема:**  
“Збереження службових даних системи та її мережева конфігурація”

Виконали: студенти **3** курсу, групи **КСМ-13А**

**Засенко Олександр**

(прізвище та ініціали)

**Дзюбенко Дмитро**

(прізвище та ініціали)

**Сторожук Костянтин**

(прізвище та ініціали)

Київ  2023

**ЗМІСТ**

Мета роботи ………………………………………………………………………...3

Хід роботи ………………………….……………………………….………………6

Контрольні запитання………………………………………………………………8

Conclusions…………………………………………………………...……………..11

**Мета роботи:**

1. Отримання практичних навиків роботи з командною оболонкою Bash.

2. Знайомство з базовими структурами для збереження системних даних - процеси, память, лог-файли та

повідомлення про стан ядра.

3. Знайомство зі стандартом FHS.

4. Знайомство з діями при налаштуванні мережі.

**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

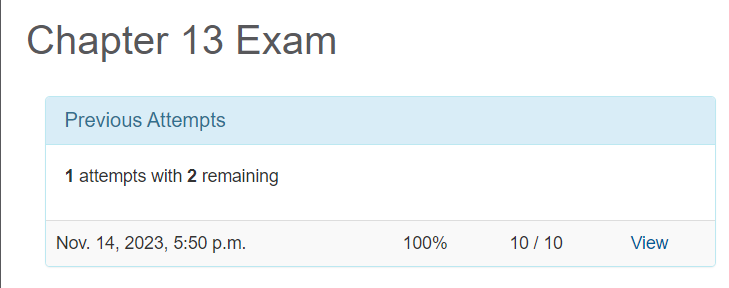
**Завдання для попередньої підготовки**

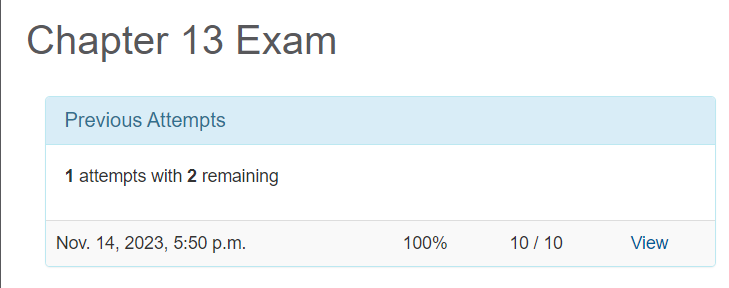
***Готував матеріал студент Zasenko***

Невеликий словник базових англійських термінів з питань призначення команд та їх параметрів.

|  |  |
| --- | --- |
| NAT | Invented to overcome the possibility of running out of IP addresses in an IPv4 environment, Net  Address Translation (NAT) used a technique to provide more hosts access to the Internet. |
| Porting | Porting is switching over from one technology to another. |
| DNS | As mentioned previously, hostnames are translated into IP addresses, prior to the network packet  being sent on the network. |
| URL | A Uniform Resource Locator (URL), also commonly called a web address, is used to locate a  resource, like a web page, on the internet. |
| IP Address. | An Internet Protocol (IP) address is a unique number assigned to a host on a network. Hosts  use these numbers to address network communication. |

**Пройдіть тестування у курсі NDG Linux Essentials за такими темами:**





4.1. Pseudo file system: A pseudo file system is a mechanism that provides access to information about various system resources through a file interface. In Linux, /proc is an example of a pseudo file system that provides access to information about processes, memory, hardware, and other system resources.

The pseudo file system is used to provide simplified access to system resources and create their representation in the form of files for the convenience of interaction between programs and the operating system kernel.

4.2. The /proc directory: Users do not often access the /proc directory directly, as the data there is stored in the form of text files and is often difficult to understand without special knowledge. To get information, users can use commands that automatically process this data, such as ps for process information.

4.3. Files /proc/cmdline, /proc/meminfo and /proc/modules:

* /proc/cmdline: Stores the kernel command line that was used at system startup. Includes parameters passed to the kernel at boot.
* /proc/meminfo: Provides information about memory usage, including total available memory, used, free, and other parameters.
* /proc/modules: A list of loaded kernel modules.

4.4. The free command: The free command is used to display information about memory usage in the system, including total, used, free, and other parameters.

4.5. Log files: Log files are used to record events and information on the system. Examples of uses include tracking system events, auditing, diagnosing problems, monitoring program activity, etc.

4.6. The /var/log/dmesg file: The dmesg file contains the output of the kernel during system boot. It contains information about various aspects of the hardware and boot processes.

4.7. FHS (Filesystem Hierarchy Standard): FHS is designed to establish standards for the structure of directories and files in the Linux file system. Its purpose is to ensure program portability, simplify administration, and facilitate interoperability between different Linux distributions.

4.8. Commands to view and configure the network:

* ifconfig or ip addr show: View information about network interfaces.
* iwconfig: View information about wireless interfaces.
* route or ip route show: Information about the routing table.
* ping: Check the availability of network devices.
* traceroute or traceroute6: Determine the path to the specified address.
* netstat or ss: Display network connection statistics.
* nmcli (NetworkManager Command-Line Interface): Manages network connections for systems that use NetworkManager.

**Хід роботи**

***The material was prepared by Dziubenko***

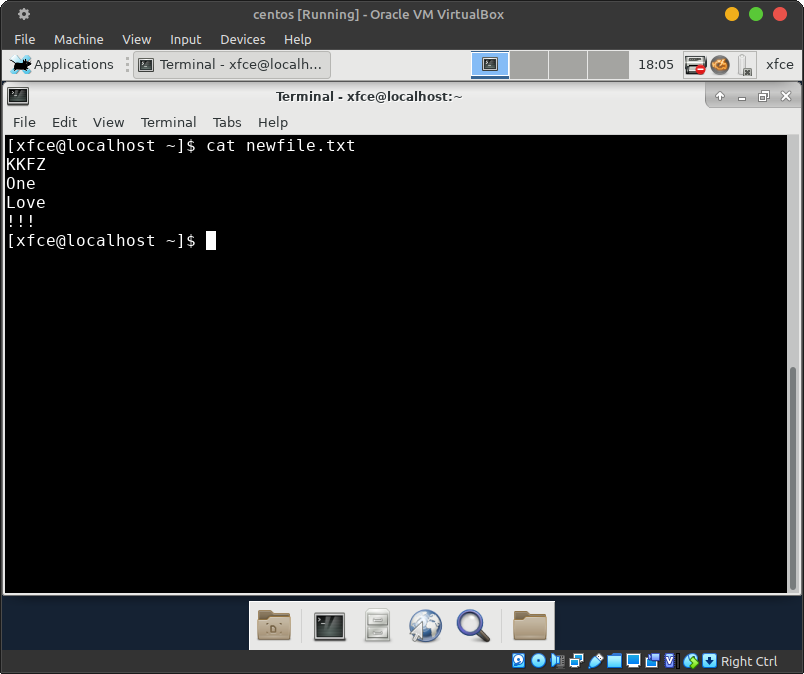
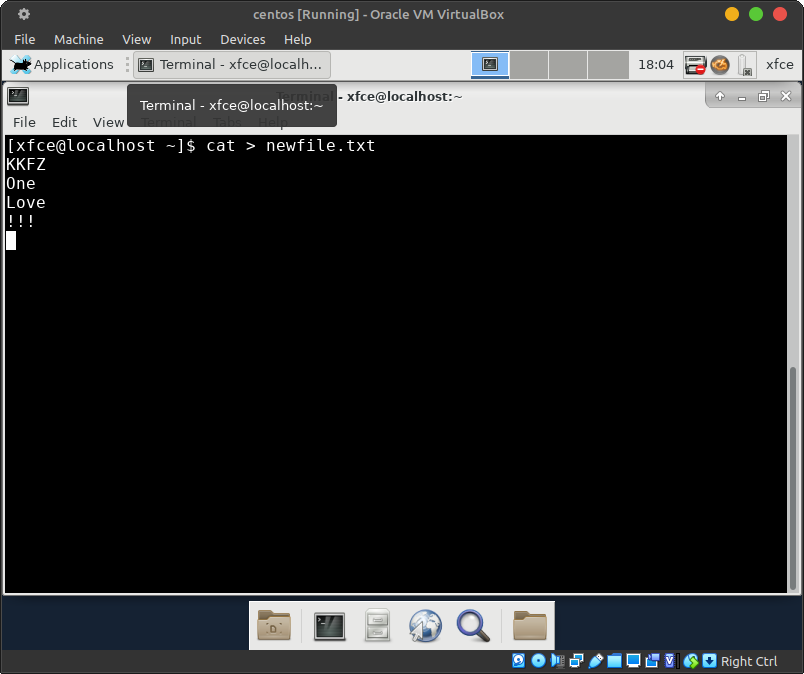
|  |  |
| --- | --- |
| Назва команди | Its purpose and functionality |
| Su | Change the current user to root |
| Ls | To view a directory |
| cat | To display the contents of files |
| echo | Show a line of text |
| Ps | View information about the selection of running processes |
| Ping | Check the latency of your router relative to the host or IP address |
| jobs | List of active tasks |
| fg %1 | Resumes a background task |
| bg %1 | Switches a task from paused to background mode. |
| Kill | Terminate a process |
| Top | List of programs that are running |
| Sleep | To stop a program for a certain period of time |
| Free | Shows the entire operating memory |
| ssh localhost | Establishes a dial-up connection to your own computer |
| Ifconfig | Displays information about network interfaces |
| Route | Displays the routing table on your system |
| Grep | Search for file contents by a specified pattern |
| Dig | To convert hostname to IP address |
| Netstat | See which services are listening or waiting for an incoming connection |
| Ss | Displays information about sockets |

1. Виконайте практичні завдання у терміналі (продемонструйте скріншоти):

- в даній лабораторній роботі використовувалась команда cat, дослідіть її можливості та опишіть для яких задач вона призначена;

The 'cat' command is used to display the contents of files in the console. The main tasks of 'cat' include displaying the contents of files on the screen, combining the contents of several files, creating new files, and copying the contents of files.

* 1. продемонструйте приклади, коли команда cat використовується для створення файлу, перегляду вмісту файлу, перенаправлення інформації у інший файл, склеювання декількох файлів в один;



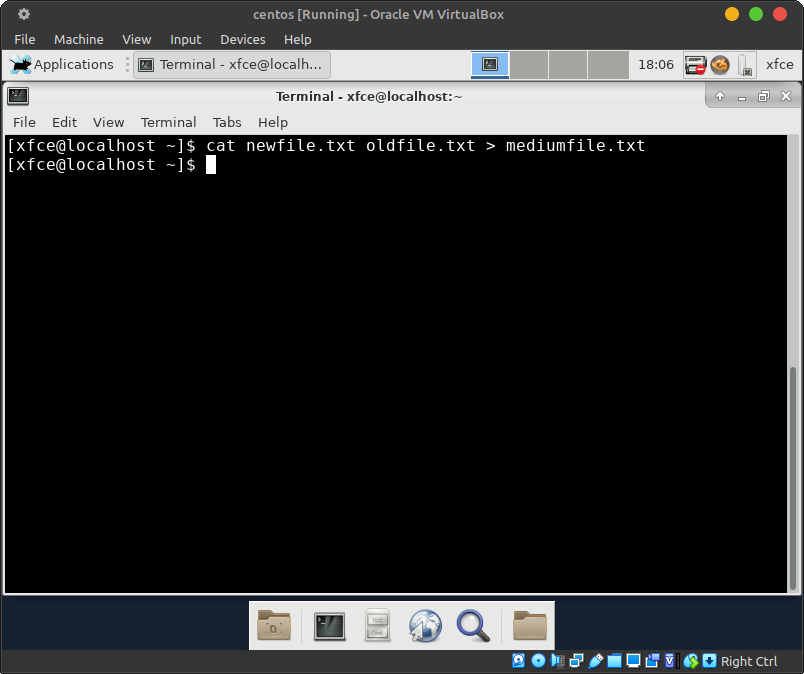
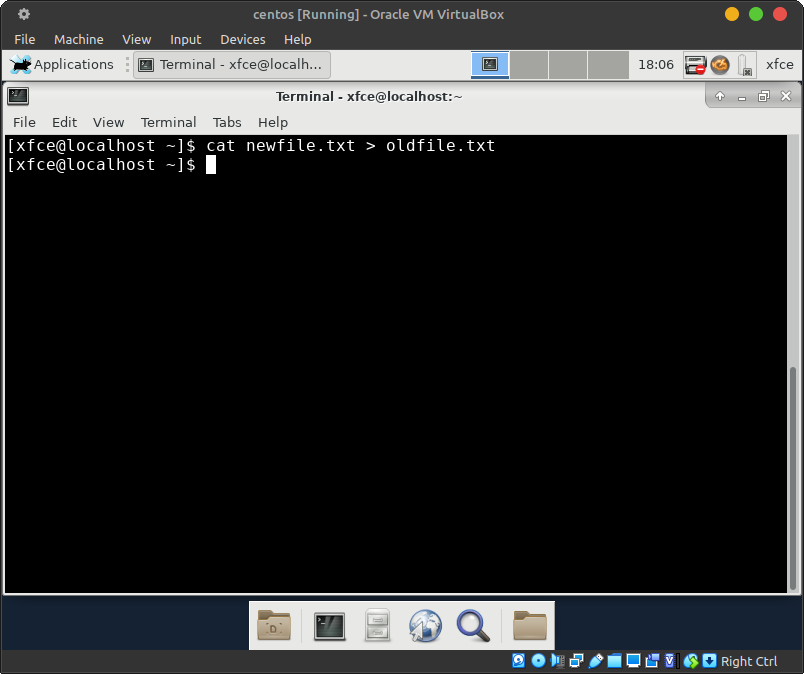


Fig. 1-4 – Using command “cat”

* 1. які параметри команди cat треба використати, щоб пронумерувати рядки файлу, відобразити недруковані символи, видалити порожні рядки?  
     Number lines - cat -n filename.txt, display unprintable characters - cat -v filename.txt, delete empty lines - cat -s filename.txt.
  2. опишіть можливості команди dig та наведіть приклади;

Команда ‘dig’ використовується для використання DNS-запитів.

The record type A (IPv4) - dig example.com A, (MX) - dig example.com MX, DNS record details - dig +trace example.com, DNS server verification - dig.

* 1. опишіть можливості команди netstat та наведіть приклади;.

The 'netstat' command is used to display information about network connections, routes and statistics.

To display all active network connections - netstat -a, to display listening ports and corresponding services - netstat -l, other.

**Контрольні запитання**

***The material was prepared by Storozhuk***

1. The cat and tac commands are two different commands used to view and process text files. The cat command prints the contents of a file to standard output, while the tac command prints the contents of a file in reverse order.

The cat and tac commands are related in that they both use the same syntax.

2. The ss command is a utility used to display information about network connections. It can display information about active connections, which ports are open, and which processes are using those ports.

3. The ps --forest and pstree commands are two commands used to display a process tree. They both display information about processes and their parent processes, but they do so in different ways.

The ps --forest command displays the process tree in a table. It displays the following information:

* Process ID (PID)
* Process name
* Process status
* Parent PID

4. System settings are stored in several directories located in the root directory (/). The main directories for system configuration include:

* /etc is the main directory for system configuration. This directory contains configuration files for the kernel, services, programs, and other system components.
* /etc/default - this directory contains the default configuration files for various services and programs. These files are used to initialize services and programs when they are started.
* /etc/modprobe.d - This directory contains configuration files for kernel modules. These files are used to manage kernel modules that are loaded into the kernel.
* /etc/profile - this file contains the environment settings for all users.
* /etc/skel - This directory contains file templates for new users.

5. The programs installed in the system that are available to the user can be found in the following directories:

* /usr/bin - this directory contains executable files of programs that are available to all users.
* /usr/sbin - this directory contains executable files of system services and programs that are available to all users.
* /usr/local/bin - this directory contains executable files of programs that were installed by the user or system administrator.
* /usr/local/sbin - this directory contains executable files of system services and programs that were installed by the user or system administrator.

6. The installed system programs can be found in the following directories:

* /usr/bin - this directory contains executable files of programs that are available to all users, including system programs.
* /usr/sbin - this directory contains executable files of system services and programs that are available to all users, including system programs.

7. The ping command

The ping command is used to check the availability of a host on the network. It sends ICMP Echo Request packets to the host and receives ICMP Echo Reply packets. If the ping command cannot receive a response, the host is unreachable.

The ifconfig command

The ifconfig command is used to display information about network interfaces. It displays information about the interface type, its address, subnet mask, default gateway, and other parameters.

The traceroute command

The traceroute command is used to trace the path of packets between your computer and a specific host. It sends ICMP Echo Request packets to the host through different routers and displays information about those routers.

8. In Linux, network interfaces are called network devices. They are physical or virtual devices that allow your computer to connect to a network.

Network devices in Linux have the following characteristics:

* Name: Each network device has a unique name. You can use the name of a network device to identify it.
* Type: A network device can be an Ethernet, Wi-Fi, Bluetooth, or other type of device. The type of network device determines how it connects to the network.
* Address: Each network device has a unique address. The address of a network device is used to identify it on the network.
* Subnet mask: The subnet mask is used to determine which part of a network device's address is its identifier and which part is its subnet identifier.
* Default gateway: A default gateway is a device that is used to forward packets that cannot be delivered directly to the destination.

9. To display the parameters of only one network interface with the ifconfig command, you can use the -a option. The -a option displays information about all network interfaces, but you can use it to display information about a single interface by listing its name after the option.

**Conclusions**

In this work, we gained practical skills in working with the bash command, got acquainted with the basic structures for saving system data, and also learned how to configure the network. There were no problems during the work.