“Київський фаховий коледж зв’язку”

Циклова комісія Комп’ютерної інженерії

**ЗВІТ ПО ВИКОНАННЮ**

**ЛАБОРАТОРНОЇ РОБОТИ №2**

з дисципліни: «Операційні системи»

**Тема: «Знайомство з інтерфейсом та можливостями ОС Linux»**

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Перевірив викладач

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**Мета роботи:**

1. Знайомство з інтерфейсами ОС Linux.

2. Отримання практичних навиків роботи в середовищах ОС Linux та мобільної ОС – їх графічною оболонкою, входом і виходом з системи, ознайомлення зі структурою робочого столу, вивченняосновних дій та налаштувань при роботі в системі

**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

***Готував матеріал студент Заїка С. В.***

**Завдання для попередньої підготовки**

CLI mode is an interface for interacting with a computer that uses text commands to run and control programs. It combines the capabilities of the graphical user interface and program code, allowing you to run programs and access files, start processes, and control the system without using a graphical user interface.

A GUI-based terminal refers to software that allows users to perform actions using a graphical user interface. This combines the ability to use a mouse, keyboard, and screen to enter data and control programs. Using this interface, the user can perform actions such as managing programs, downloading files, configuring settings, and more.

A virtual terminal is a program that allows users to perform actions that they would be able to perform with a dedicated device such as a keyboard, mouse, and monitor. This type of program is usually used to access a server or to perform some tasks that may require the use of terminal commands.

**Хід роботи**

***Готував матеріал студент*** ***Кресан Р.А.***

1. Робота в графічному режимі в ОС сімейства Linux (робота з інтернет-джерелами):

1.1. Оберіть графічну оболонку для ОС сімейства Linux, яку ви хочете розглянути. Розгляньте структуру робочого простору користувача, та опишіть основні його компоненти (\*\*\*показано основні компоненти оболонки Gnome):

- Bookmark Applications

|  |  |
| --- | --- |
|  | The "Applications" window contains tabs:  - Favorites  - Audio and video  - Documentation  - Internet  - Office  - Miscellaneous  - System  - Standard  - Utilities  - Other |

- Закладка Places

|  |  |
| --- | --- |
|  | The Places window contains tabs:  - Home folder  - Computer  - Documents  - Music  - Pictures  - Videos  - Downloads  - Network overview |

- Menu System

|  |  |
| --- | --- |
|  | The System menu contains:  - Volume slider  - Network status  - Charge status  - Account status  - Settings button  - Workspace lock button  - Button to quickly turn off the system |

|  |  |
| --- | --- |
|  | A screenshot of another System menu was found on the Internet, and it contains tabs:  - Preferences  - Administration  - Help  - Lock Screen  - Log Out |

- Навігаційний простір Activities overview

|  |  |
| --- | --- |
|  | This is where the windows of the open programs we work with are located. You can also easily close them here if you don't need them. |

\*\*\* Якщо ви обрали інший графічний інтерфейс то компоненти меню можуть бути іншими.

1.2. Запуск програм. Дослідіть можливості запуску додатків різними способами (описати спосіб і по-можливості показати скріншоти):

- Запуск програм через панель швидкого запуску

- Запуск програм через пошук в меню

- Запуск програм через віджет запуску

- Запуск програм через глобальне меню

|  |  |
| --- | --- |
|  | The program can be opened from the main menu. To do this, open the Applications window, select the required category, and launch the program. |
|  | You can also open the program from the desktop. If it's not there, you can add it (click on the program and select Add to Desktop). The program can be found in the console using the find command. |
|  | If the program is already running, you can minimize it using the taskbar. |
|  | The program can be found and launched by searching. |

1.3. Вихід з системи та завершення роботи в Linux. Як виконати в графічному інтерфейсі наступні дії (наведіть скріни):

- Change the user to root

|  |  |
| --- | --- |
|  | Changing the user to root is done using the console. |

- Rebooting the system

|  |
| --- |
|  |
| There are several ways to restart the system. In the Quick Access panel, click the Machine tab and select Restart. You can also shut down the system in this tab. |

- Shutting down the system

|  |  |
| --- | --- |
|  |  |
| You can also turn off the system in different ways. In the "System" menu, click on the shutdown button, after which a dialog box will open where you need to click the "Shutdown" button or wait 60 seconds and the system will shut down by itself. You can also restart the system in this dialog box. | |

***Готував матеріал студент Заїка С. В.***

2. Робота в середовищі мобільної ОС.

2.1. Опишіть головне меню вашої мобільної ОС, який графічний інтерфейс вона використовує?

The Android main menu contains a number of items from which the user can choose to launch various applications. This includes menu items such as Home, Apps, Settings, Search, and others. The graphical interface used in Android is called Material Design. This interface works on the basis of design principles that help users understand how to use applications and features. It uses colors, textures, and gradients to provide a user-friendly experience.

2.2. Опишіть меню налаштувань компонентів мобільного телефону.

The mobile phone component settings menu contains the following items:

1. Screen settings: font size, screen light settings, color gamut, etc.

2. Sound settings: volume, sound balance, sound profile settings, etc.

3. Camera settings: resolution, pixel count, brightness settings, and more.

4. App settings: select apps to launch, order in which apps are launched, and more.

5. Network settings: connect to a Wi-Fi network, configure network settings, and more.

6. Security settings: enable anti-virus protection, set passwords, and more.

2.3. Використання комбінацій клавіш для виконання спеціальних дій.

Depends on the model. In general, the most common keyboard shortcuts to perform special actions are as follows:

- To activate a function of any use of the hardware buttons on your Samsung device, you must press the key combination: Pause + Home.

- To activate the function of any use of software buttons on your Samsung device, press the key combination: Pause + Menu.

- To activate the function of any use of the on-screen buttons on your Samsung device, press the key combination: Pause + Back.

- To activate the function of any use of voice commands on your Samsung device, press the key combination: Pause + Home.  
  
2.4. Вхід у систему та завершення роботи пристрою. Особливості налаштувань живлення батареї.

Log in to the system

To log in to your Samsung mobile phone, press the permanent on/off button on the right side of the device. After pressing the button, long press the volume button on the top of the device. After that, you will see a screen with a login warning. Click the "Next" button to continue.

Shutting down the device

To shut down your Samsung mobile phone, press the permanent on/off button on the right side of the device. After pressing the button, long press the volume button on the top of the device. After that, a menu will open with a power off confirmation. Press the "Off" button to confirm the shutdown.

Setting the battery power

To adjust the battery power on your Samsung mobile phone, go to the Settings menu. Find the "Battery power" option and select it. Here you can set different battery power modes, such as power saving mode, auto power off mode, etc. Always make sure you select the correct power mode to ensure the best performance from your device.

**Відповіді на контрольні запитання**

***Готував матеріал студент Губенко Є.О.***

1. Provide examples of Linux server applications for a database server, mailing servers, and file sharing servers.
2. Ubuntu Server
3. Debian Server
4. Red Hat Enterprise Linux
5. Fedora Server
6. OpenSUSE Leap
7. SUSE Linux Enterprise Server
8. AlmaLinux
9. Oracle Linux
10. Rocky Linux
11. Compare the Bourne, C, Bourne Again (Bash), the tcsh, Korn shell (Ksh), and zsh shells.

All of the above shells are command prompts in Unix-like operating systems and provide common functions such as running commands, managing files and processes, and interpreting scripts. However, each of these shells has its own features and operating principles that can affect their efficiency and usability.

The Bourne (sh) shell: This is one of the original Unix shells and is quite easy to use. It provides a basic set of functions such as process control and command execution. However, the Bourne shell does not have many of the user-friendly features available in newer shells.

C shell (csh): This shell was developed to improve on the features of the Bourne shell and has additional features such as command history, auto-completion, and easy output formatting. However, on the other hand, the C shell can have problems handling complex commands and scripts.

Bourne Again Shell (Bash): This shell is an improvement on the Bourne shell and has become the standard for most Unix-like systems. It has many features, such as auto-completion, command history, keystroke handling, and the ability to use complex commands and scripts. Bash is also very flexible and has many configuration options.

The tcsh shell: This shell is an improvement on the C shell and has many convenient features such as auto-completion, command history, and many other features.

1. Why do you need a package manager. What package managers do you know in Linux?

A package manager is a software that allows you to install, uninstall, and manage program packages on your operating system. It is an important part of managing the programs on your computer because it simplifies the process of installing, uninstalling, and updating programs.

There are several different package managers available in Linux, each with their own advantages and disadvantages. Here are some of the most popular ones:

Advanced Package Tool (APT): This package manager is used in Debian, Ubuntu, and other Linux distributions that are based on Debian. It allows you to install, uninstall, and update packages using the command line or graphical interface.

Yellowdog Updater, Modified (YUM): This package manager is used in Fedora, Red Hat Enterprise Linux, and other Red Hat-based distributions. It allows you to install, uninstall, and update packages using the command line or graphical user interface.

Pacman: This package manager is used in Arch Linux and other Arch-based distributions. It allows you to install, remove, and update packages using the command line.

Portage: This package manager is used in Gentoo Linux. It allows you to install, remove, and update packages using the command line.

Zypper: This package manager is used in openSUSE. It allows you to install, remove, and update packages using either the command line or the GUI.

1. What security features are used in Linux?

The main security features in Linux include the following:

Authentication and authorization: Linux uses a system of user accounts and passwords to verify user identification and authorization. Access rights: Linux has a permission system that allows you to control user access to system resources. Each file or directory has its own access rights, which can be changed according to the needs of users. Firewall: Linux has a built-in firewall that allows you to monitor network traffic and block unsafe connections. Encryption: Linux has support for file system-level data encryption, which ensures data security in the event of a lost or stolen device. Security updates: Linux has a security update system that allows you to keep your system up to date to prevent vulnerabilities from being exploited. Security auditing: Linux has a built-in security audit system that allows you to record events that occur on the system for later analysis and identification of potential threats. SELinux: Linux has the SELinux security system, which allows you to control user access to system resources and applications at the level of the operating system kernel. AppArmor: Linux also has the AppArmor security system, which allows you to control the access of applications to system resources, which provides an additional level of security.

1. Why virtualization has become so important now

Virtualization has become relevant for several reasons:

Cost savings: Virtualization allows you to configure and manage more servers on less physical hardware, which helps reduce the cost of hardware, power, cooling, and management of that hardware.

Increased performance: Virtualization allows you to host more virtual machines on a server, which can increase overall performance and use server resources more efficiently.

Increased reliability: Virtualization reduces the possibility of physical server failures and improves system reliability by automatically moving virtual machines to other physical servers if one fails.

Easier management: Virtualization reduces the complexity of system and resource management because administrators can work with virtual machines as separate objects rather than multiple physical servers.

Greater flexibility: Virtualization allows you to quickly configure and deploy new virtual machines, which increases flexibility and responsiveness to changing business needs.

1. How do you understand the concept of containerization?

Containerization is an operating system-level virtualization technology that allows you to run applications and services in separate, dehydrated environments called containers. Containers allow you to package software and its dependencies into one compact image that can be run on any machine that supports containerization technology.

Each container contains all the necessary dependencies that allow the application to run, including the operating system, libraries, and other components. Containers help to avoid the problems that arise when using virtual machines, such as large image sizes, a significant amount of resources required for their operation, and complexity of management.

One of the most well-known containerization technologies is Docker. Docker allows you to install and run containers with your applications and services on any Docker-enabled server. Docker containers have many advantages, including speed of startup, ease of management, and the ability to quickly transfer applications between different environments and systems.

1. What are the advantages/disadvantages of using open source software?

**Advantages of using open source software:**

Free availability: Open source software is usually available for free to download and use. You can copy, modify, and redistribute this software at any time without having to obtain additional permissions or payment.

Independence from vendors: When using open source software, users are not dependent on vendors who typically provide support and updates for closed systems. Users can provide their own support and development of the software if they have the appropriate skills and knowledge.

Community-driven development: Many open source programs are created with the participation of a community of developers and users, which allows for more ideas, experience, and knowledge to be incorporated into the project. In addition, the community usually provides support and development of the software over time.

Flexibility: The code of open source software can be modified and adapted to suit your own needs. Users can modify the code, add new features, and fix bugs.

**The main disadvantages of using open source software:**

Low level of support: Open source software does not have the same level of support that you can get from paid solutions. While there are usually a large number of experienced developers in the community who can provide assistance, they may not be available 24/7, which is important for businesses.

Lack of guarantees: Many open source software developers do not provide warranties for their product. This can be a problem for users who plan to use this software in important projects.

Poor compatibility: Sometimes open source software can be less compatible with other programs or devices, which can lead to integration issues.

Lack of innovation: Because open source software is developed with community input, the development process may be slower and less innovative than if it were developed by a commercial company.

Security: The security of open source software may be less, as open source code can be easily accessed by attackers who can find vulnerabilities and exploit them for their own purposes.

1. 8. How many active virtual consoles (terminals) can be in the Linux process by default. How to call them and switch between them? Give examples?

By default, most Linux distributions can run 6 virtual consoles (terminals), designated as tty1, tty2, tty3, etc. up to tty6. Using the keys Ctrl + Alt + F1, you can switch to the first virtual console (tty1), and using the keys Ctrl + Alt + F2 - to the second (tty2), and so on to the sixth virtual console (tty6). To return to the graphical interface, you can use the key Ctrl + Alt + F7 or Ctrl + Alt + F8.

For example, if you are in the GUI and want to switch to the third virtual console, you need to press Ctrl + Alt + F3. If you are in the second virtual console and want to switch to the fourth, you need to press Ctrl + Alt + F4.

In virtual consoles, you can run commands and view system messages. For example, if you want to open a new virtual console, you can run the command "Ctrl + Alt + F3", enter your username and password, and log in. You can perform any commands that you would normally perform in a terminal, such as viewing logs, configuring the network, or working with the process list.

To return to the graphical interface, you can run the command "Ctrl + Alt + F7" or "Ctrl + Alt + F8". This will switch you back to the graphical mode..

1. Which virtual console (terminal) performs the function of a graphical shell?

In most Linux distributions, a graphical user interface, such as GNOME or KDE, starts on the first virtual console (tty1) by default. Therefore, if you turn on your computer and immediately see a graphical user interface, it started on the first virtual console.

However, it should be noted that in some cases there may be differences depending on the system or distribution settings. For example, some distributions may use a different virtual console to launch the GUI. To check which virtual console is running the GUI, you can run the command "ps aux | grep Xorg" in a terminal. The output of this command will contain a line containing the parameter "-display :0", where "0" indicates the number of the virtual console on which the GUI is running.

1. Is it possible to register in a Linux system several times under the same system name? What advantages can this provide??

In Linux, you can register multiple sessions under the same system name, but this does not mean creating multiple users with the same name.

If a user is logged in to a Linux system and tries to log in again with the same name, a second session will be granted. As a result, the user will have two different sessions, and they will be able to work with them in parallel.

The advantages of this solution are that the user can perform several tasks at the same time without having to switch between different sessions. This increases productivity and efficiency.

However, it is worth remembering that using many sessions under the same name can lead to an increase in system load, especially if you are working with many heavy tasks at the same time. It can also create security issues if different people use the same account. Therefore, you should choose this approach only when it is necessary and important for a particular situation.

**Conclusions:**

In the course of the laboratory work, they gained practical skills in working in Linux and mobile OS environments - their graphical shell, logging in and out of the system, familiarizing themselves with the structure of the desktop, learning the basic actions and settings when working in the system.