“Київський фаховий коледж зв’язку”

Циклова комісія комп’ютерної та програмної інженерії

**ЗВІТ ПО ВИКОНАННЮ**

**ЛАБОРАТОРНОЇ РОБОТИ №2**

з дисципліни: «Операційні системи»

**Тема: "Знайомство з інтерфейсом та можливостями ОС Linux”**

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Робота студентів групи КСМ-23а Команда Bald hedgehogs: Кочубей С.С., Кошкін І.О., Сарапин Я.О.

**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, вивчення основних дій та налаштувань при роботі в системі

**Матеріальне забезпечення занять:**

1. ЕОМ типу IBM PC.

2. ОС сімейства Windows та віртуальна машина Virtual Box (Oracle).

3. ОС GNU/Linux (будь-який дистрибутив).

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

**Завдання для попередньої підготовки. (Kochubei S. 9v)**

1. \*Прочитайте короткі теоретичні відомості до лабораторної роботи та зробіть невеликий словник базових англійських термінів з питань призначення команд та їх параметрів.
2. Вивчіть матеріали онлайн-курсу академії Cisco “NDG Linux Essentials”:

* Chapter 3 - Working in Linux
* Chapter 4 - Open Source Software and Licensing

1. Пройдіть тестування у курсі NDG Linux Essentials за такими темами:

* Chapter 03 Exam
* Chapter 04 Exam

1. \*\*Дайте визначення наступним поняттям:

* CLI-режим - **CLI Mode (Command Line Interface)**: This mode refers to interacting with a computer through a text-based interface where users input commands in text form and receive text-based responses. CLI allows users to perform various system and programmatic operations through commands entered into a command line.

* Термінал на основі графічного інтерфейсу користувача - **Graphical User Interface Terminal**: This is a terminal with a graphical interface, meaning it includes visual elements such as windows, buttons, and menus. Unlike a traditional text-based terminal or CLI, a graphical terminal provides a more user-friendly interaction with the system through visual elements.

* Віртуальний термінал - **Virtual Terminal**: This is a terminal that operates within a virtualization or emulation environment, allowing users to access a command line or text interface in a non-physical terminal environment. Virtual terminals are commonly used in operating systems to provide multiple command-line sessions on a single physical computer. For example, Linux provides several virtual terminals that users can switch between using keyboard shortcuts.

1. Підготувати в електронному вигляді початковий варіант звіту:

* Титульний аркуш, тема та мета роботи
* Словник термінів
* Відповіді на п.4 з завдань для попередньої підготовки

**Хід роботи. (Kochubei S. 9v)**

1. Робота в графічному режимі в ОС сімейства Linux (робота з інтернет-джерелами):
2. Оберіть графічну оболонку для ОС сімейства Linux, яку  ви хочете розглянути ***(в 401 ауд. це Gnome)***. Розгляньте структуру робочого простору користувача, та опишіть основні його компоненти:

* Основне меню - The **Main Menu** in GNOME is accessed through the Activities Overview. You can activate it by pressing the "Super" key (Windows key) or by moving your cursor to the top-left corner of the screen. This menu provides access to applications, system settings, and utilities. It also includes a search bar that helps you quickly locate and launch applications.

* Панелі швидкого доступу - **Quick Access Panels**:

GNOME has a **Top Bar** that provides quick access to various functions:

* **System Menu**: Located on the right side of the top bar, it includes icons for system functions such as network settings, battery status, volume control, and user account options.

* **Notification Area**: Also part of the top bar, this area shows notifications from applications and the system.

* **Clock and Calendar**: Clicking on the clock displays a calendar and provides access to date and time settings.

* Пошук - **Search**:

The **Search** function is integrated into the Activities Overview. By pressing the "Super" key, you enter the overview mode where you can start typing to search for applications, files, and settings. The search results are dynamically updated as you type, making it easy to find what you need quickly.

* Доступ до нових робочих столів тощо - **Access to New Workspaces**:

GNOME uses **Workspaces** (also known as Virtual Desktops) to help manage multiple tasks. In the Activities Overview, you can see a visual representation of your current workspaces. You can add new workspaces by simply moving to the edge of the existing workspace view or using the "+" button if visible. You can also switch between workspaces by using keyboard shortcuts, such as "Super + Page Up" or "Super + Page Down," or by dragging windows between workspaces in the overview.

1. \*Запуск програм. Дослідіть можливості запуску додатків різними способами (описати спосіб і по-можливості показати скріншоти): (Koshkin I. 10v)

**1. Launching Applications via the Quick Launch Panel**

In GNOME, the **Quick Launch Panel** isn't as prominent as in some other desktop environments. Instead, GNOME emphasizes using the Activities Overview and search functionality. However, you can still pin applications to the **Dock** (also known as the Dash) for quick access. Here's how:

* **Pinning Applications to the Dock**:
  1. Open the **Activities Overview** by pressing the "Super" key or moving your cursor to the top-left corner of the screen.
  2. Find the application you want to pin by searching or browsing.
  3. Right-click the application icon and select **Add to Favorites**. This action pins the application to the Dock on the left side of the screen.

**Screenshot**:

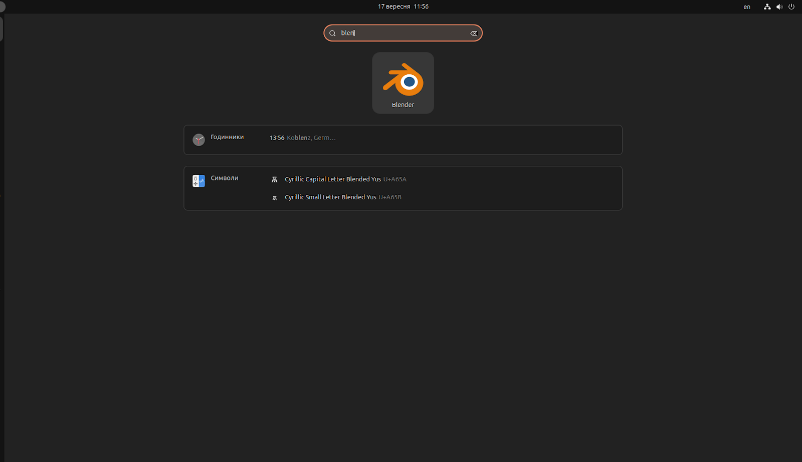
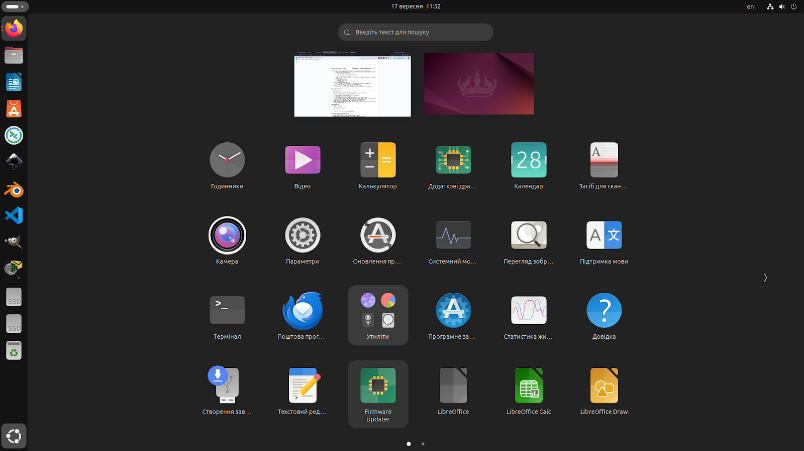
**

**2. Launching Applications via Search in the Menu / Global Menu**

GNOME uses a unified search function in the **Activities Overview**:

* **Using the Search Function**:
  1. Press the "Super" key or move your cursor to the top-left corner to enter the **Activities Overview**.
  2. Start typing the name of the application you want to launch. GNOME will display search results that include applications, files, and system settings.
  3. Click on the application icon in the search results to launch it.

**Screenshot**:

**

**3. Launching Applications via the Application Launcher Widget**

GNOME does not use a traditional widget for launching applications. Instead, it provides an integrated **Applications Grid** accessible from the Activities Overview:

* **Accessing the Applications Grid**:
  1. Open the **Activities Overview**.
  2. Click on the **Show Applications** icon at the bottom of the Dock or press "Super + A". This will display the Applications Grid.
  3. Browse or search for the application you want to launch. Click on the application icon to start it.

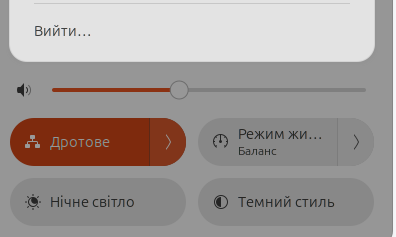
**Screenshot**:

**

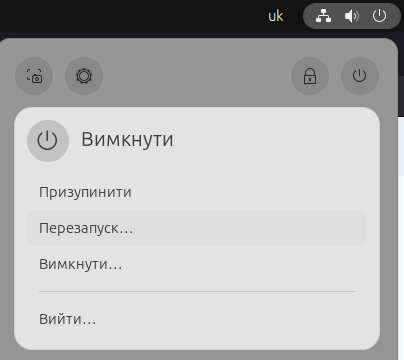
1.3 \*Вихід з системи та завершення роботи в Linux. Як виконати в графічному інтерфейсі наступні дії (наведіть скріни) (Sarapyn)

* Switching to the root user:

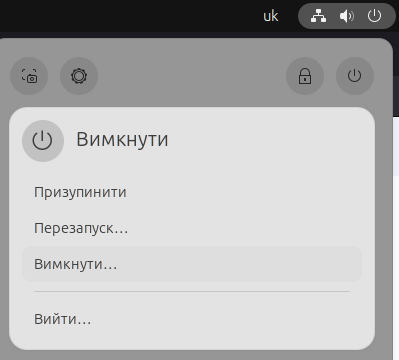
1. Log out of the current account.
2. Select another account with root privileges.
3. Enter the password and log in.



* System reboot:



* System shutdown:



2. \*\*Робота в середовищі мобільної ОС. (Sarapyn)

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

2.2 Опишіть меню налаштувань компонентів мобільного телефону.

2.3 Використання комбінацій клавіш для виконання спеціальних дій.

2.4 Вхід у систему та завершення роботи пристрою. Особливості налаштувань живлення батареї

1. The main Android menu has an intuitive graphical interface. The menu is presented in the form of icons. At the top of the screen, there is a panel displaying the battery status, clock, and internet connection. Important apps like "Contacts" and "Messages" are located in the bottom shortcut panel.
2. The settings menu is divided into several main sections:

**Network & Internet:** Settings for Wi-Fi, Bluetooth, mobile networks, and airplane mode.  
**About Phone:** Information regarding the phone model, operating system, and its version.  
**Security Status:** Security updates and other features that protect the phone from viruses and other threats.  
**Display:** Brightness, dark mode, font settings, and sizes.  
**Sound:** Volume, vibration, ringtones, and notification sound settings.  
**Battery:** Usage information and power-saving settings.  
**Security:** Settings for passwords, biometrics, and data encryption.  
**SIM Cards & Mobile Networks:** Information about available SIM cards, which card to use by default for calls, and which for internet usage.  
**Apps:** Management of installed apps, their permissions, and notifications.

Each section has a simple and user-friendly interface with prompts for convenience.

1. Using keyboard shortcuts to perform special actions.

* Volume Up/Down: During media playback.
* Screenshot: Press and hold the volume down button and the power button simultaneously, or swipe down with three fingers. To take a screenshot of a specific area of the screen, tap the screen with three fingers and then select the desired area to save the photo.
* If you hold the power button for 0.5 seconds, you can activate Google Assistant.
* A double press of the power button turns on the camera or flashlight.

All these settings can be disabled if necessary.

1. The login occurs through the lock screen, where the user (if enabled in security settings) can enter a PIN, password, or use biometric authentication (fingerprint or facial recognition). The device automatically enters sleep mode after a period of inactivity.  
   To power off the device, the user can press and hold the power button, which opens a menu with options to "Shut Down," "Restart," or "Airplane Mode."

**Battery Power Settings Features**Battery power settings allow users to manage energy usage. They include:

* **Power Saving Mode:** Limits background app activity and reduces screen brightness.
* **Usage Analysis:** Information on which apps consume the most battery.
* **Notification Settings:** The ability to disable notifications for less important apps, helping to conserve battery life.
* **Battery Check.**
* **Additional features.**

**Контрольні запитання:** (Koshkin I. 10v)

**1. Приклади серверних додатків у Linux:**

**Database servers:**

* MySQL/MariaDB: popular relational database management systems.
* PostgreSQL: a powerful object-relational database with rich functionality.
* SQLite: an embedded database stored in a single file.

**Message servers:**

* Postfix: an open-source mail server widely used for SMTP.
* Exim: a mail server for Unix systems.
* Sendmail: another popular server for email transmission.

**File sharing servers:**

* Samba: provides file sharing between Linux and Windows systems via SMB/CIFS protocol.
* vsftpd: an FTP server for file transfer via the FTP protocol.
* NFS (Network File System): allows file sharing over a network between Linux/Unix systems.

**2. Порівняння оболонок:**

* Bourne shell (sh): a basic Unix shell, convenient for scripts but limited for interactive work.
* C shell (csh): has C-like syntax with extended capabilities for interactive commands, but complex for scripts.
* Bash (Bourne Again Shell): an improved version of Bourne shell with support for command completion, command history, environment variables, and many extensions.
* tcsh: an enhanced version of C shell with command auto-completion and history support, improved for interactive use.
* Korn shell (ksh): combines features of Bourne shell and C shell, with extended functionality for both scripts and interactive commands.
* zsh: similar to Bash but with richer functionality, including auto-completion, simplified configuration, and enhanced scripting capabilities.

**3. Призначення менеджера пакетів та приклади:**

Package managers automate the process of installing, updating, and removing software, ensuring dependencies are installed and compatible with the system.

* APT (Advanced Package Tool): used in Debian-based distributions (e.g., Ubuntu).
* Yum/DNF: package manager for Red Hat-based distributions (Fedora, CentOS).
* Pacman: used in Arch Linux.
* Zypper: package manager in SUSE Linux.

**4. Засоби безпеки в Linux:**

* SELinux (Security-Enhanced Linux): provides access control based on policies.
* AppArmor: an alternative to SELinux that provides application-level access control.
* iptables/nftables: tools for managing network filters (firewalls).
* ClamAV: an antivirus for scanning the system for malware.
* Fail2Ban: automated IP address blocking after suspicious activity.

**5. Чому віртуалізація стала актуальною:**

* **Resource efficiency:** multiple virtual machines can run on a single physical server, reducing hardware costs.
* **Scalability and flexibility:** virtual machines are easy to configure, scale, and reconfigure without affecting physical servers.
* **Security:** virtual machines provide better data and application isolation.
* **Testing and development:** it is easier to test new configurations and applications in a virtual environment.

**6. Поняття контейнеризації:**

Containerization is a method of isolating applications and their dependencies into containers. Unlike virtual machines, containers share the host operating system kernel, making them more lightweight and faster.

**7. Переваги/недоліки програмного забезпечення з відкритим кодом**:

**Advantages:**

* Free to use.
* Large support community.
* Ability to modify code to fit specific needs.
* Code transparency.

**Disadvantages:**

* May not always have official technical support.
* May require more knowledge for setup and use.
* In some cases, there may be compatibility issues with commercial software.

**8. Кількість активних віртуальних консолей та їх використання:**

By default, Linux has 6 virtual text consoles (tty1 - tty6), which can be accessed using Ctrl+Alt+F1 ... Ctrl+Alt+F6. Switching between them is done with Alt+F1 ... Alt+F6.

**9. Віртуальна консоль графічної оболонки:**

The graphical shell usually runs on the **7th virtual console** (tty7). It's activated when the graphical server (X.org or Wayland) is started. To switch to the graphical interface, use **Ctrl+Alt+F7**.

**10. Реєстрація під одним іменем декілька разів:**

Yes, it is possible to log into the system multiple times under the same username through different virtual consoles or sessions (e.g., via SSH). The advantages are:

* **Multitasking:** the user can work in several sessions simultaneously.
* **Working in different environments:** users can work both in graphical and text-based environments.

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### Conclusion (Sarapyn)

During the study of the interface and capabilities of the Linux operating system, we gained valuable experience working with both graphical interfaces and the command line. We also learned how to change users and reboot the system.

Exploring mobile operating systems highlighted the variety of settings that enhance device usability. The review questions helped us gain a deeper understanding of package managers and security tools in Linux.

Learning the fundamentals of working in Linux provides valuable technical skills and an understanding of system functionality, which is essential for every IT professional.