

REPORT ON THE IMPLEMENTATION

LABORATORY WORK №2

in the discipline: "Operating systems"

Topic: "Familiarization with the working environment of virtual machines and operating systems of different families"

Performed by a student  
of the group BIX-13  
Kogut Igor Svyatoslavovich  
Bereza Artem  
Checked by the teacher  
Sushanova V.S.

Purpose 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, familiarizing yourself with the structure of the desktop, learning the basic actions and settings when working in the system.

Material support for classes

1. Computer such as IBM PC.
2. OS of the Windows family (Windows 7).
3. Virtual machine - Virtual Box (Oracle).
4. GNU/Linux operating system - CentOS.

Tasks for preliminary preparation

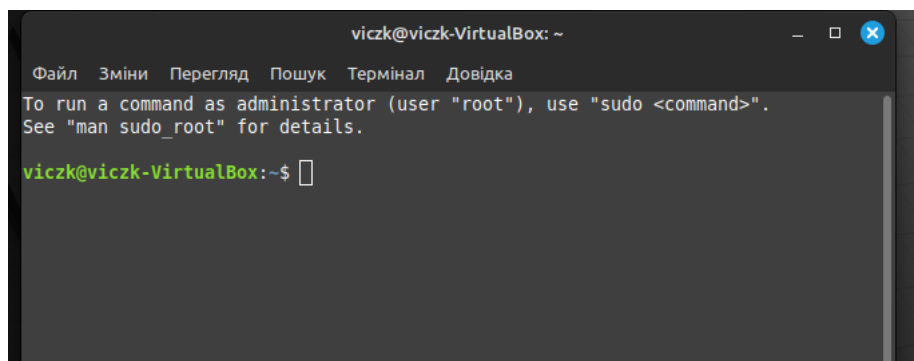
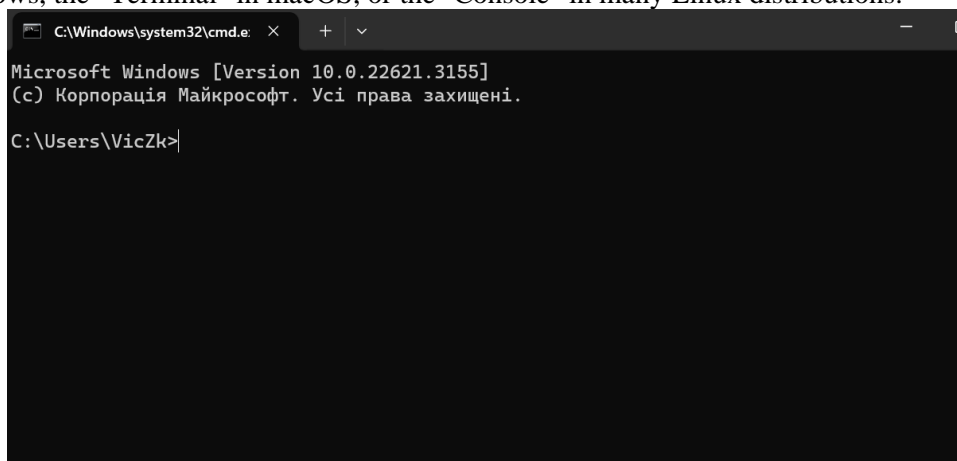
1. Read the brief theoretical information for the laboratory work and make a small dictionary of basic English terms on the classification of operating systems.

Термін англійською	Термін українською
Command line interface	Інтерфейс командного рядка
Application Programming Interface	Інтерфейс прикладного програмування
Central processing units	Центральні процесори
Graphical user interface	Графічний інтерфейс користувача
Server Applications	Серверні програми
Desktop Applications	Десктопні програми
Tools	Інструменти

After reading the brief theoretical information, answer the following questions:

1. CLI-mode (Command Line Interface): This is a way of interacting with a computer system or program by typing commands. In CLI mode, the user enters commands into a text box (usually on the command line) to perform various tasks, such as running programs, managing files, configuring the system, and so on. The CLI is a simple, powerful, and efficient way for advanced users and administrators to interact with a computer.

2. A terminal based on a graphical user interface: This is software that provides a graphical interface for interacting with the operating system or other programs that run on the computer. It typically includes windows, buttons, toolbars, and other controls that allow the user to easily perform various tasks. Examples of such terminals are the "Command Prompt" in Windows, the "Terminal" in macOS, or the "Console" in many Linux distributions.



3. Virtual terminal: This is a concept that allows for multiple independent I/O sessions to be run simultaneously on the same computer. The user can open multiple virtual terminals and switch between them to perform different tasks, such as entering commands, viewing program output, etc. Virtual terminals are useful for system administration, program debugging, and other tasks that require a divided workspace.

Procedure.

## 2.1. Main menu of the mobile OS and graphical interface:

The main menu of a mobile operating system (OS) typically includes the following elements:

- Home screen: This is the start screen that contains shortcuts to the main applications, widgets, shortcuts to phone functions (such as camera, mail, calendar), and information about the time, date, connection, and battery status.
- Applications: This is the menu where all the installed applications on the device are stored. The user can search, install, and manage applications from this menu.
- Messages: From this menu, the user can view received messages, including text messages, emails, notifications from other applications, etc.
- Settings: This is the section for changing various settings of the phone, including network settings, screen settings, security, accounts, and other device settings.

The graphical interface may vary depending on the manufacturer and version of the mobile operating system. For example, iOS uses a "Home Screen" with shortcuts, while Android may have different wallpapers, widgets, and purposes for different screens.

## 2.2. Settings menu of mobile phone components:

The mobile phone settings menu usually includes the following sections:

- Connection and network: Allows you to set up connections to mobile networks, Wi-Fi, Bluetooth, NFC, VPN, etc.
- Sounds and notifications: Adjust the volume, ringtones, vibrations, notifications, and sound effects.
- Display and brightness: Control display settings such as brightness, auto-adjustment, screen modes, and more.
- Battery: Set up power saving settings, display battery usage, and control background processes.
- Programs and applications: Manage apps, their rights, standard apps, uninstall, and memory management.
- System and updates: Language and input settings, date and time, system updates, and more.

## 2.3 Use key combinations to perform special actions:

Keyboard shortcuts in mobile phones are often used to perform various actions, such as:

- Turning the device off/on: Holding down the power button.

- Calling a voice assistant: For example, press the home button twice.
- Screenshot: Press the volume down button and the power button at the same time.
- Calling the snooze mode: For some devices, press the two volume keys and the power button at the same time.

2.4. Logging in and shutting down the device In Linux, you can log in and shut down the device using different methods:

Logging in:

Local login: The user enters a username and password on the login screen.

Remote login (SSH): The user can log in remotely from another computer or device using an SSH client and the appropriate authorization credentials.

Automatic login: In some cases, especially on personal computers, you can set up automatic login without entering a password.

Shutting down the device:

Graphical User Interface (GUI): The user can use the graphical user interface to shut down, usually through the Shutdown or Restart menu.

Command line: Shutdown can also be accomplished through the command line using commands such as shutdown, poweroff, reboot.

Features of battery power settings:

In Linux, you can configure various battery power settings to control the power consumption and battery life of the device. Some of them include:

Power Saving Management: The user can configure various power-saving options such as turning off the screen, entering sleep mode, or hibernating when inactive.

Adjust screen brightness: Turning down the screen brightness can help conserve battery power.

Control background processes: It is important to manage background processes that may consume battery resources, such as apps running in the background or synchronizing data.

Monitoring battery level: Monitoring tools allow the user to keep track of the battery level and recharge it or reduce power consumption if necessary.

Answers to the control questions.

## 1. Examples of Linux server applications:

- Database server: MySQL, PostgreSQL, MongoDB, Oracle Database.
- Messaging servers: Postfix, Sendmail, Exim.
- File sharing services: vsftpd (Very Secure FTP Daemon), ProFTPD, Pure-FTPd.

## 2. Comparison of shells:

- Bourne shell (sh): The original shell, simple and stable, but limited in functionality.
- C shell (csh): Has a syntax similar to C, supports history commands, but is known for its limitations.
- Bourne Again shell (Bash): The most popular shell compatible with sh, it has a rich set of features and extensions.
- TC shell (tcsh): An advanced version of csh with an improved history command and autocomplete.
- Korn shell (Ksh): An extended version of sh with many Bash-like features.
- Z shell (zsh): An advanced shell with many features, including a powerful autocomplete system.

## 3. A package manager is necessary for convenient management of installed programs and their dependencies. Some package managers in Linux:

- APT (Advanced Package Tool): Used in Ubuntu and other Debian-based distributions.
- YUM (Yellowdog Updater Modified): Used in CentOS and Fedora.
- DNF (Dandified YUM): A new version of YUM that is also used in Fedora.
- Pacman: Used in Arch Linux.

## 4. Security features in Linux include:

- Access rights (permissions): Controls user access to files and directories.
- Firewall (iptables, firewalld): Controls and filters network traffic.
- SELinux (Security-Enhanced Linux): A kernel module that provides additional layers of security.
- Antivirus software: For example, ClamAV for virus scanning.
- Resource Limitation: Controls the amount of resources that users can use.

## 5. The use of virtualization is relevant because of:

- Efficient use of resources: The ability to run multiple virtual machines on a single physical server, which reduces hardware costs.
- Fast deployment and migration: The ability to quickly create and migrate virtual machines between servers.

- Isolation of environments: Increase security and stability by isolating virtual machines.

6. Containerization is the process of packaging and executing software with all its dependencies and configuration in a standardized environment known as a container. Containerization allows developers to quickly deploy and run applications in any environment.

7. The advantages of using open source software include open access to the source code, the ability to audit and correct bugs, faster bug fixes, and community development. Disadvantages include less support than commercial software and the possibility of compatibility issues.

8. When running Linux, you can usually have several virtual consoles (terminals) open. They can be called up using keyboard shortcuts such as Ctrl + Alt + F1 to F6. Switching between them is also done using these shortcuts. For example, to switch to virtual console F2, use the key combination Ctrl + Alt + F2.

9. The graphical shell usually works on the first virtual console (terminal), which is usually accessible using the key combination Ctrl + Alt + F7.

10. In Linux, it is possible to register multiple sessions under one system name, but each of them will have a unique session ID. This can be useful for remote control or managing the system using multiple sessions of one user.

## Conclusion.

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