“Київський фаховий коледж зв’язку”
Циклова комісія Комп’ютерної інженерії

ЗВІТ ПО ВИКОНАННЮ ЛАБОРАТОРНОЇ РОБОТИ No1

з дисципліни: «Операційні системи»

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

Виконала студентка групи Бікс-03
Жукова А.О.
Перевірив викладач Сушанова В.С.

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Завдання для попередньої підготовки
1. Прочитайте короткі теоретичні відомості до лабораторної роботи та зробіть невеличкий словник базових англійських термінів з питань класифікації ОС.

Термін англійською. Термін українською
Operating System-Операційна система
machine simulator-машинний емулятор
binary translation-бінарний транслятор
shared hosting-спільний хостинг
hipervizor-гіпервізор
address space-адресний простір
host operating system-головна ОС
classification of operating systems-класифікація операційних систем
kernel-ядро

2. Прочитавши матеріал з коротких теоретичних відомостей дайте відповіді на наступні питання:
A hypervisor is a program that manages the physical resources of a computer and distributes those resources among several different operating systems, allowing them to run simultaneously.
In other words, the hypervisor creates several copies, clones of hardware resources from one physical computer, and each clone is visible to the user as a separate device. You can install a user's guest operating system on each virtual machine, which is not tied to the "hardware" of the host.

Hypervisors can be divided into two main types:

Type 1, a.k.a. bare metal is a hypervisor that is installed directly on the computer. There is no host OS and the hypervisor has direct access to all hardware and features. The main reasons for installing a Type 1 hypervisor are to run multiple operating systems on a single computer without the overhead of a host OS, or to take advantage of portability and hardware abstraction. Bare metals are most often used for servers because of their security and portability for switching from hardware to hardware in the event of a crash. Good

examples of Type 1 hypervisors are VMware ESXi, Citrix XenServer, and Microsoft Hyper-V.

Type 2, a.k.a. hosted, is what most people are probably familiar with virtual operating systems. Distributed hypervisors require a host OS and are often seen as installed software inside the host. Type 2 can run multiple operating systems at the same time, but does not have direct access to the hardware and therefore has more overhead when starting the guest. This means that the guest operating system will not be running at its full potential, and if your device crashes, you will not be able to access your guests either. Type 2 hypervisors are an ideal way to test multiple operating systems on Windows, OS X, or Linux. Good examples are VMWare Workstation, VMware Parallels, Oracle Virtualbox, and Microsoft VirtualPC.

2. Перерахуйте основні компоненти та можливості гіпервізорів відповідно до свого варіанту (порядковий номер по журналу), табл.1.

Microsoft's Hyper-V hypervisor is a hardware virtualization platform that allows you to create sandboxed software environments for use as virtual machines that simultaneously run on the same physical server.

The platform provides the ability to run within the created virtual machine various operating systems that can interact with the hardware of the physical server through the hardware virtualization supported by the platform itself.

Hyper-V is most commonly used as

-solution for creating servers and clusters in data centers or hosting providers,
-workplace virtualization tool,
-a tool for developers who need a secure sandbox for software testing.

Хід роботи
1. Подивіться ознайомчі відео та демонстраційні матеріали з наступних напрямків:
    1. [GNU/Linux. Базові відомості.](https://www.youtube.com/watch?v=k4AKMLS2Ac8)

2. [Встановлення CentOS у VirtualBox.](https://www.youtube.com/watch?v=W3XTYYoHe9A)
3. [Встановлення CentOS в текстовому режимі.](https://www.youtube.com/watch?v=gOR-1o3K18Q)
4. [Встановлення оточення робочого столу Gnome в CentOS.](https://www.youtube.com/watch?v=gcEiIH3KF4Y)
5. [Встановлення оточення робочого столу KDE в CentOS.](https://www.youtube.com/watch?v=_ruIWLExaOY)
6. [The Shell (Linux)](https://drive.google.com/open?id=0B0PV0_SM0LoDSVNPWUVRdUxaN2s)
7. [Огляд графічних оболонок Linux](https://www.youtube.com/watch?v=lEGplwLXZ78)

2. Після перегляду відео дайте відповіді на наступні питання.
1. Перерахуйте етапи для розгортання операційної системи на базі віртуальної машини VirtualBox.

Stages of deploying an operating system on VirtualBox:
- In the "Automatic installation" section, optionally specify the data of the future OS user
- In the "Hardware" section, set the desired system resource limits
- In the "Hard disk" section, specify the maximum size and location of the OS disk file
- Click "Finish" and wait for the installation

- Download the image of the desired system
- In the hypervisor, click the "Create" button
- Select "Expert mode" at the bottom
- In the "OS name and type" section, specify the image, system type, version and storage location on the host system

2. Чи є якісь апаратні обмеження при встановленні 32- та 64-бітних ОС?
Yes, on a 32 system you can install 4 gigs of RAM, and on a 64 you can install 4 gigs or more

3. Які основні етапи при встановленні CentOS в текстовому режимі?

The main steps in installing CentOS in text mode include:
- Selecting the user interface language.
- Selecting the keyboard language.
- Loading network profiles.
- Installing the system.
- Confirmation of settings and disk partitions.
- Enter the user, his password and other access details.
- Installing additional packages if desired.

4. Яким чином можна доустановити графічні оболонки Gnome та KDE на CentOS, якщо вона вже встановлена в текстовому режимі (вкажіть необхідні команди та пакети)?

To install the Gnome and KDE desktop environments on CentOS, run the following commands and packages:

- To install Gnome:
sudo yum groupinstall "GNOME Desktop"
sudo yum groupinstall "X Window System"
- To install KDE:
sudo yum groupinstall "KDE Plasma Workspaces"
sudo yum groupinstall "X Window System"

5. Дайте коротку характеристику графічних інтерфейсів, що використовуються в різних дистрибутивах Linux відповідно до свого варіанту, табл.2.

GNOME is a desktop environment for Linux. Includes a set of utilities, application software, system utilities, and other components.
JWM is a simple and easy to customize graphical interface that allows users to create a convenient panel of programs for their personalization.

Контрольні запитання

1. The difference between type 1 and type 2 hypervisor is that the type 1 hypervisor runs directly on the hardware and is independent of the underlying OS. A type 2 hypervisor can run directly on the physical processor. A type 1 hypervisor has higher performance than a type 2 hypervisor.

2. GNU General Public License (GNU General Public License or GNU General Public License) is one of the most popular licenses for free software.

3. The essence of open source software is that the source code is freely available for anyone to access, use, modify and distribute without restriction or fee.

4. A distribution is a package that contains all the files needed to install and run software on a particular operating system or platform.

5. The main tasks of a system administrator in Linux include:

- update the software;
- setting the operating modes of the OS;
- editing configuration files;
- OS installation;
- management of the OS loading process;
- adding and removing OS users;
- ensuring reliable operation of the OS;
- computer network settings.

6. Android is a mobile operating system based on the Linux kernel. It uses the Linux kernel as a base, but also includes its own unique user interface.

7. Embedded Linux is a version of the Linux operating system designed for use in embedded systems such as smartphones, routers, and other small devices. Applications of Embedded Linux include industrial automation, automotive systems, medical devices, etc.

8. The process of changing the Linux boot type from graphical to text or vice versa depends on the specific Linux distribution and version you are using. Here are some general steps that may work on some systems.

- Boot into the Linux system and wait for the bootloader screen to appear.
- Select the boot option you want to change and press the "e" key to change it.

- Find the line that starts with "linux" or "linuxefi" and add the word "text" (for text mode) or "graphical" (for graphical mode) at the end of the line.
- Press "Ctrl + x" to boot with modified boot option.

Key differences between CLI and GUI

- CLI allows users to manually enter commands to perform a desired task, while GUI provides users with visual elements to interact with the operating system, such as buttons, icons, images, etc.
- GUI tasks are easy to perform and suitable for beginners. The CLI, on the other hand, requires experience with commands and syntax.
- GUI systems require a mouse and keyboard, while CLI requires only a keyboard to operate.
- Higher accuracy can be achieved in CLI compared to GUI.
- GUI has the advantage of flexibility where CLI systems are inflexible.
- GUI consumes more system space while CLI requires less system resources and space.
- CLI appearance cannot be changed. On the contrary, the appearance of the graphical interface can be adjusted.
- CLI is faster than GUI.