Preparation for Lab 2

Week 4

Semester 1, 2025

Dr. Farshid Keivanian

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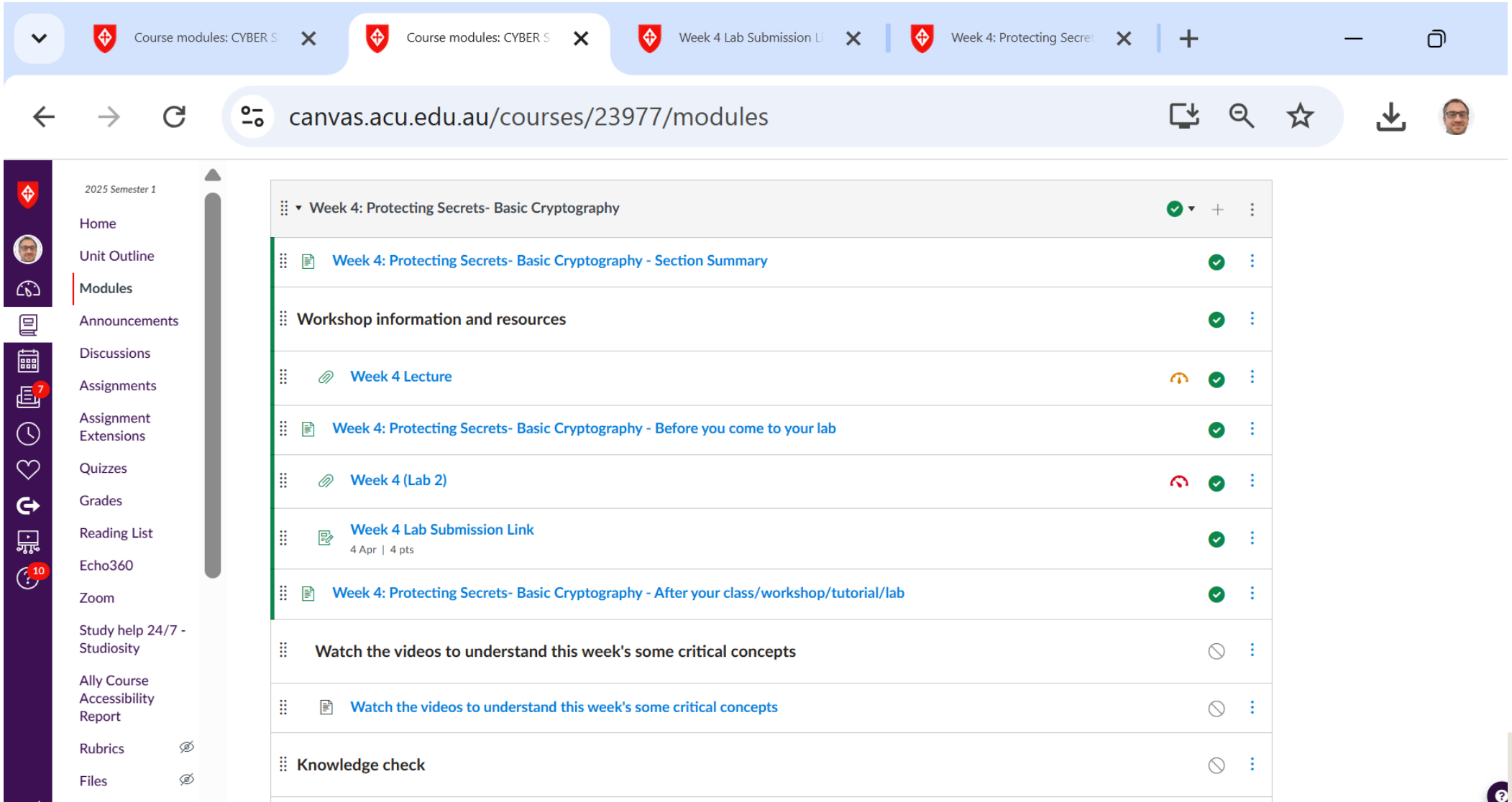
Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Navigate Canvas >> Week 4 >> Lab 2 (submit a word document with screenshot)



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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Introduction

Today, we will work with **VirtualBox** and **Kali Linux** to set up a virtual machine (VM) for penetration testing and security analysis. This lab will guide you step-by-step through installing VirtualBox and setting up Kali Linux.

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What is VirtualBox?

VirtualBox is an open-source tool developed by **Oracle** that allows users to create and run multiple operating systems on a single computer. It supports Windows, macOS, and Linux machines.

Why Use VirtualBox?

- Runs multiple OS environments on one device
- Isolates software for testing and development
- Useful for penetration testing and ethical hacking

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What Are We Doing in This Lab?

This lab is about **setting up a virtual environment** where we can run **Kali Linux** inside **Oracle VirtualBox** on our Windows computer.

This means:

- We don’t need to install Kali Linux directly on our main computer.
  - Instead, we create a **virtual machine (VM)** that runs Kali Linux **inside** Windows, like an app.
  - This allows us to experiment with **cybersecurity tools** in Kali Linux without affecting our main operating system.

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What is Oracle VirtualBox Manager?

- **Oracle VirtualBox** is a **virtualization software**.
- It allows us to run **multiple operating systems (like Kali Linux) inside our computer**.
- Think of it like **a computer inside our computer**.
- Instead of buying a separate computer for Kali Linux, we use **VirtualBox to create a virtual computer**.

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Main Purpose of VirtualBox in this Lab:

- To **install and run Kali Linux** in a safe, isolated environment.

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What is Kali Linux?

- **Kali Linux** is a special operating system designed for **penetration testing, cybersecurity, and ethical hacking**.
- It comes with **many security tools** used by cybersecurity professionals.
- Kali Linux is **based on Linux**, meaning it looks and works differently from Windows.

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Main Purpose of Kali Linux in this Lab:

- To **practice cybersecurity skills** in a controlled environment.
- To explore tools that help in **ethical hacking, network security, and system security**.

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How Do VirtualBox and Kali Linux Work Together?

VirtualBox is the software that runs Kali Linux as a virtual machine.

Here's the relationship step-by-step:

1. **We install VirtualBox on Windows.**
    - This gives us the ability to create virtual computers.

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2. **We download and install Kali Linux inside VirtualBox.**
    - Instead of installing it directly on our computer, we install it inside a **virtual machine**.
3. **Now, we can use Kali Linux within VirtualBox.**
    - We can open VirtualBox → Start Kali Linux → Use it without affecting our Windows system.

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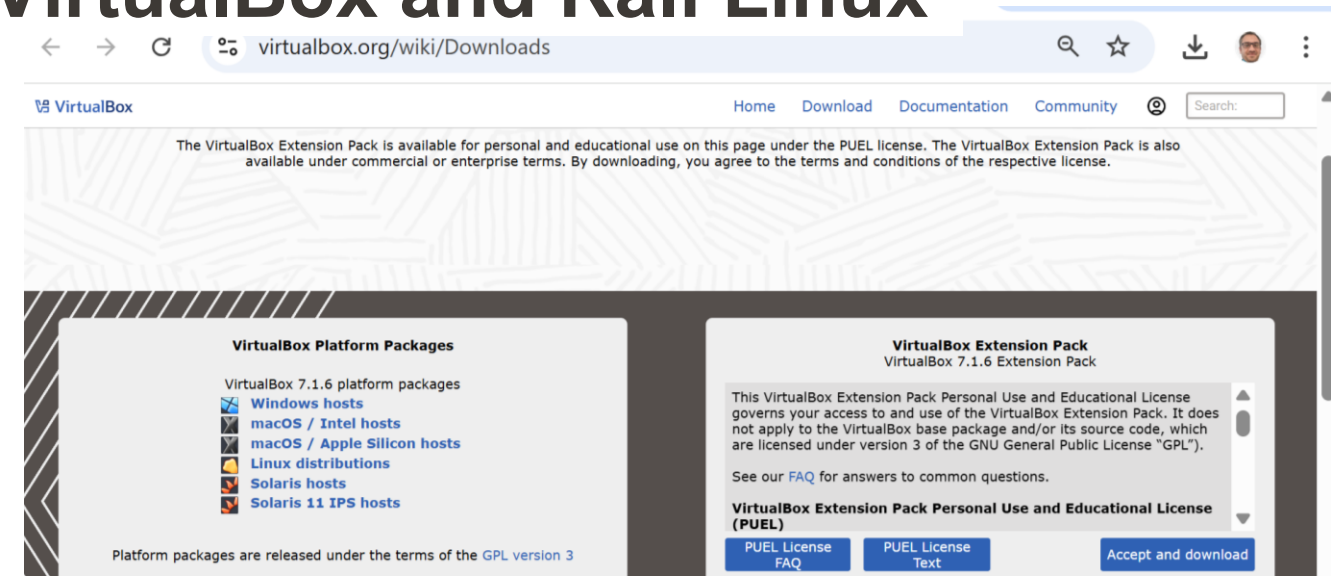
Installing VirtualBox

Follow these steps to install VirtualBox:

1. **Download VirtualBox** from the official website:

   https://www.virtualbox.org/wiki/Downloads



We should choose the **"Windows hosts"** option if we are installing VirtualBox on a **Windows machine**. If we are using **macOS**, we choose either **"macOS / Intel hosts"** or **"macOS / Apple Silicon hosts"**, depending on our system.

For Linux users, we select **"Linux distributions"**.

Running on MacOS

Kali Linux can absolutely run on macOS —you can use it with **VirtualBox for macOS** or **UTM (for Apple Silicon chips)**.

There are two recommended solutions:

Running on MacOS

Option 1: Use VirtualBox (Intel Mac)

If your Mac has an Intel processor, you can continue using VirtualBox:

1. Download the **Kali Linux ISO (Installer)** version from the official Kali Downloads page. (suitable for Intel-based Macs running VirtualBox)
2. Set it up as a new VM in VirtualBox.
3. Follow the same steps provided for Windows users in the Week 8 lab guide.

✓ Make sure to choose the **"Installer"** ISO for your architecture (**amd64** for Intel Macs).

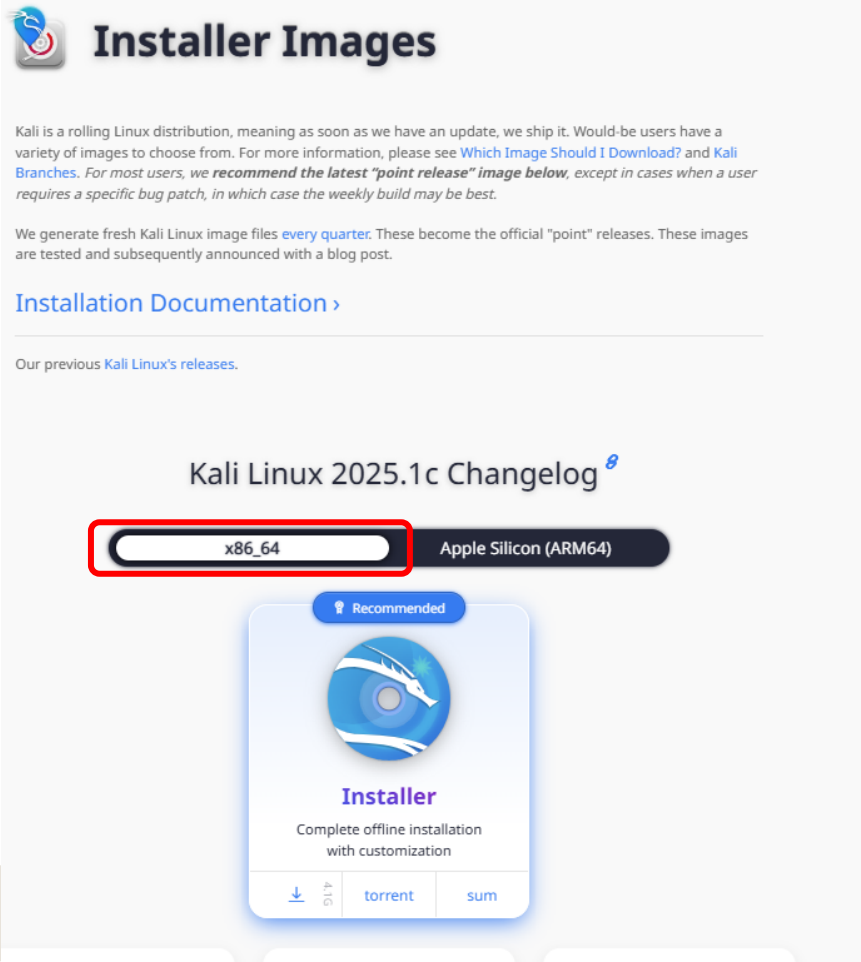
X Do **not** use the Live or NetInstaller versions for lab-based VirtualBox installation.

Running on MacOS

You should download the **Installer Image for x86_64 architecture**, which is compatible with VirtualBox on Intel Macs.

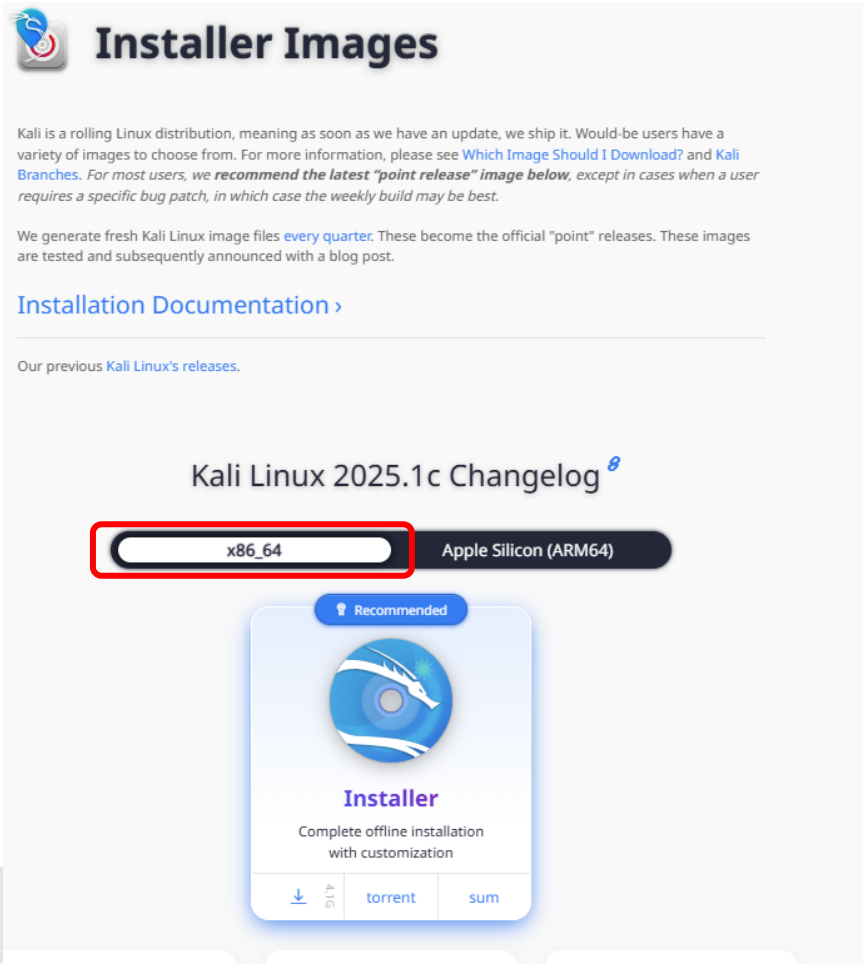
Link to download (Installer Image):

https://www.kali.org/get-kali/#kali-installer-images



Running on MacOS

- Choose **x86_64** (not Apple Silicon), then download the **Installer ISO** file.
- This version allows full installation with customization via VirtualBox.



Running on MacOS

If you are using an Apple Silicon (M1, M2, M3) Mac:

VirtualBox may not work properly. In this case, option 2 is recommend:

- Download UTM from https://mac.getutm.app/
- Then use the **ARM64 image** from this page:

  https://www.kali.org/get-kali/#kali-arm

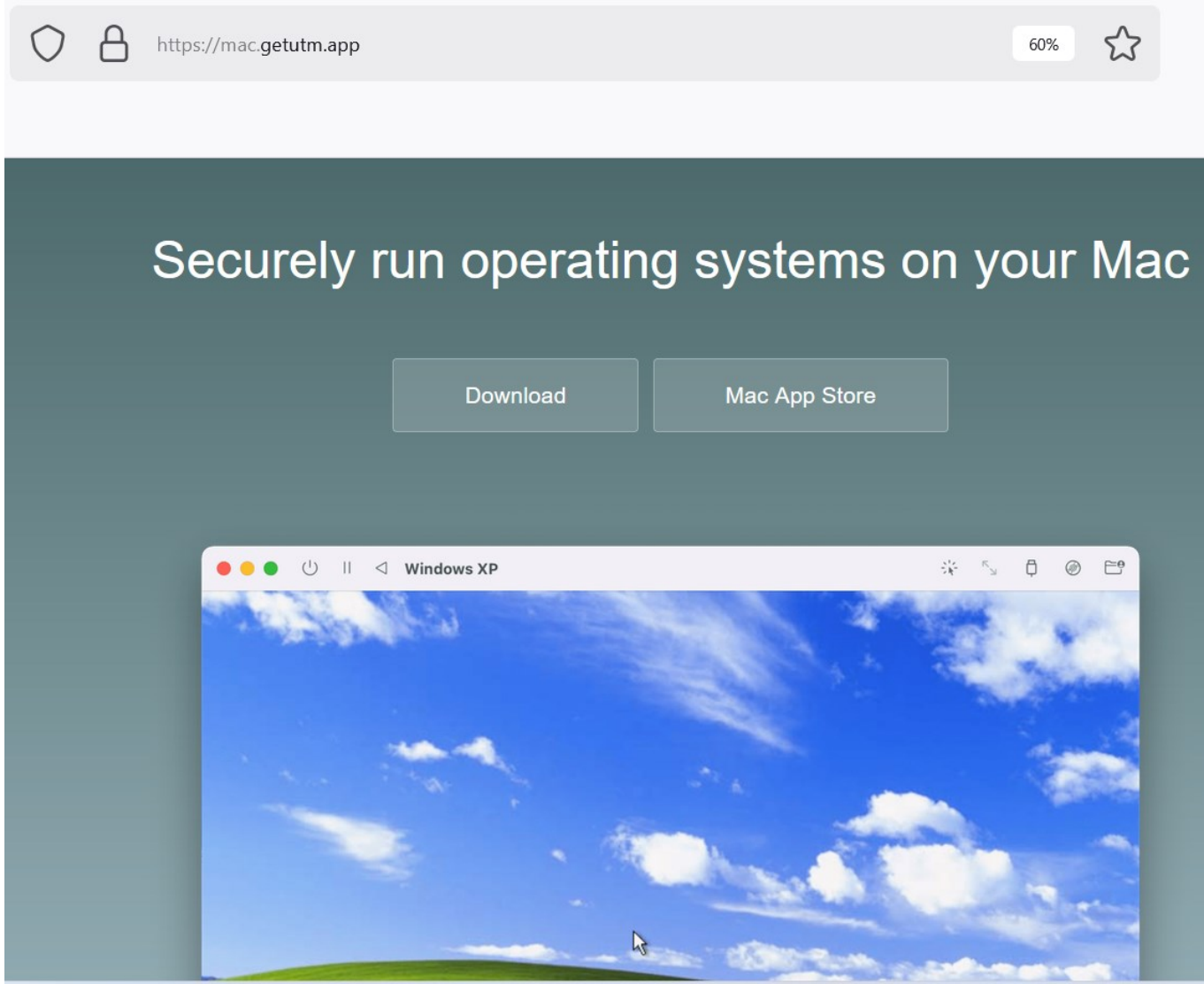
Running on MacOS

Option 2: Use UTM (Apple Silicon/M1/M2/M3 chips)

If you are using an **M1/M2/M3 Mac**, VirtualBox may not work as expected.

In that case:

1. Download and install **UTM** from https://mac.getutm.app/
2. Use a pre-built **Kali ARM image** from Kali ARM images.
3. Import it into UTM and start your Kali environment.



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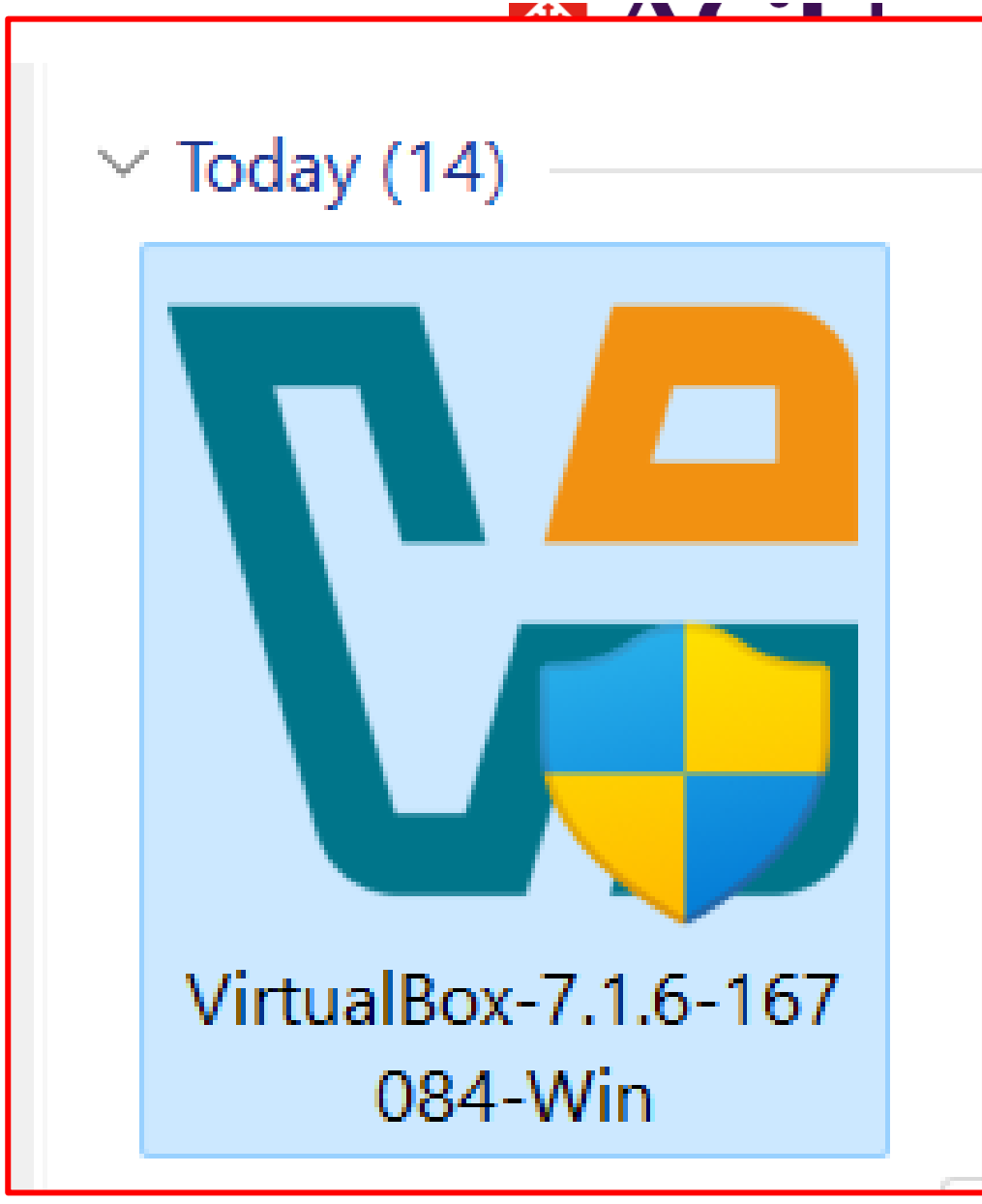
2. Once downloaded, **locate** the installation file on your computer and double-click to start the installation (Run as Administrator)



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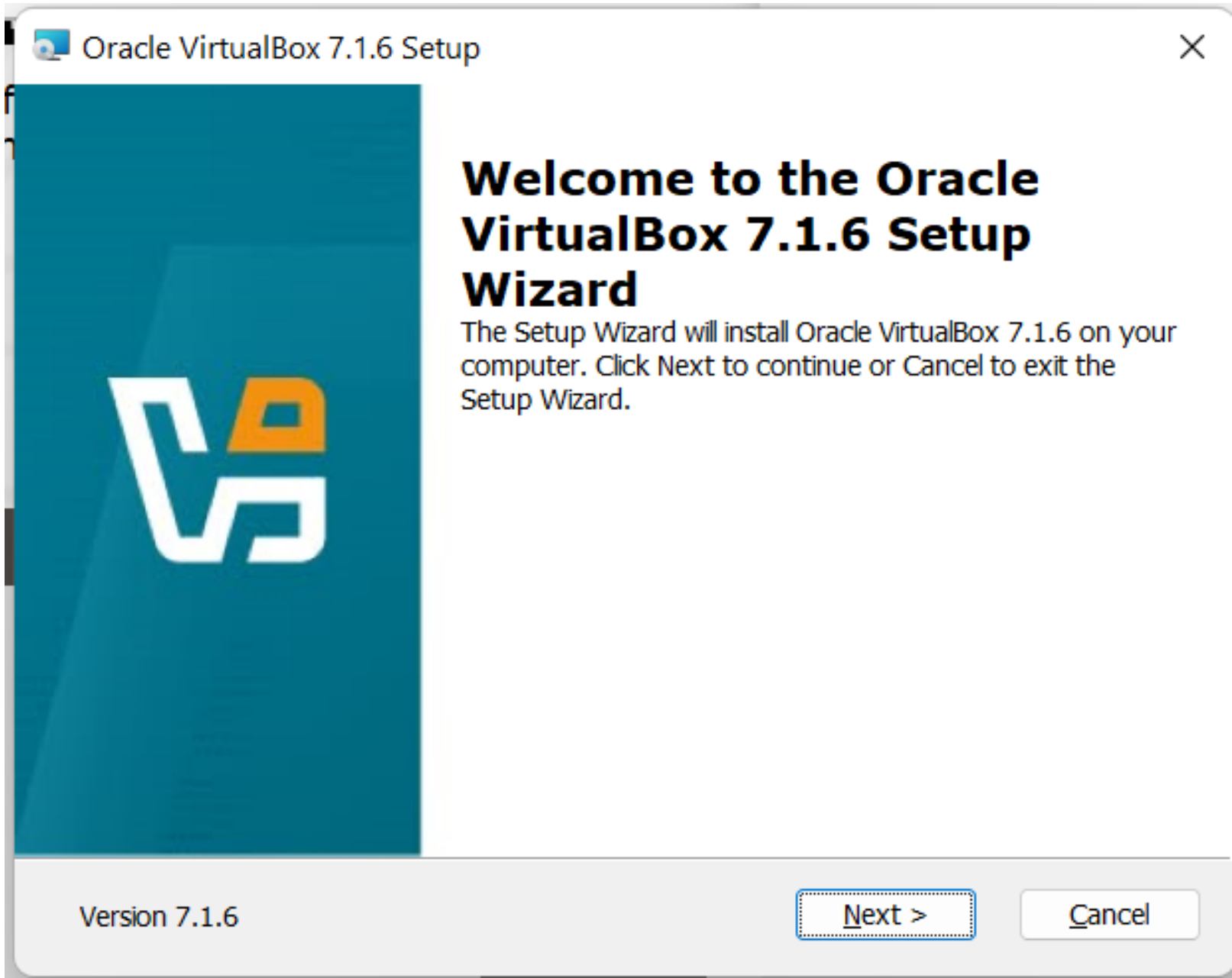
3. Click on Next



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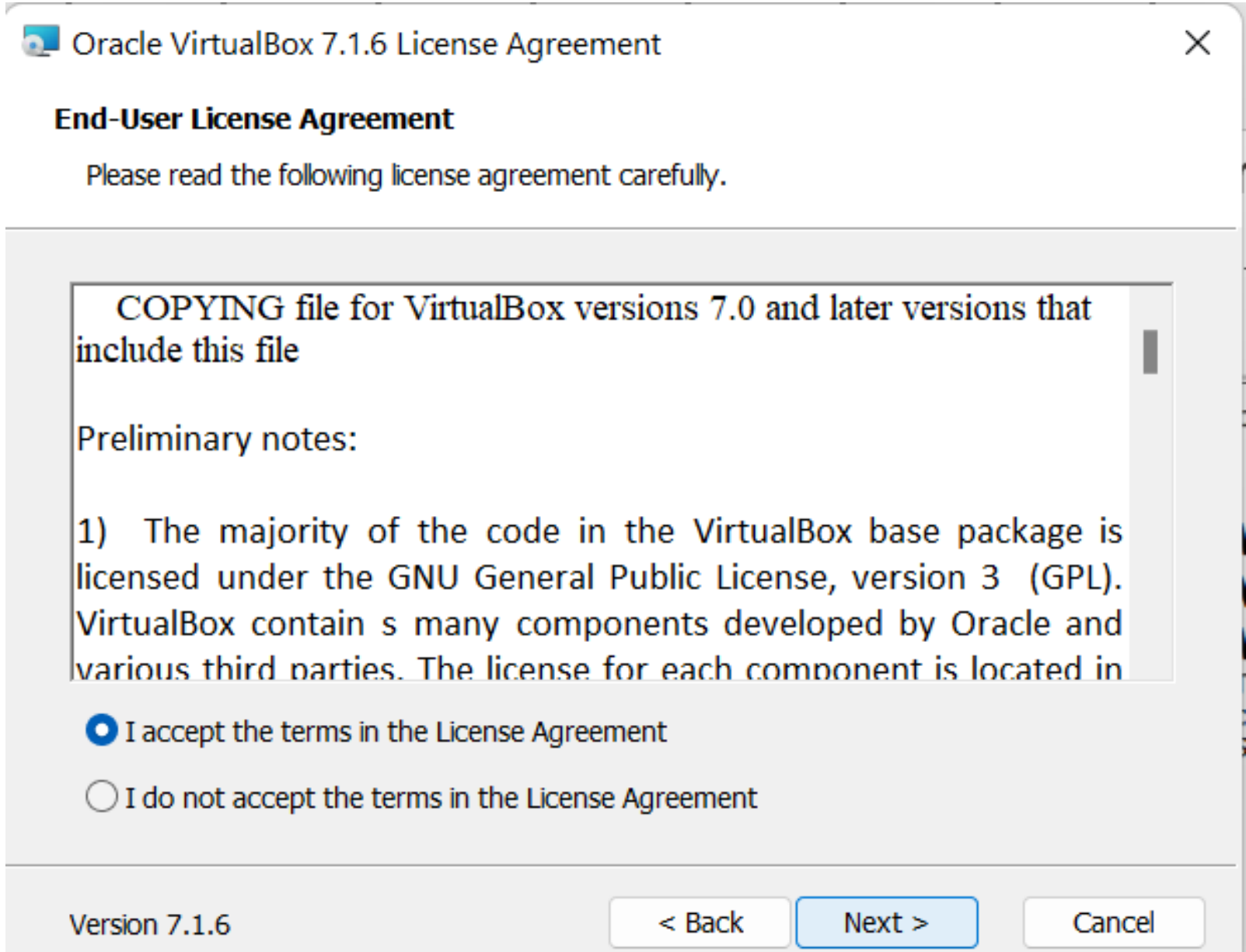
4. Accept & Click on Next



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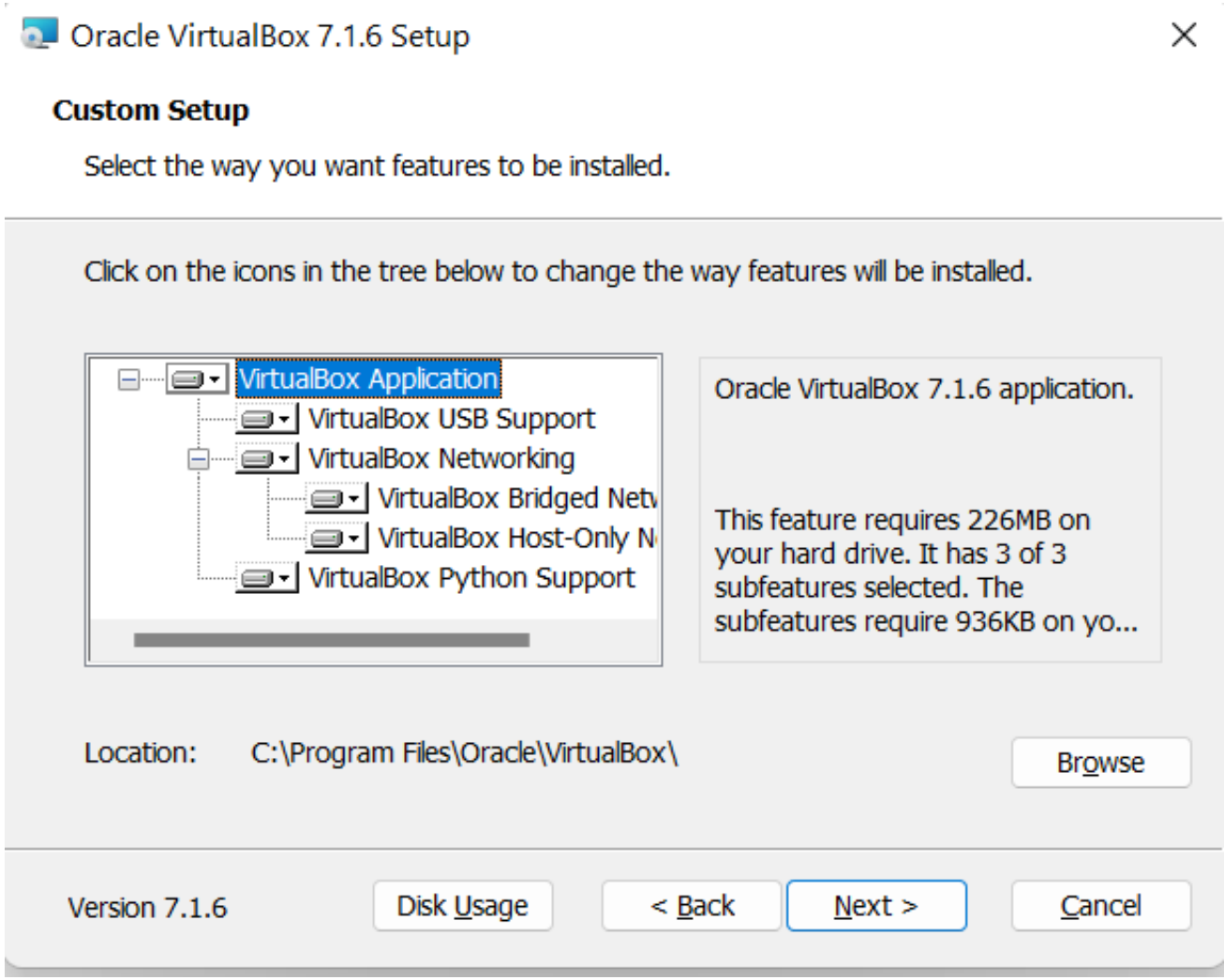
- **VirtualBox Application** (Mandatory for installation)
- **VirtualBox USB Support** (Recommended for USB device compatibility)
- **VirtualBox Networking** (Includes Bridged Networking, Host-Only Networking, and other network features—recommended to keep)



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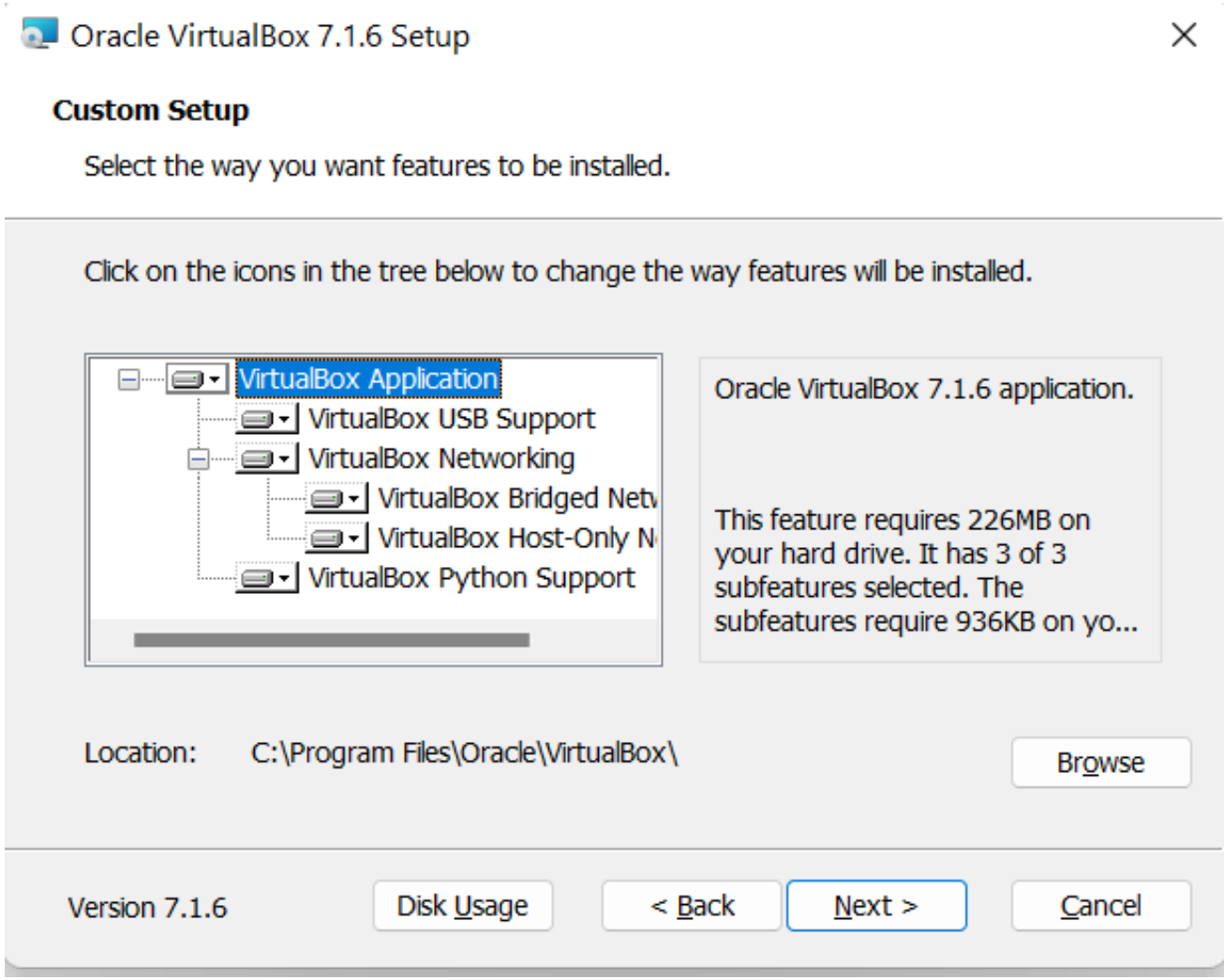
- **VirtualBox Python Support** (Optional, but useful if you plan to run automation scripts)

  5. Keep the default options selected & proceed with the installation



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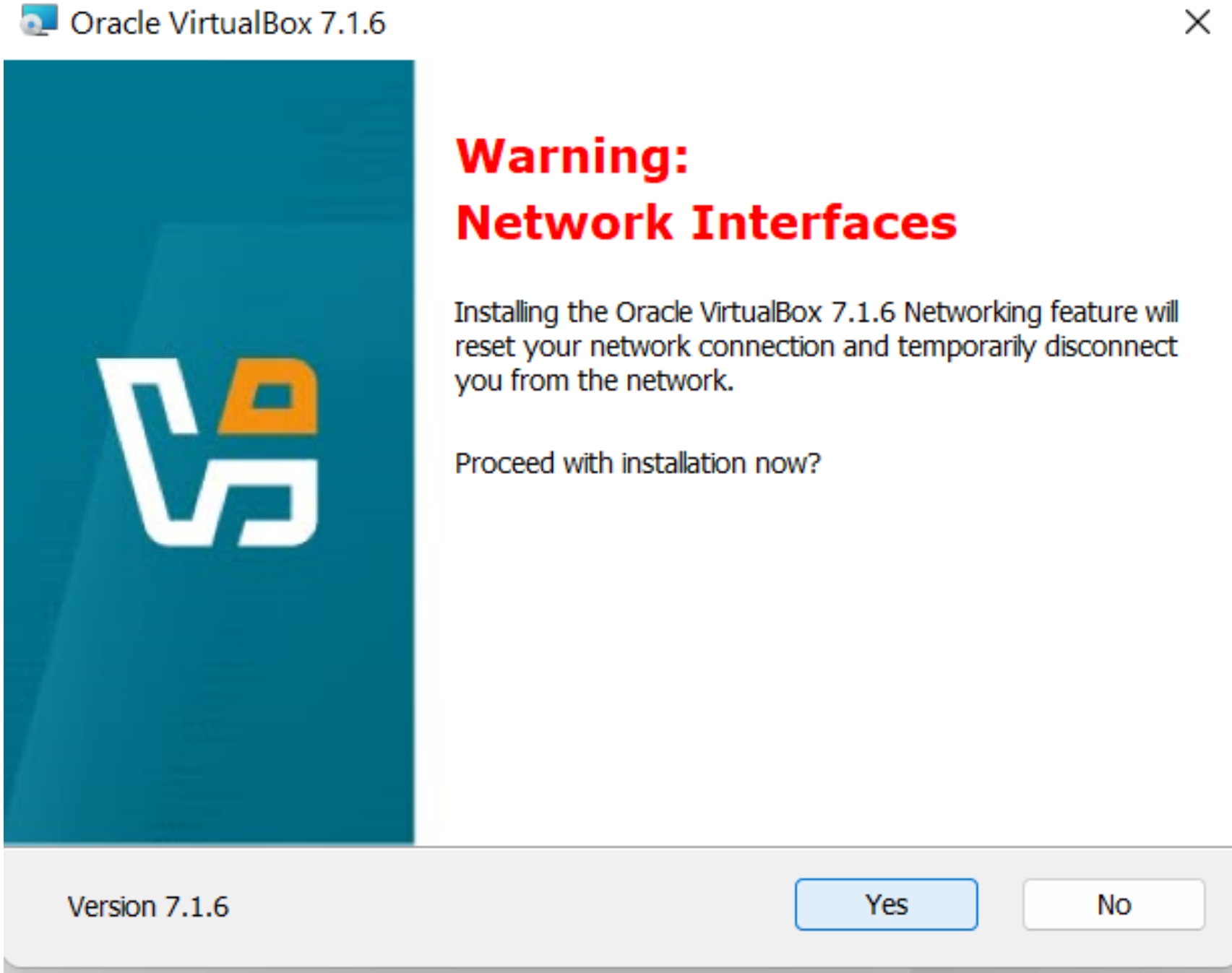
- **Click on Next & Yes**



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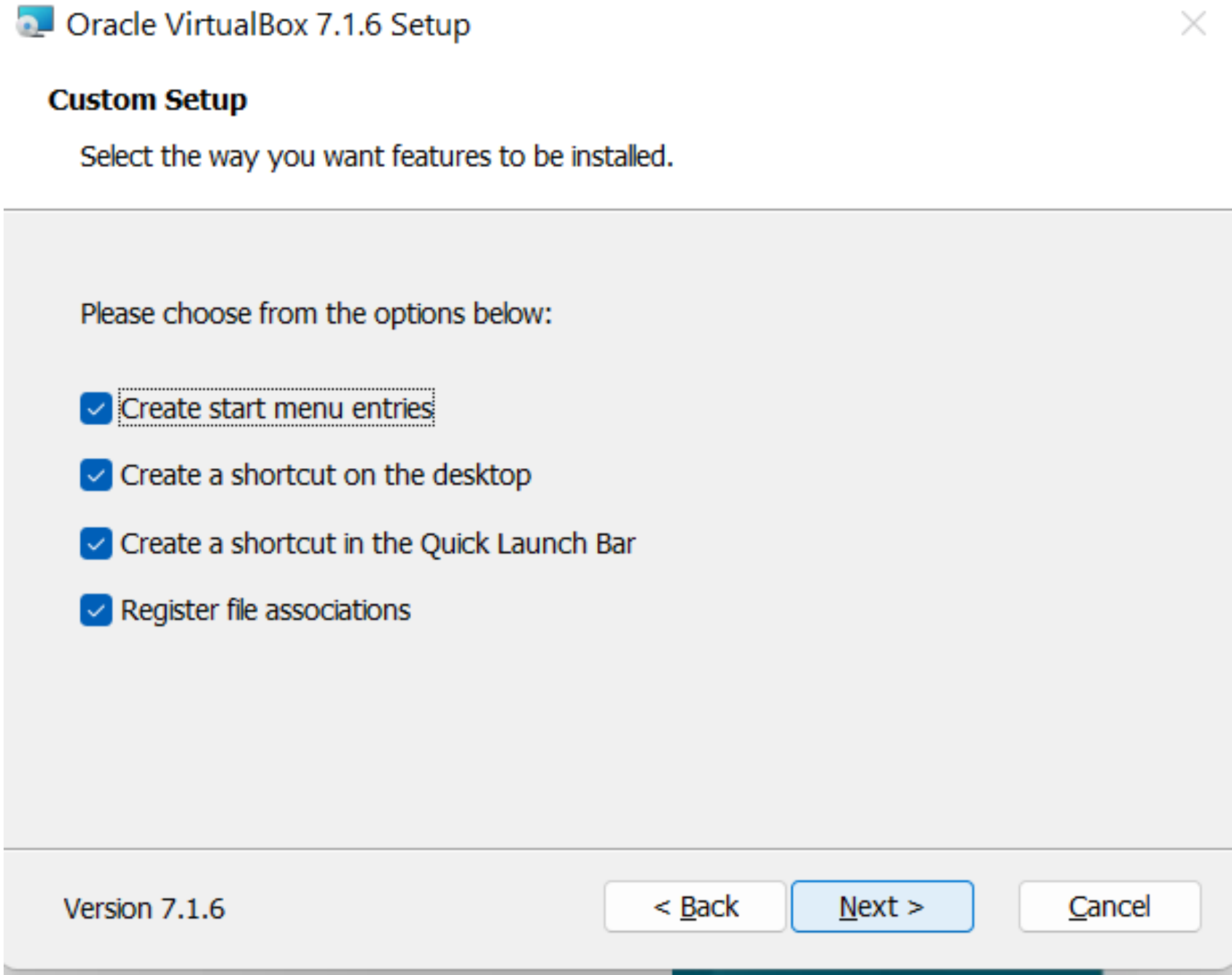
- **Next**



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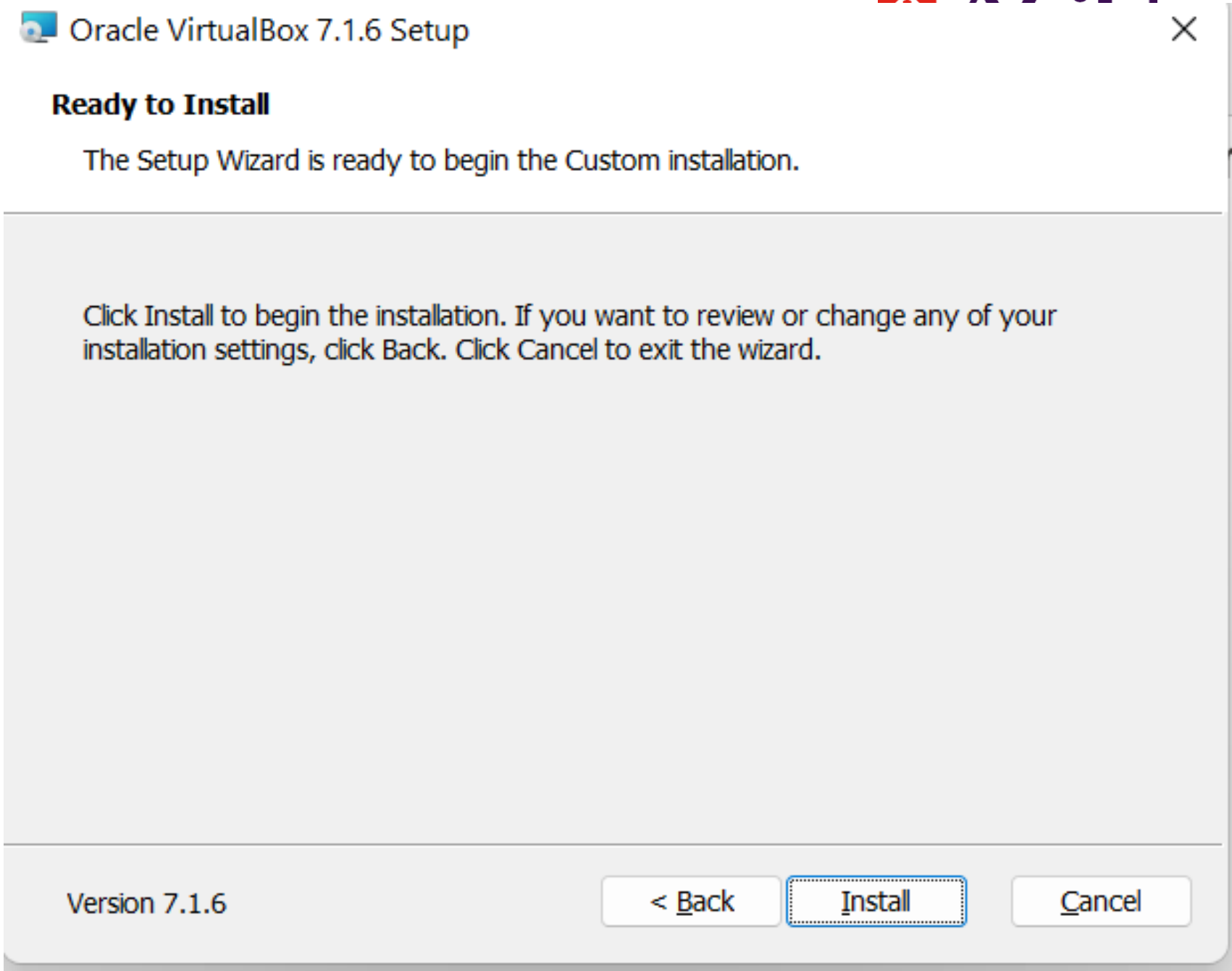
- **Install**



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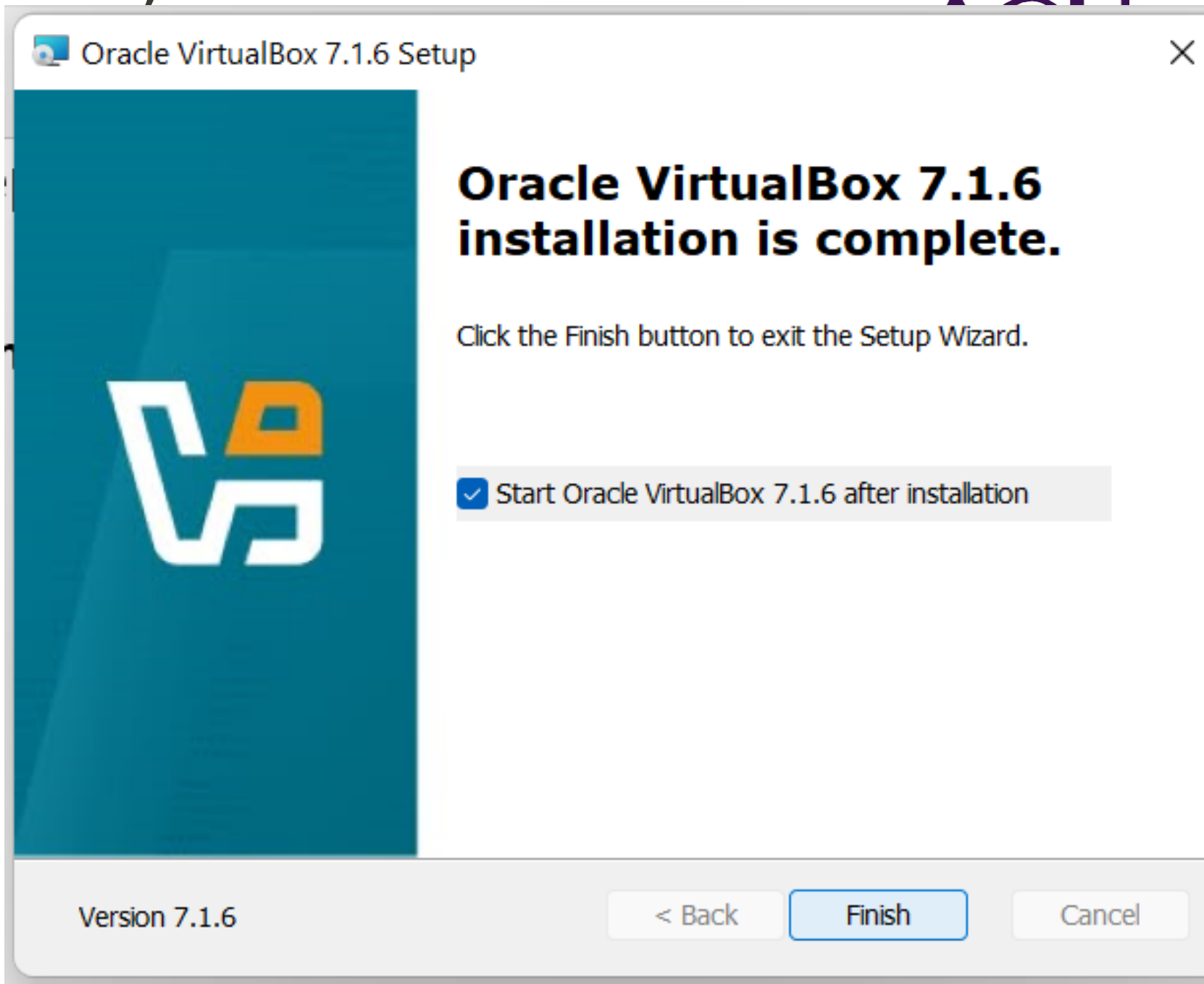
- **Click Finish** to exit the setup wizard



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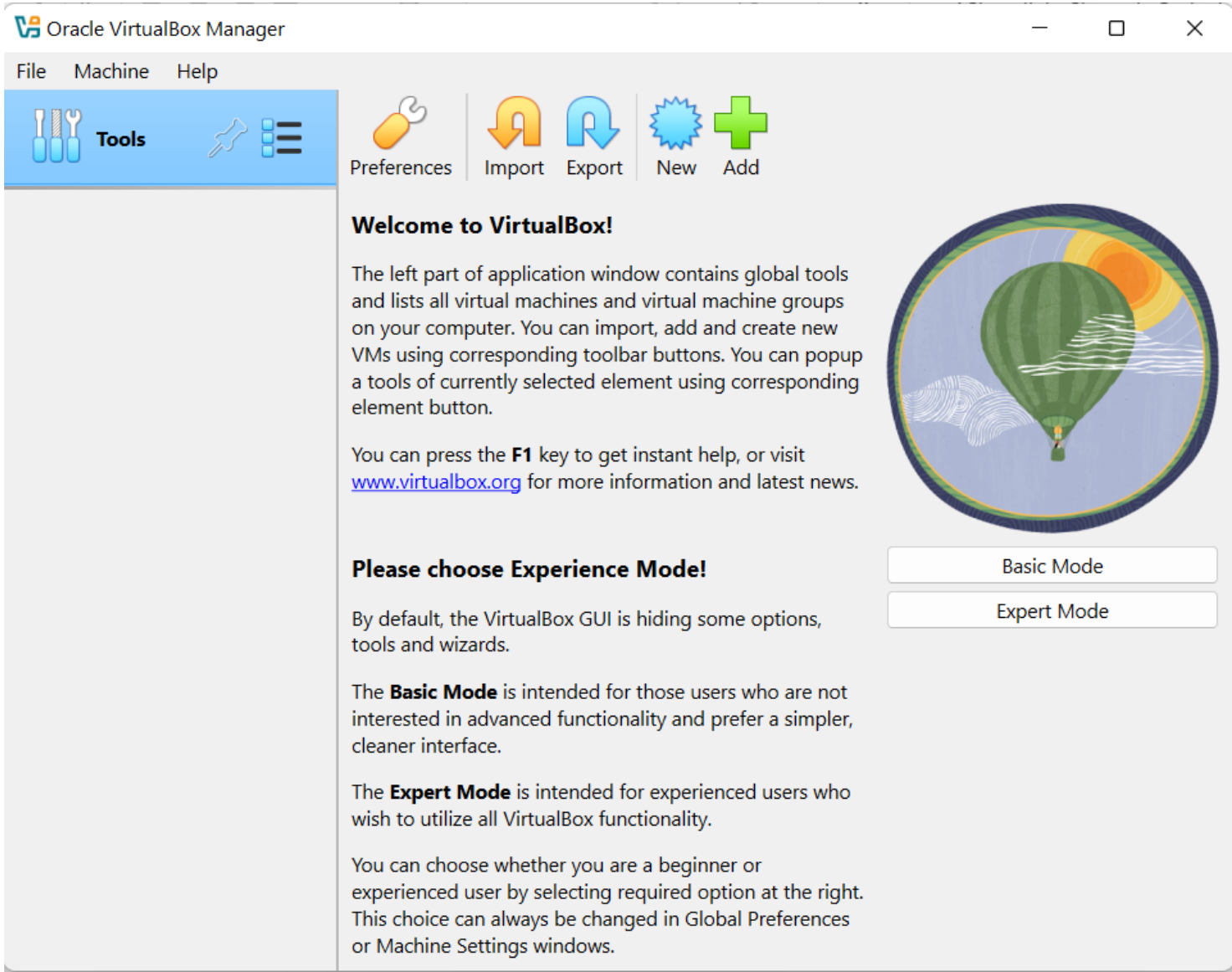
- **Now Virtual Box is ready to use**
- If you are a **beginner**, select **"Basic Mode"** (Recommended).
- It provides a simpler interface with essential options for creating and managing virtual machines.



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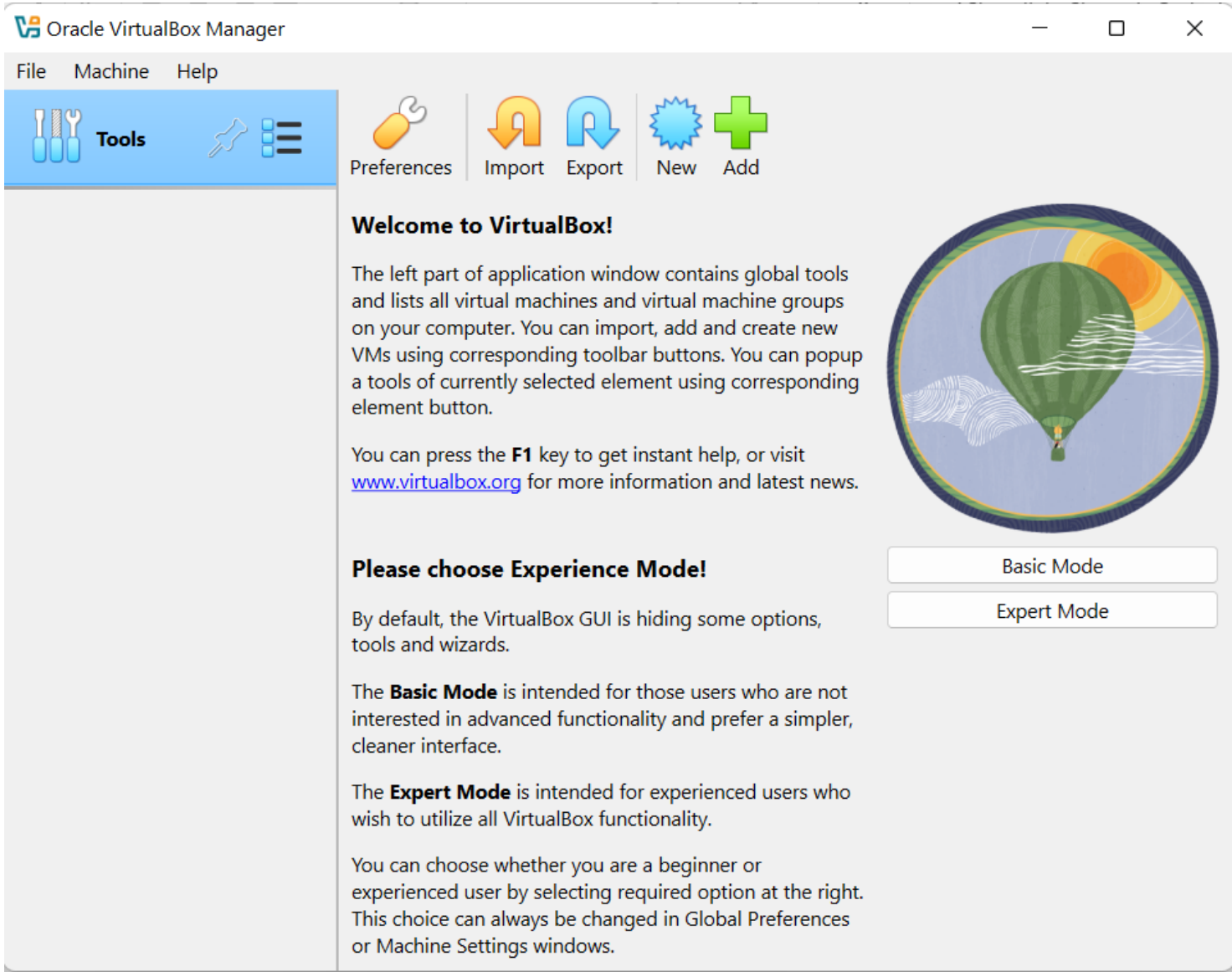
- If you are **comfortable with advanced settings**, select **"Expert Mode"**.
- This mode gives you more flexibility when setting up virtual machines, such as manually configuring storage, memory, and network settings.



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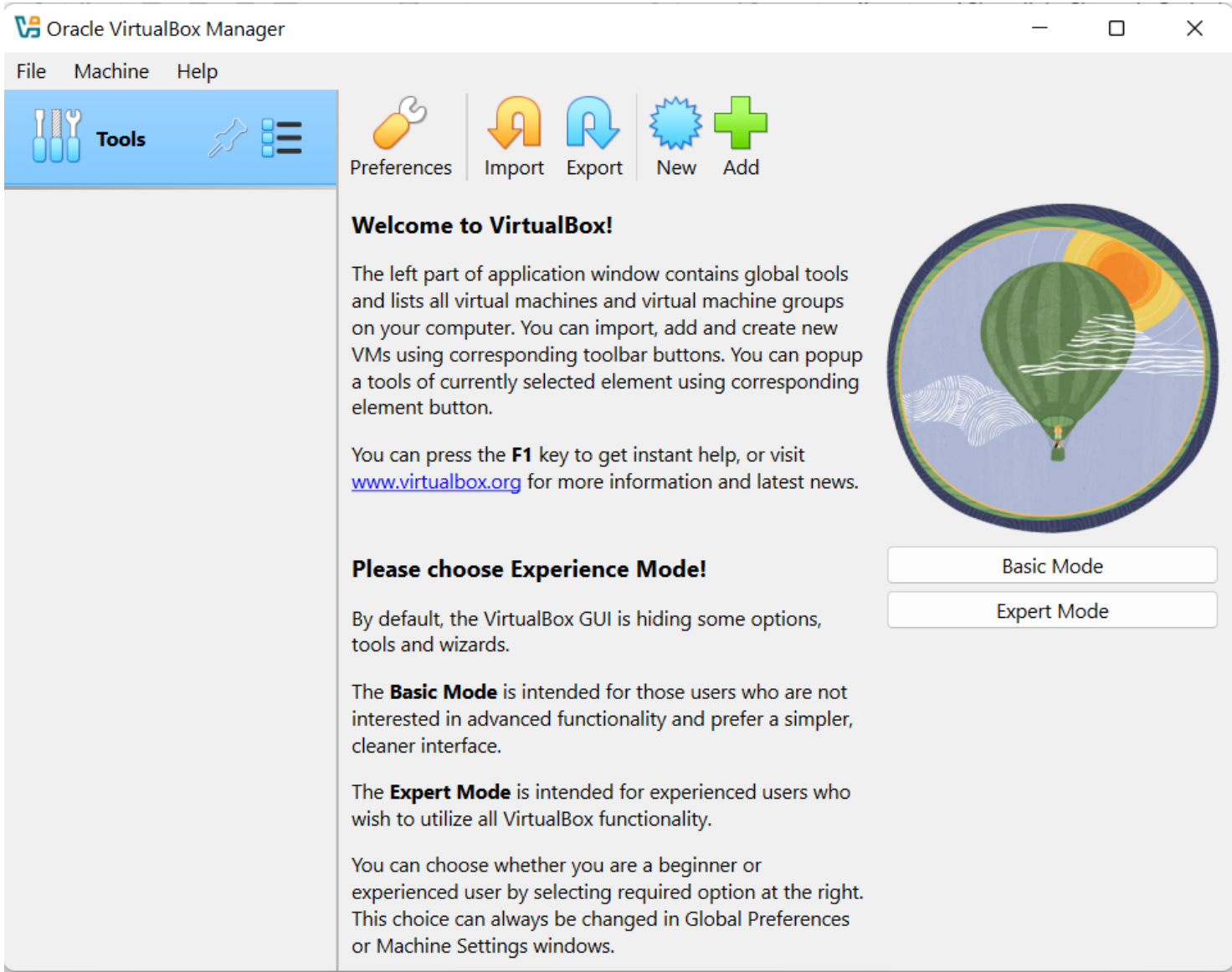
- Currently, we select **Basic Mode**. We can always switch to **Expert Mode** later from the preferences if needed.



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What is Kali Linux?

Kali Linux is a **Linux distribution** designed for penetration testing, security auditing, and ethical hacking. It comes pre-installed with a wide range of cybersecurity tools.

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Why Use Kali Linux?

- Includes essential security and penetration testing tools
- Helps in cybersecurity training and research
- Open-source and regularly updated

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Installing Kali Linux on VirtualBox

Follow these steps to install **Kali Linux** on your VirtualBox:

1. **Download Kali Linux** from the official website:

   https://www.kali.org/get-kali/#kali-platforms

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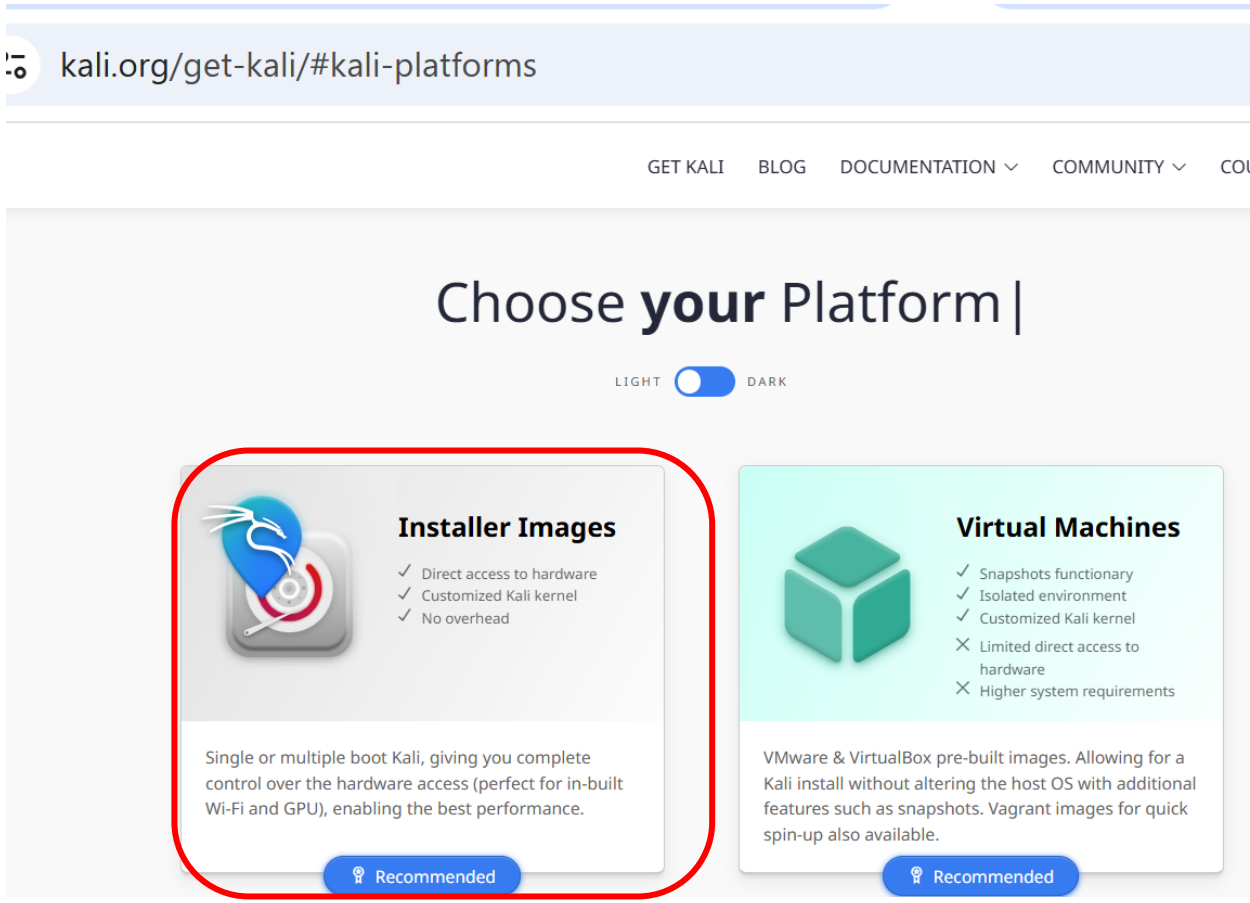
We plan to download the 64-bit ISO file



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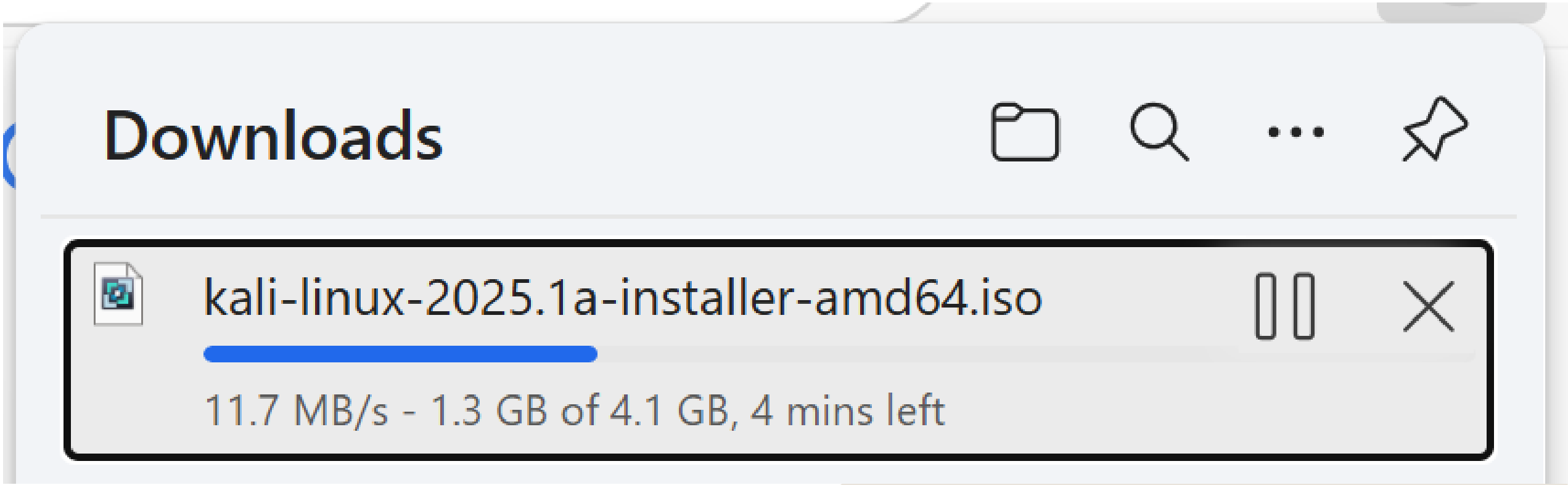
Wait 5-6 minutes until the file is completed



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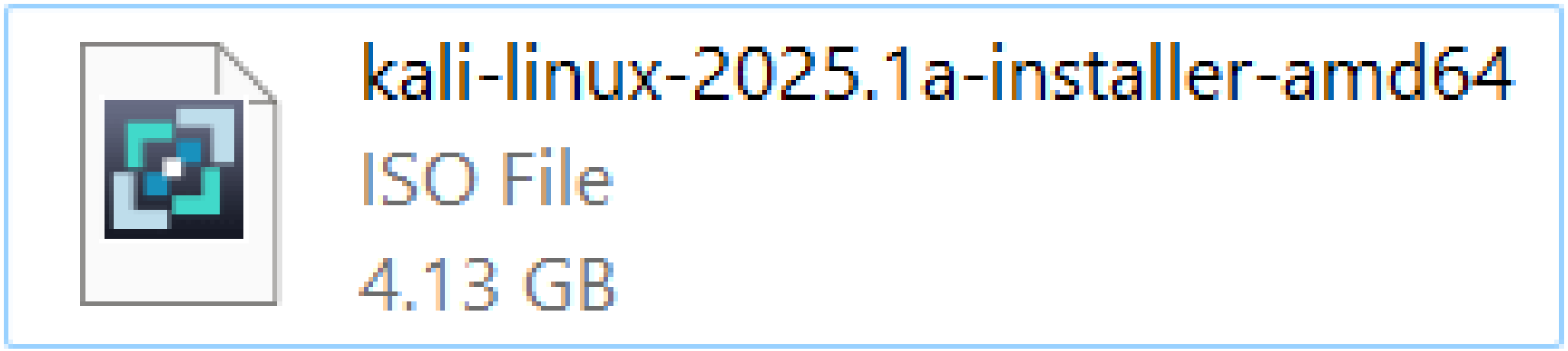
- **Once downloaded, we can install Kali Linux on our VirtualBox**



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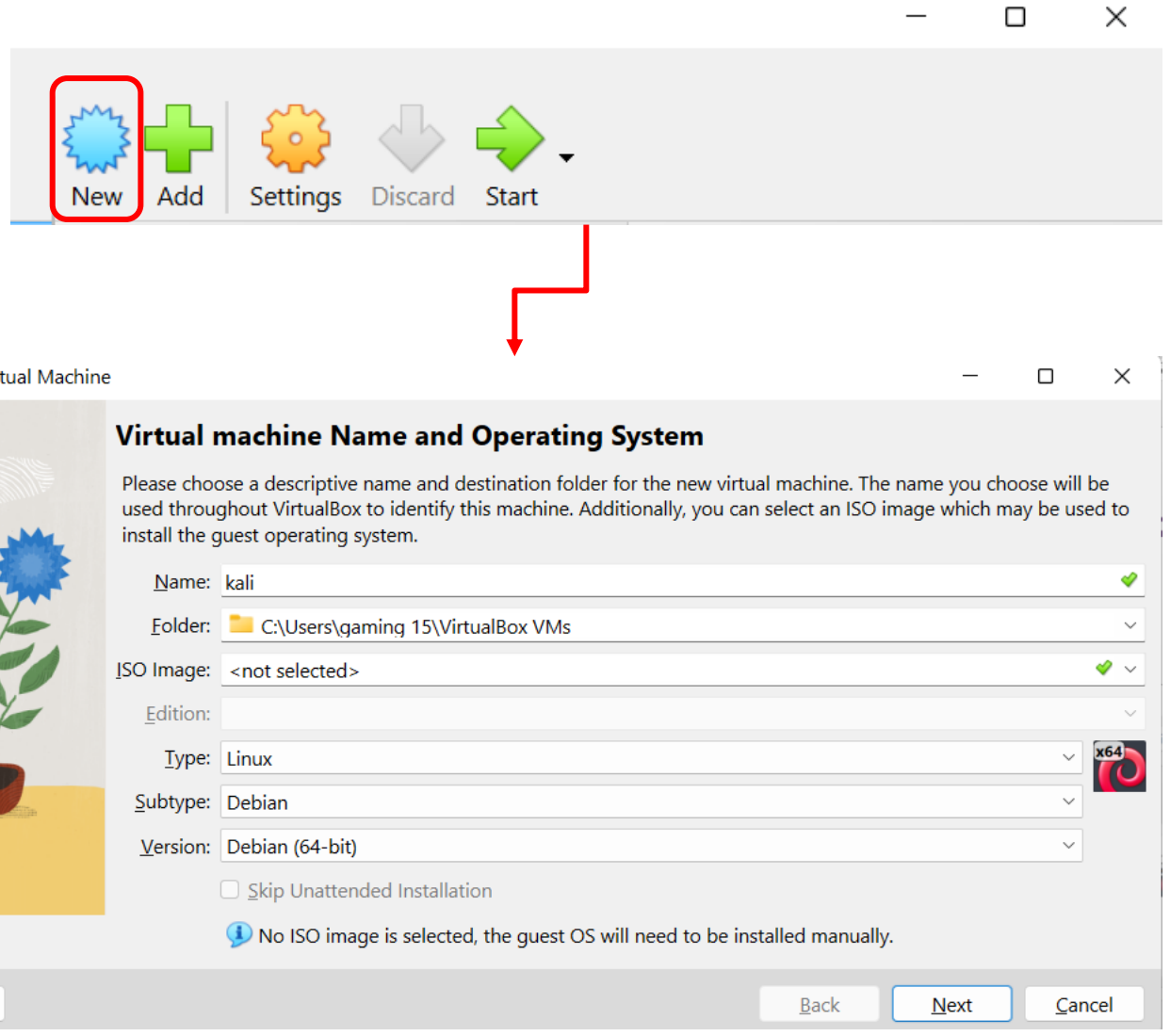
- Click on New
- Write a name for the virtual machine e.g., kali
- Type: Linux
- Version: Oracle Linux



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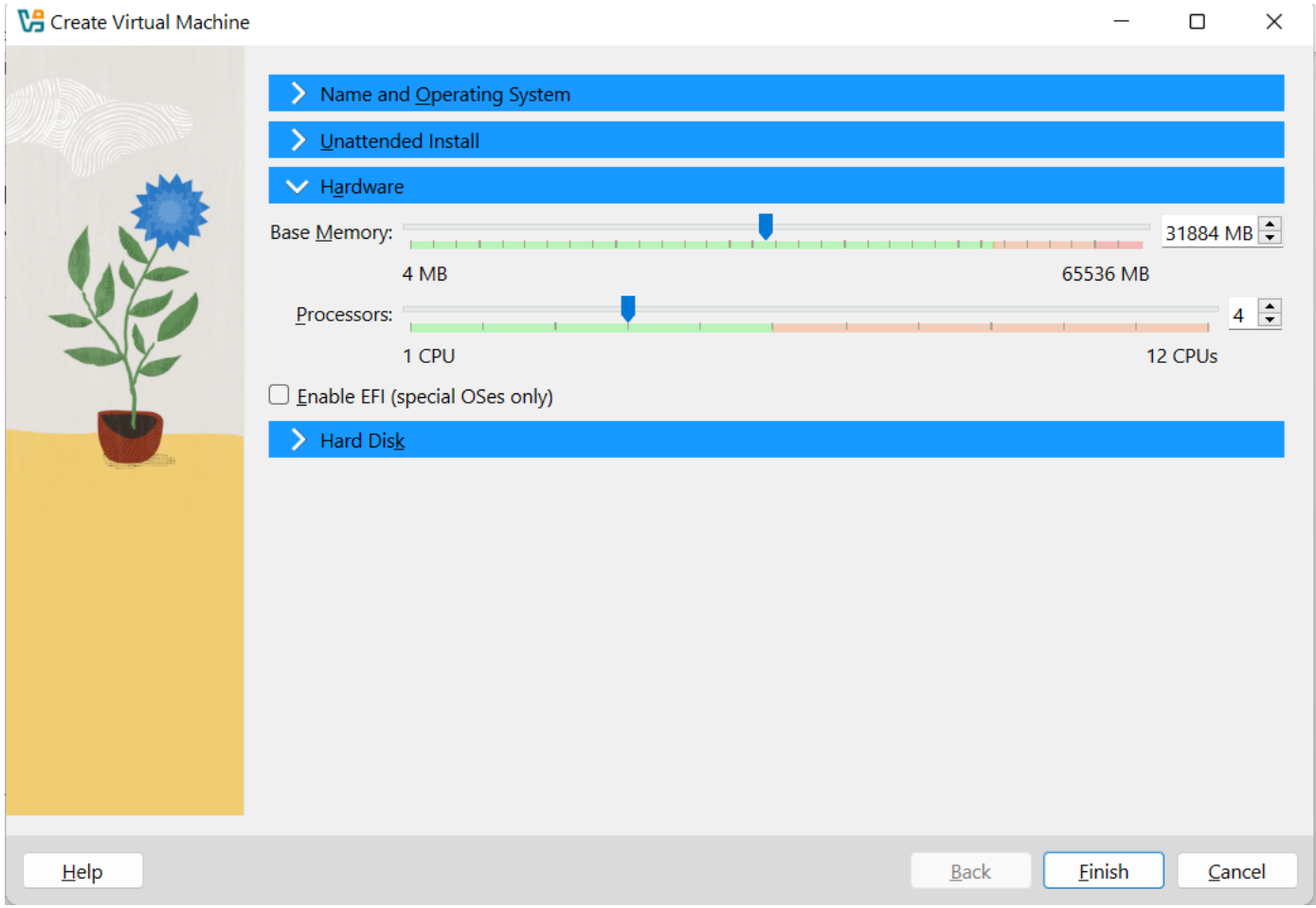
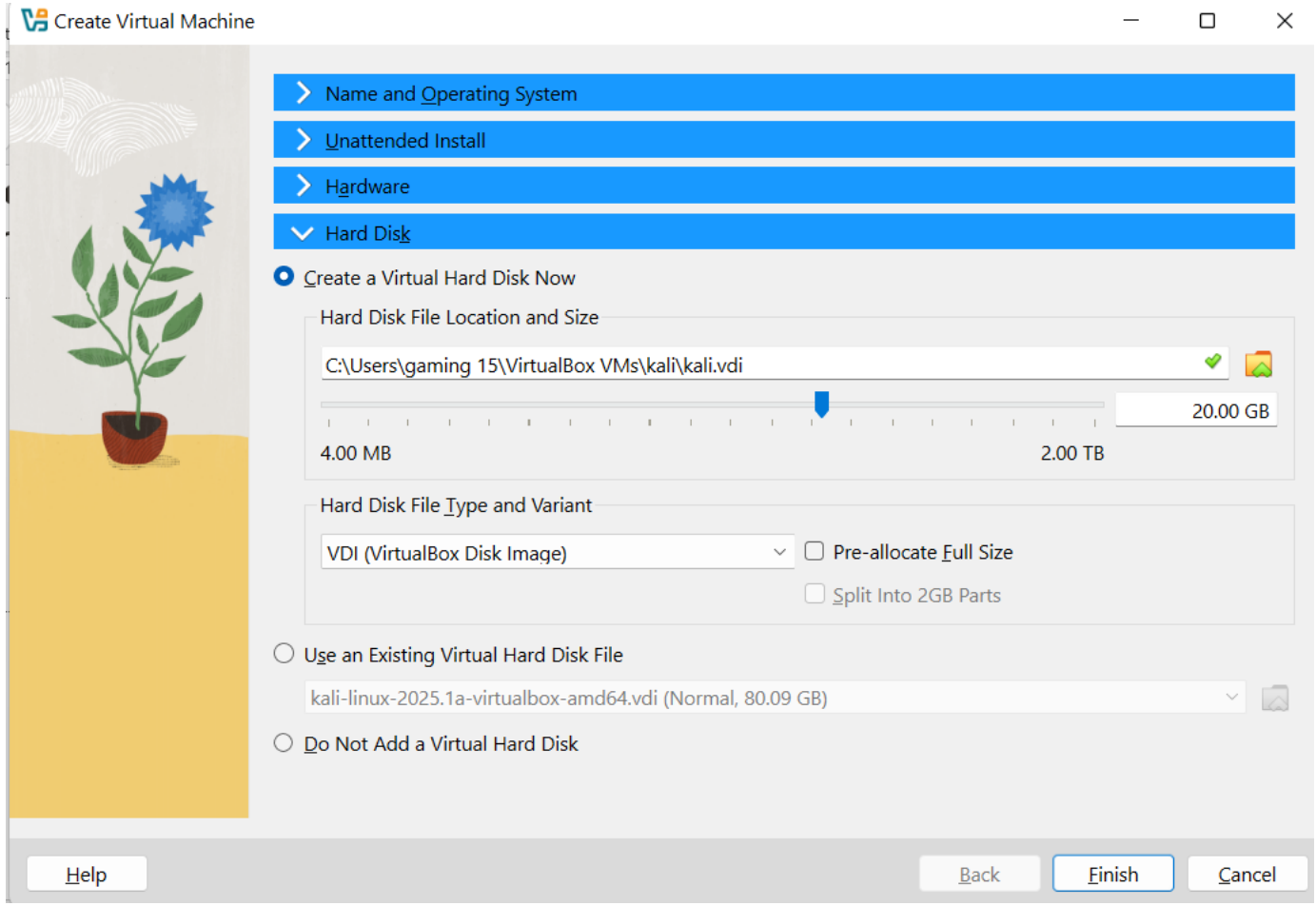
- Base Memory Size: Up to red (end of green level) ~ 3G
- Processor CPU 4



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- Hard Disk File Type: VDI (Virtual Disk Image)
- Create
- Hard Disk File Type: VDI (Virtual Disk Image)
- Finish



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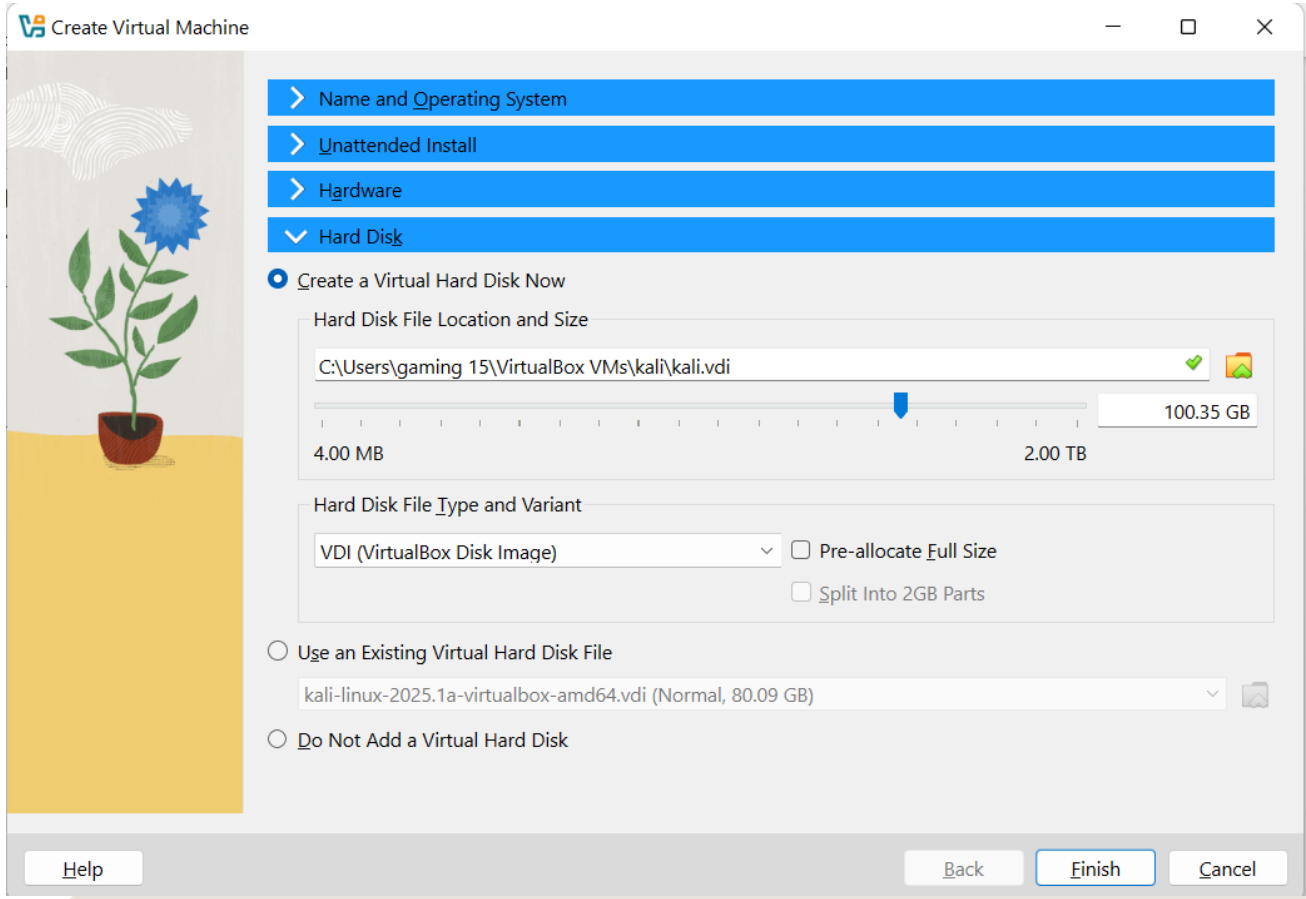
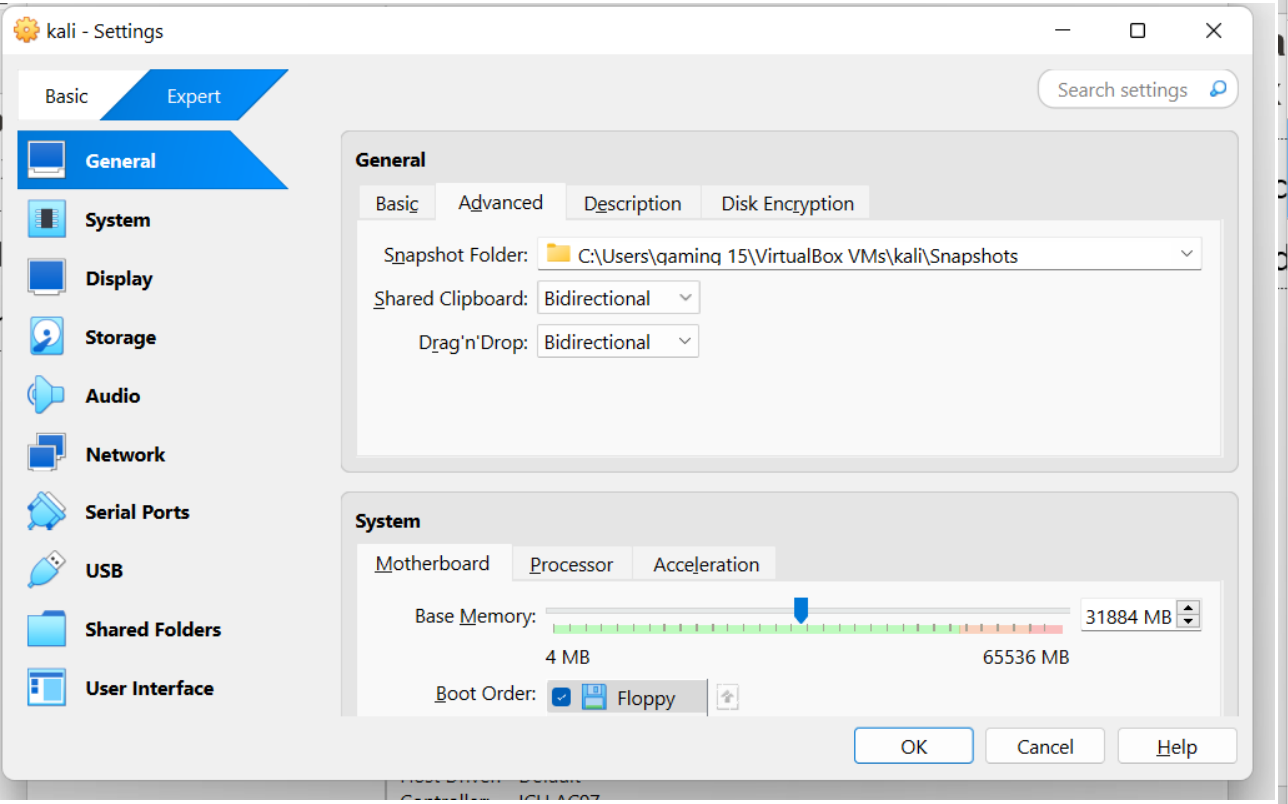
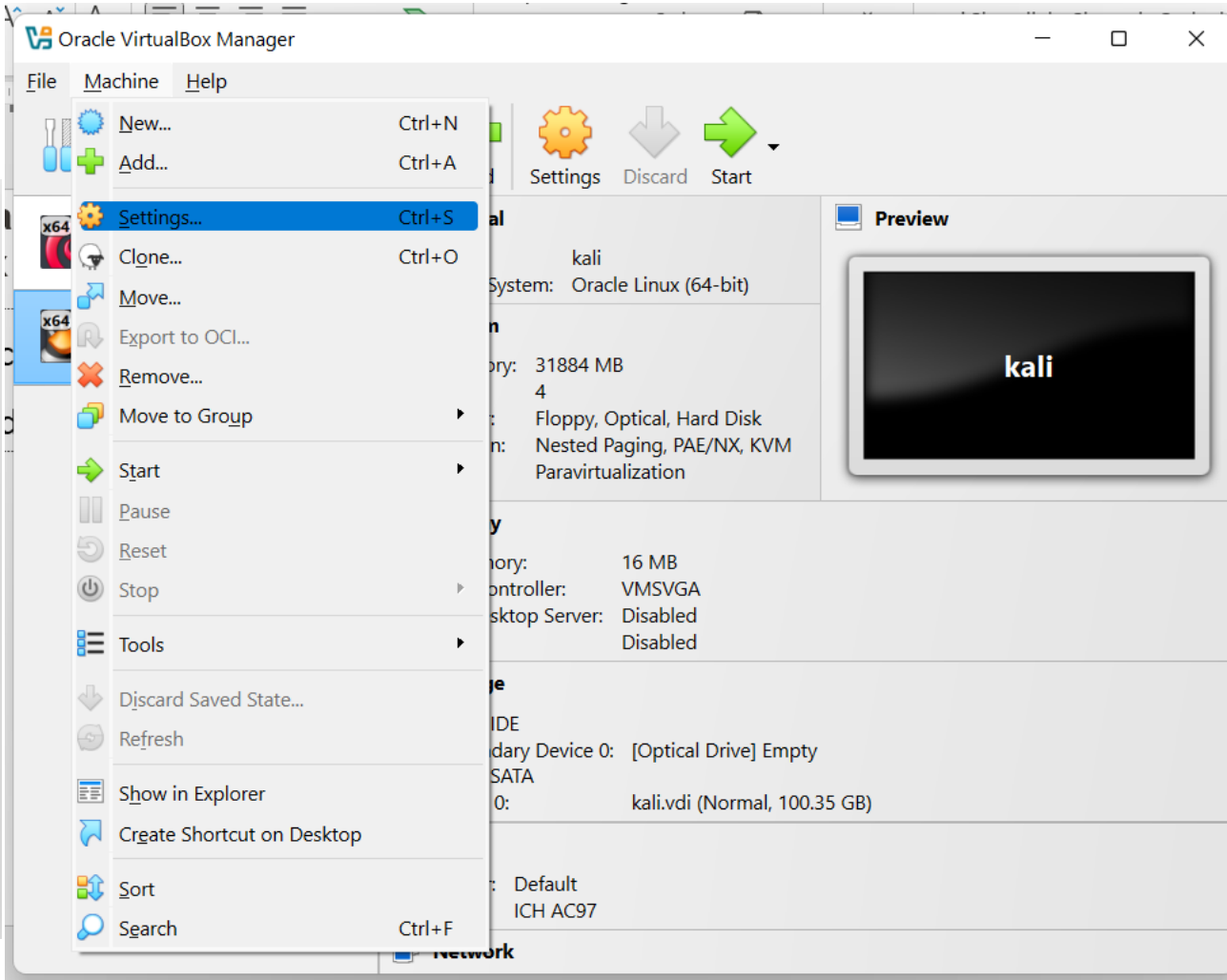
- File Location and Size: Move Size to around 100 GB
- Finish → It will create a virtual machine on Virtual Box Manager



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- Click on Settings >> General >> Advanced >> Shared Clipboard (Bidirectional) and Drag & Drop (Bidirectional)

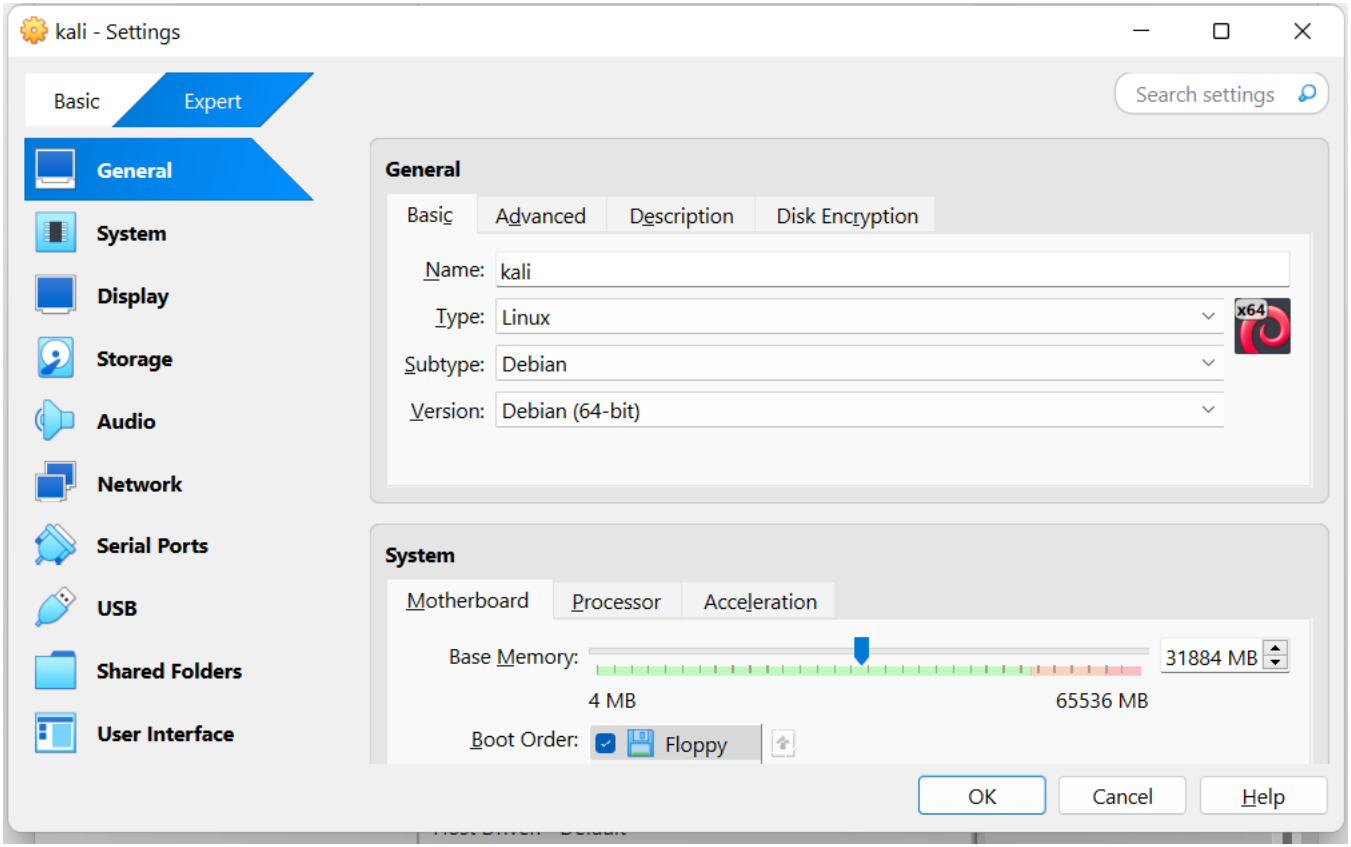




Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

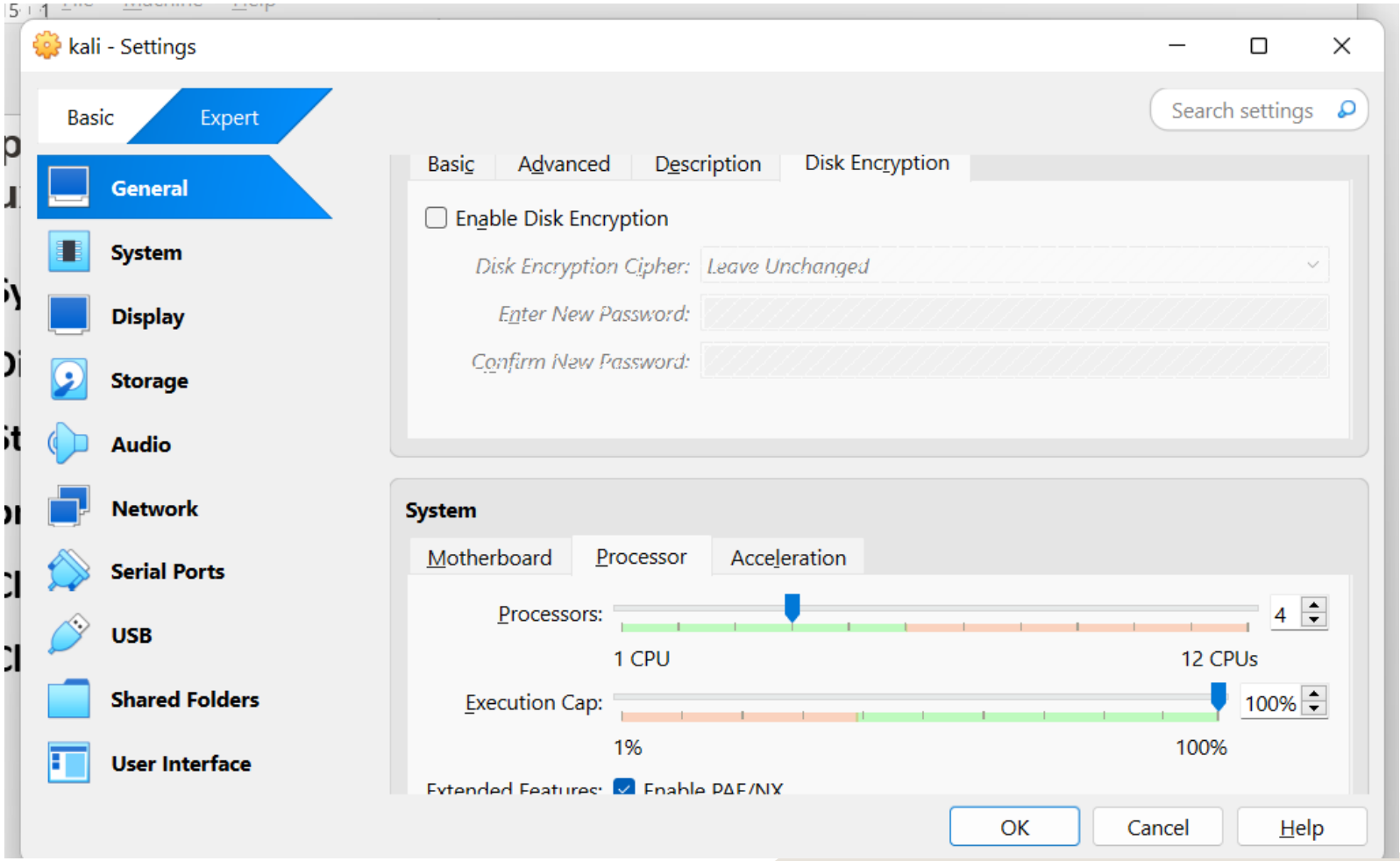
- **Kali General Settings: Type = Linux, Subtype = Debian**

Since **Kali Linux** is based on **Debian**, using Debian (64-bit) ensures proper compatibility with the virtual machine settings.



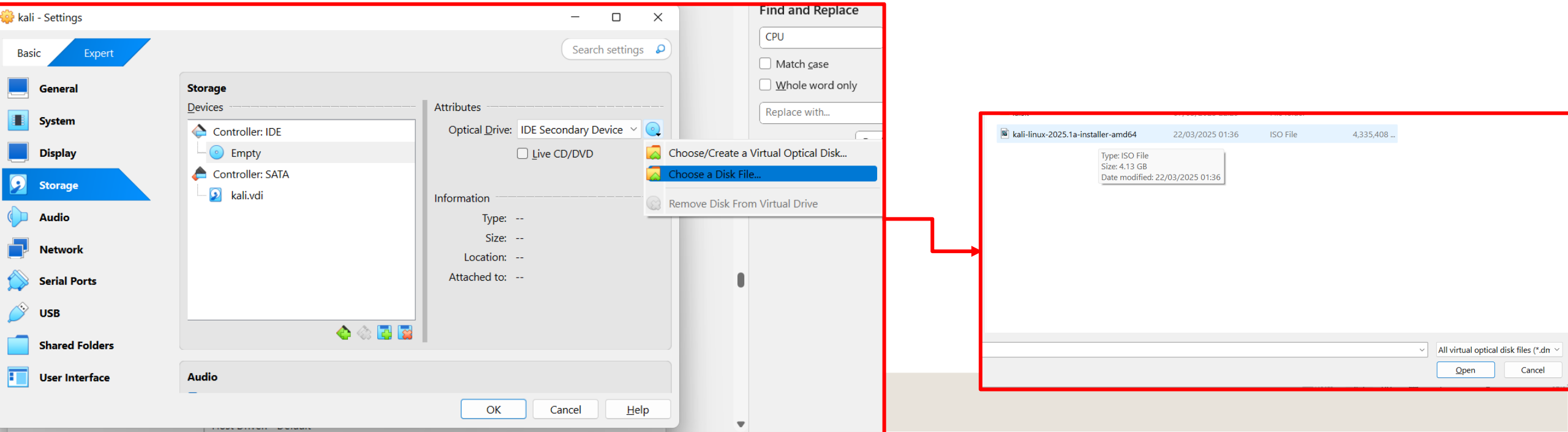
Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- **System → Processor → Assign 4 CPU to Virtual Machine**



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- **Display → Default**
- **Storage → Controller – IDE → Empty → Optical Drive → Choose a Disk file → browse to the path you downloaded iso file (open)**
- **Click Start**



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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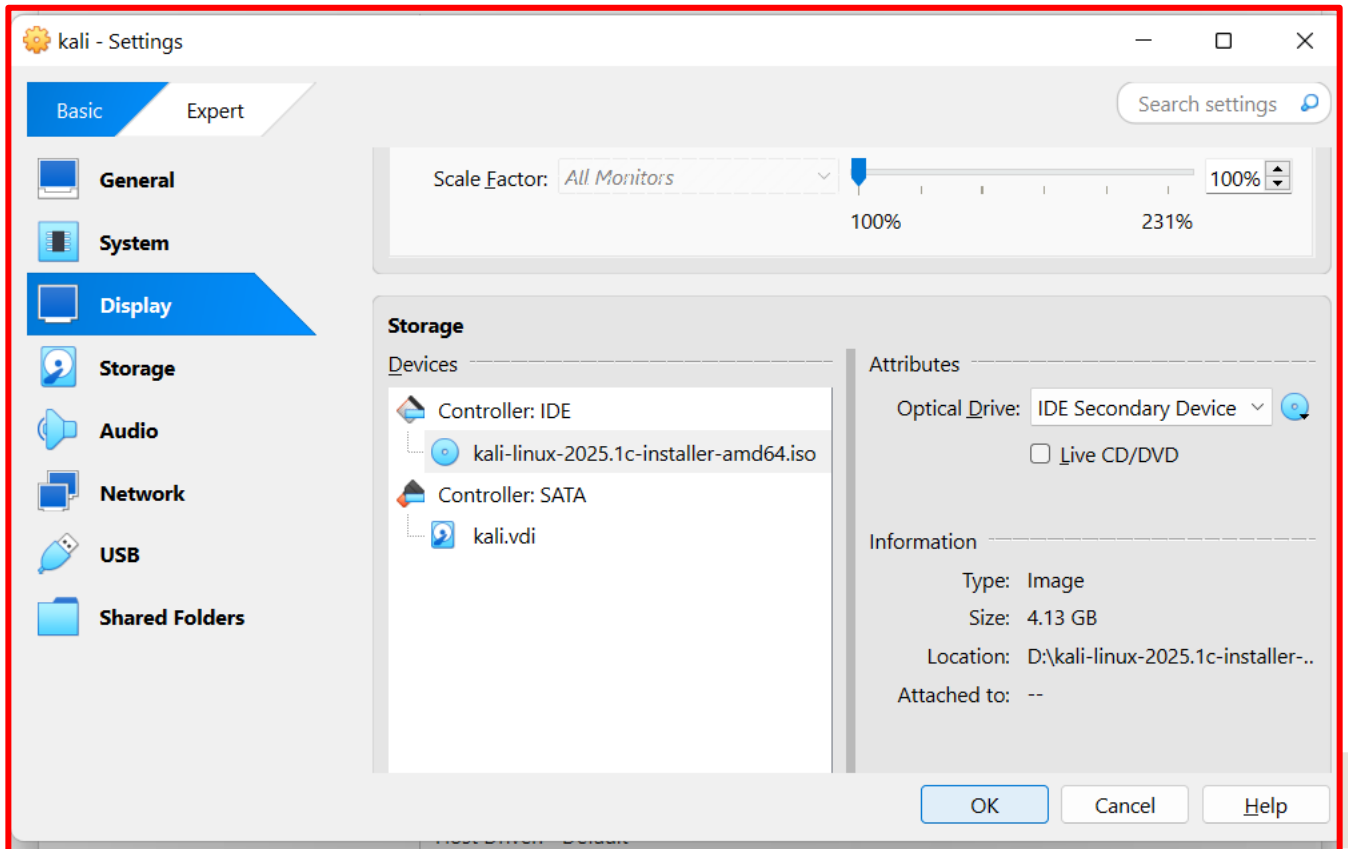

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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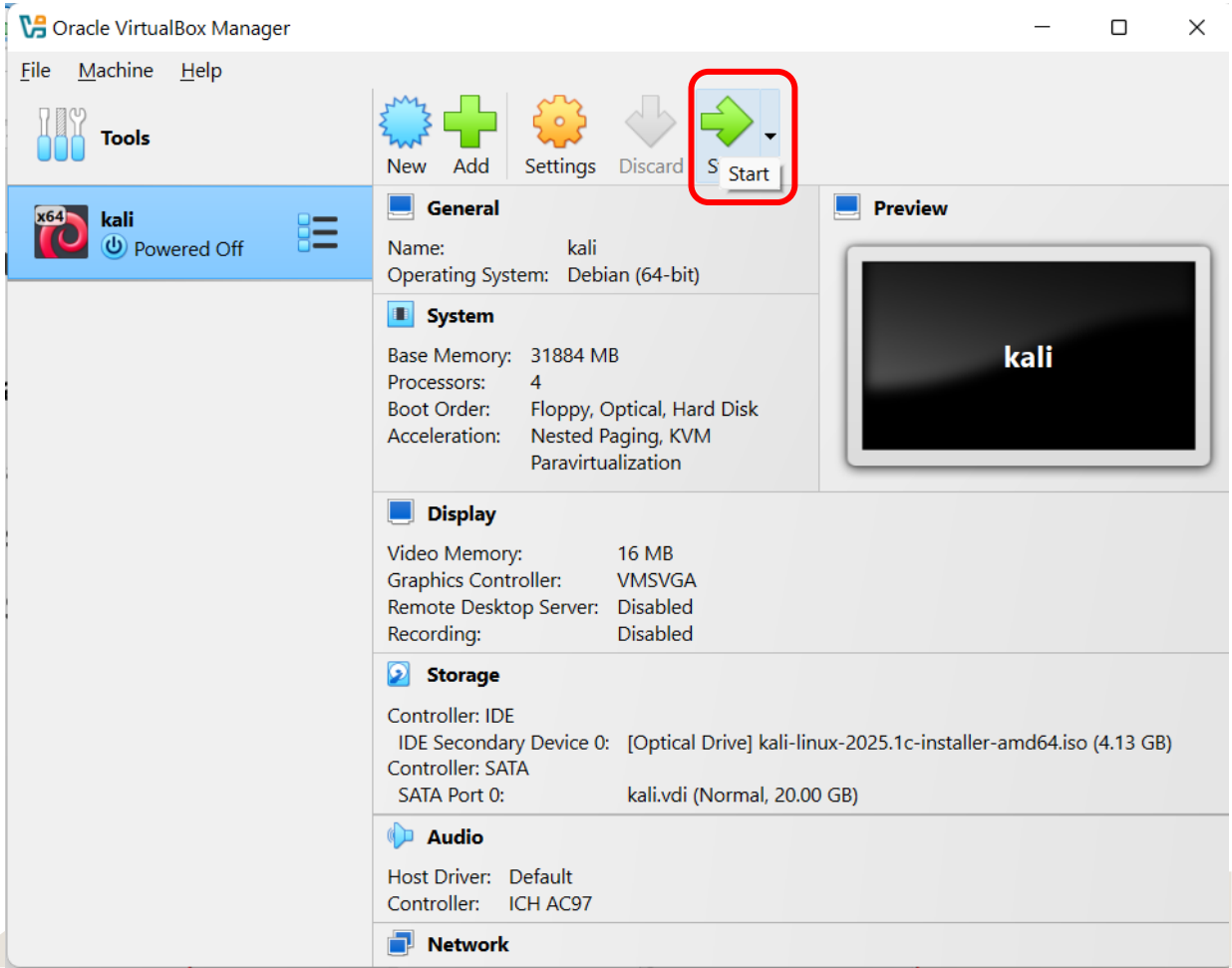


Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- Select Language (English)
- Select Location
- Configure Keyboard Layout
- If it asks for host name by default is it kali
- Domain name → leave it blank
- Full name of new user → e.g., kali or codebind

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- Set a Password when you login to Kali Linus (remember when you log in)
- Choose a clock → Central region
- Partition Disks → Guided use entire disk
- Continue
- Partition Disks → All files in one partition
- Finish Partitioning and write changes to disk
- Write the changes to disk? Yes

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- Configure the Package Manager → Blank & Continue
- Software Selection → Be default & Continue
- Installation step failed (Click on Continue)
- Install the GRUB boot loader on a hard disk? Yes
- Enter device manually → /dev/sda ..
- Wait for Kali Linus to restart

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Login Window (e.g., codebind username):

Login Credentials for Kali Linux:

- **Kali Linux 2019:**
  - **Username:** root
  - **Password:** toor
- **Kali Linux 2020 and later:**
  - **Username:** kali
  - **Password:** kali

- **Now, Kali Linux is installed and ready to use!**

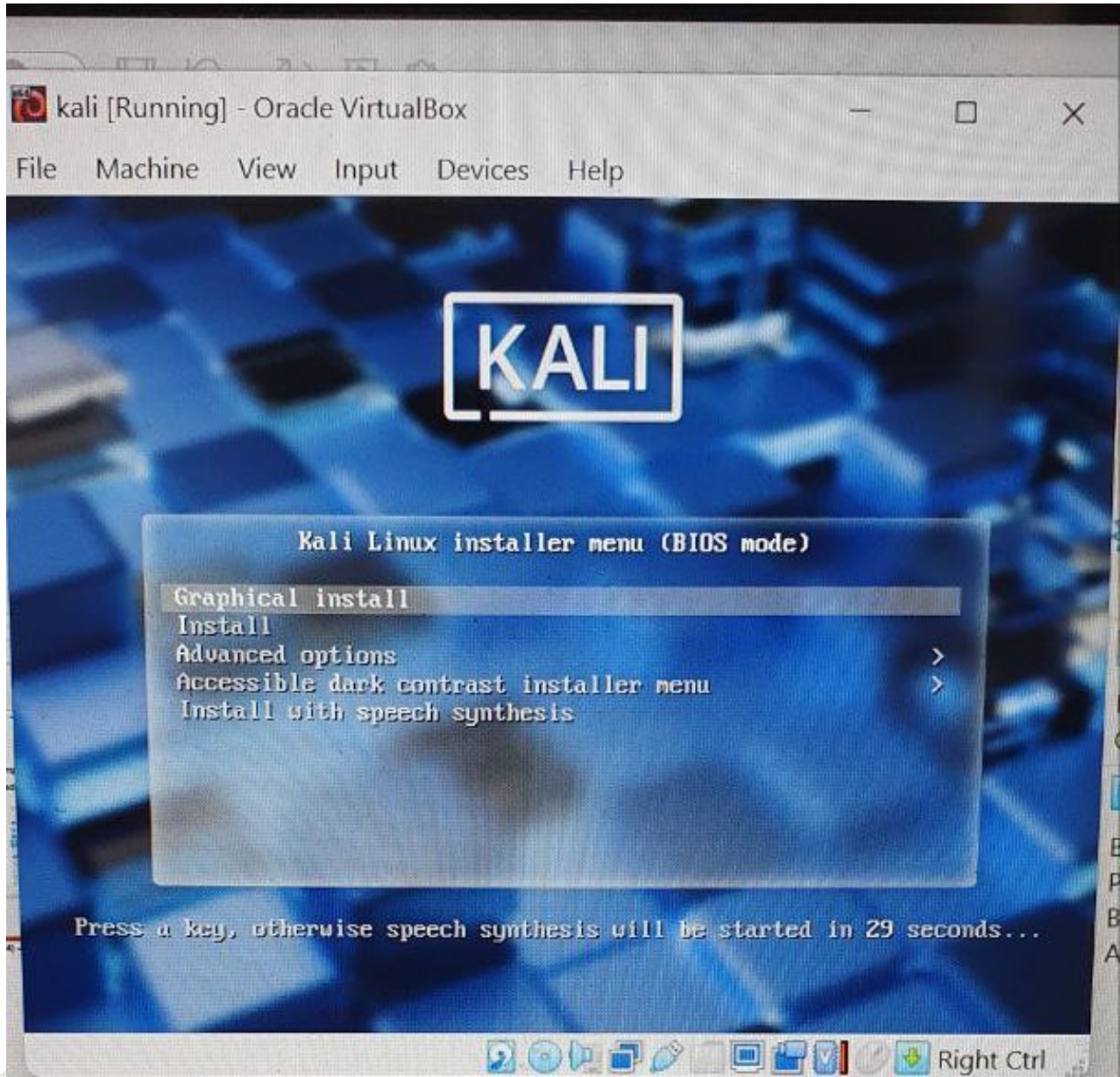
Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- Start **Kali Linux VM** and log in with:
  - **Username:** kali
  - **Password:** kali

  - **VirtualBox >>** Click **New**
  - Set the name as **Kali Linux**
  - Select **Type: Linux** and **Version: Debian (64-bit)**
  - Allocate at least **2GB RAM** (recommended: 4GB or more)
  - Create a **virtual hard disk** (20GB minimum)

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

- **Proceed the steps, as explain or shown in the following**



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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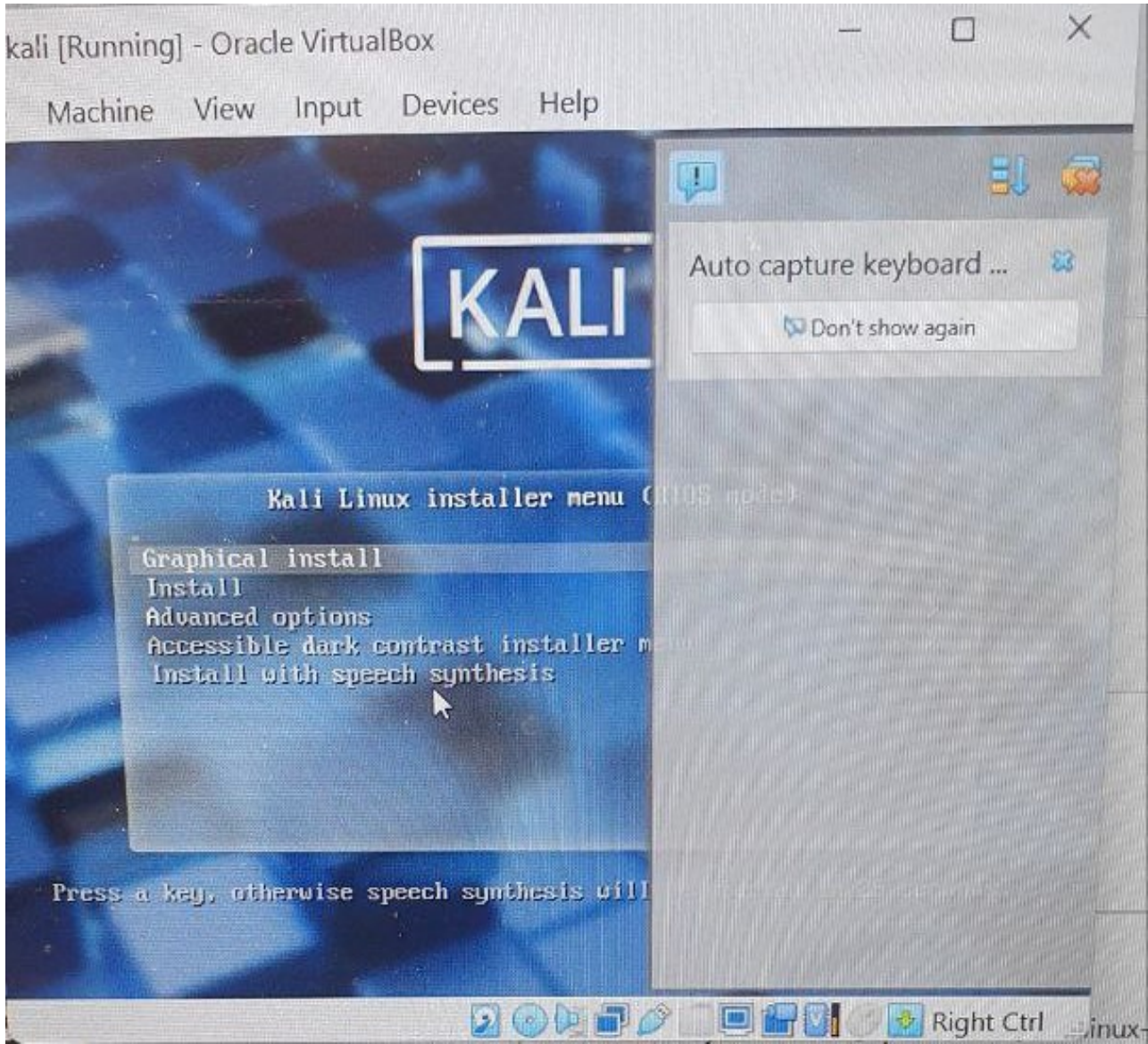

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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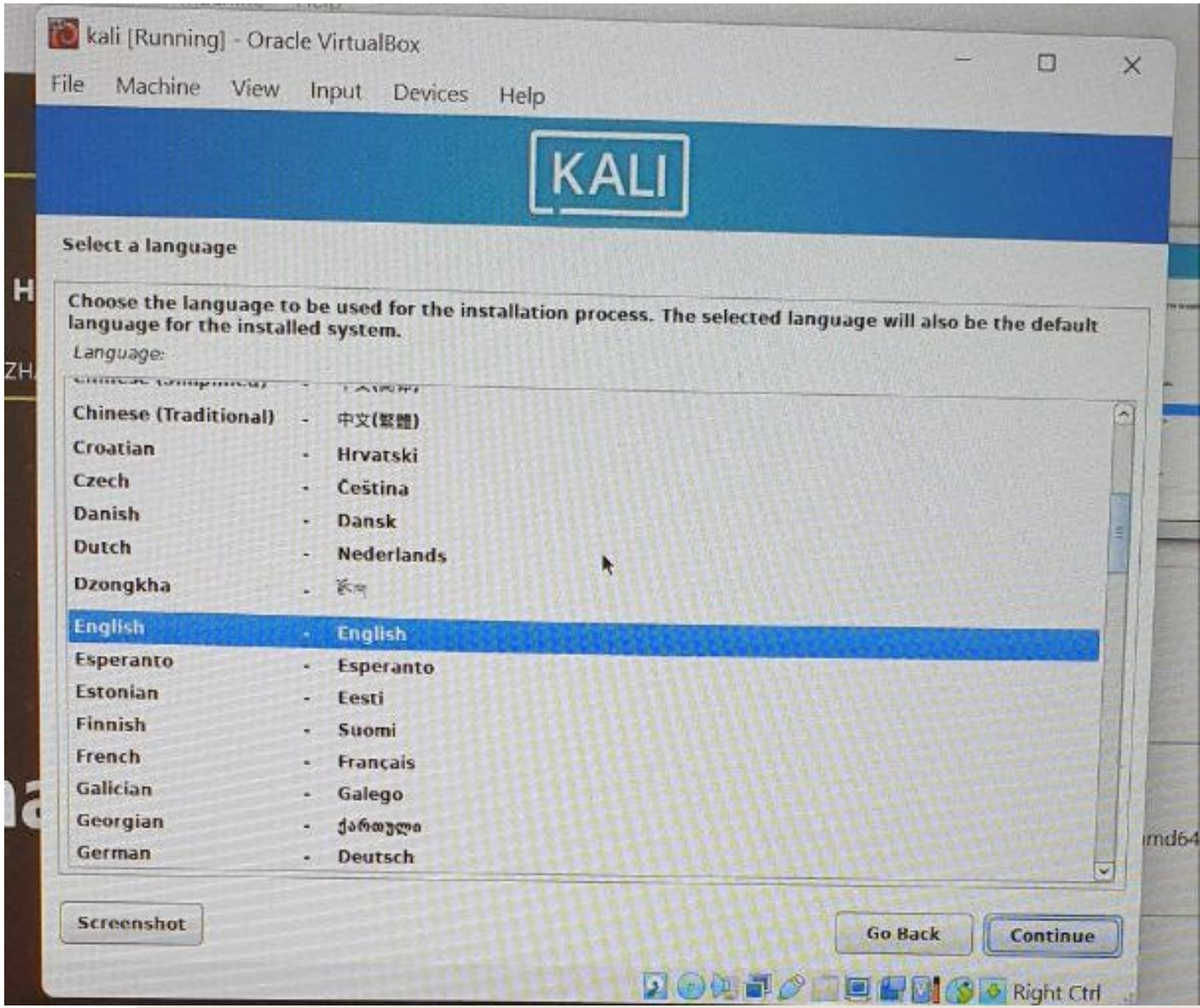

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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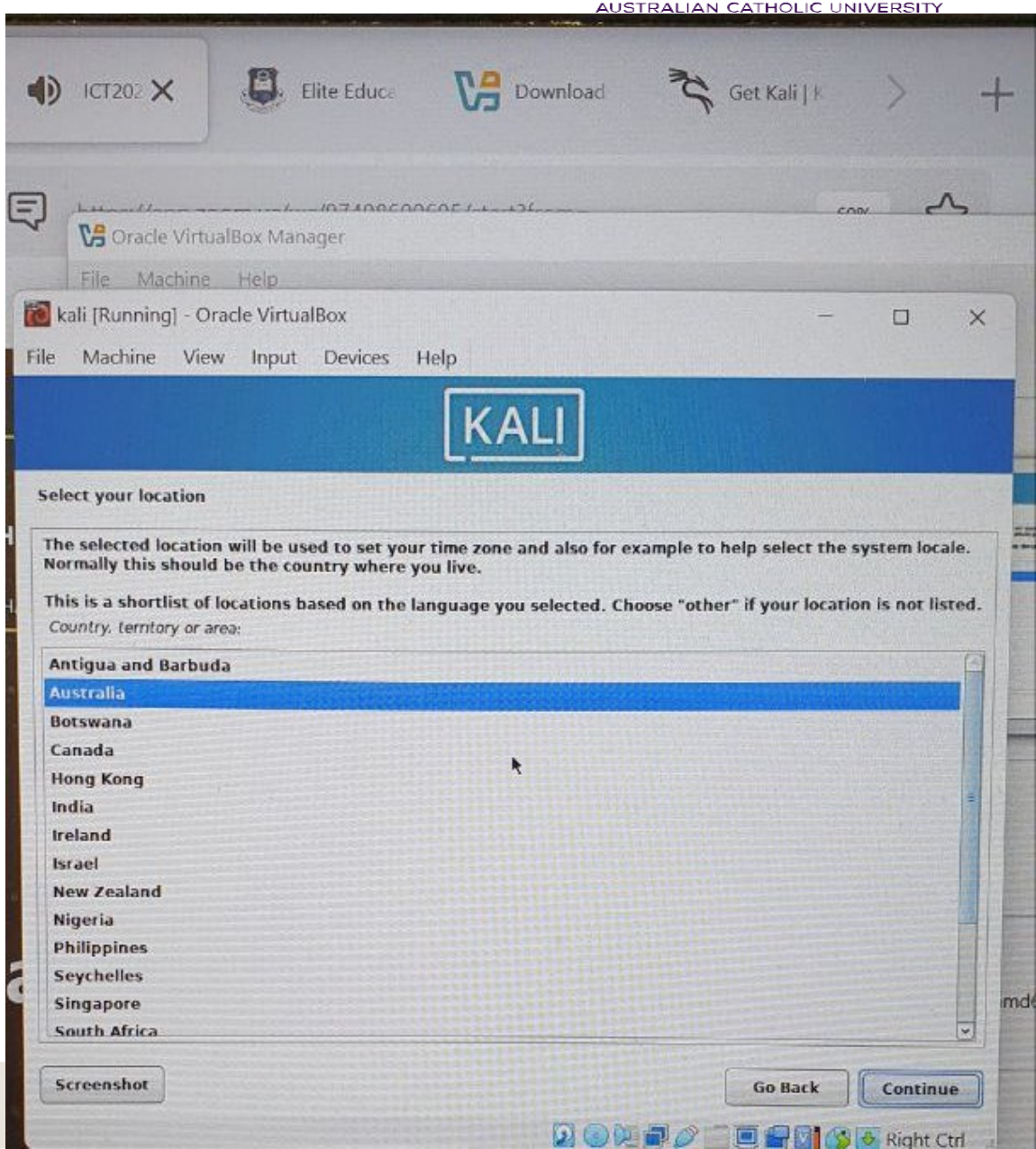

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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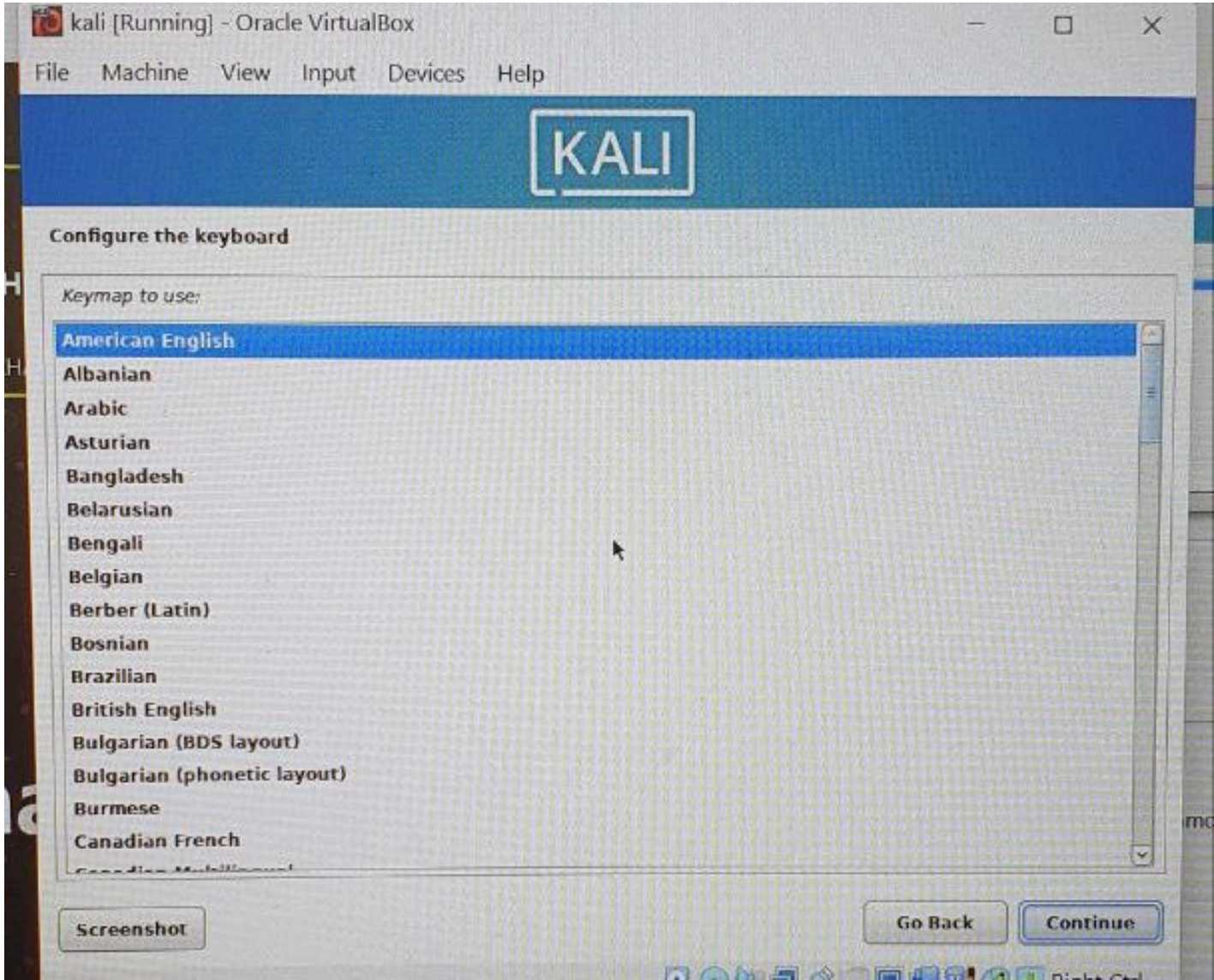

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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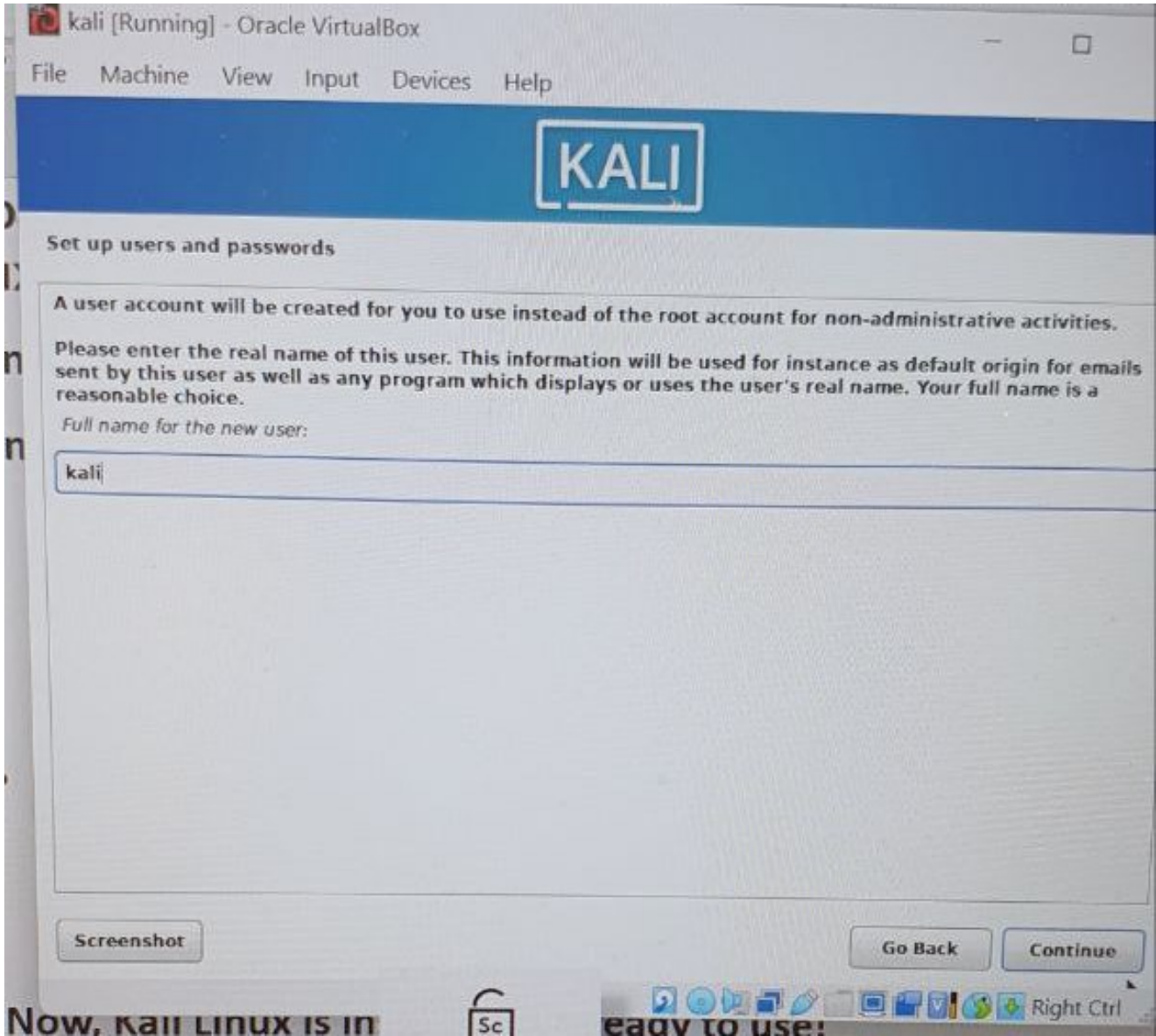

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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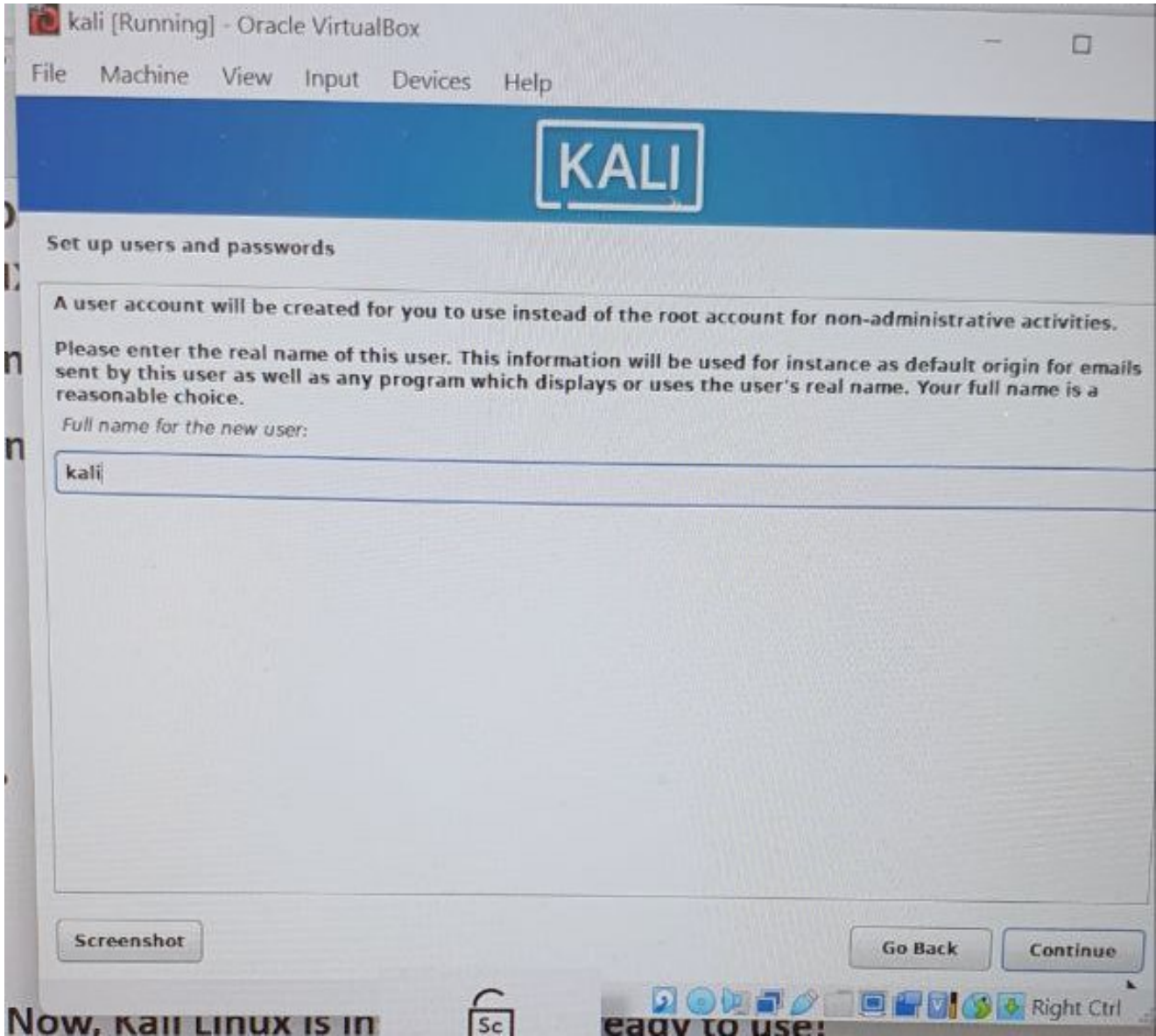

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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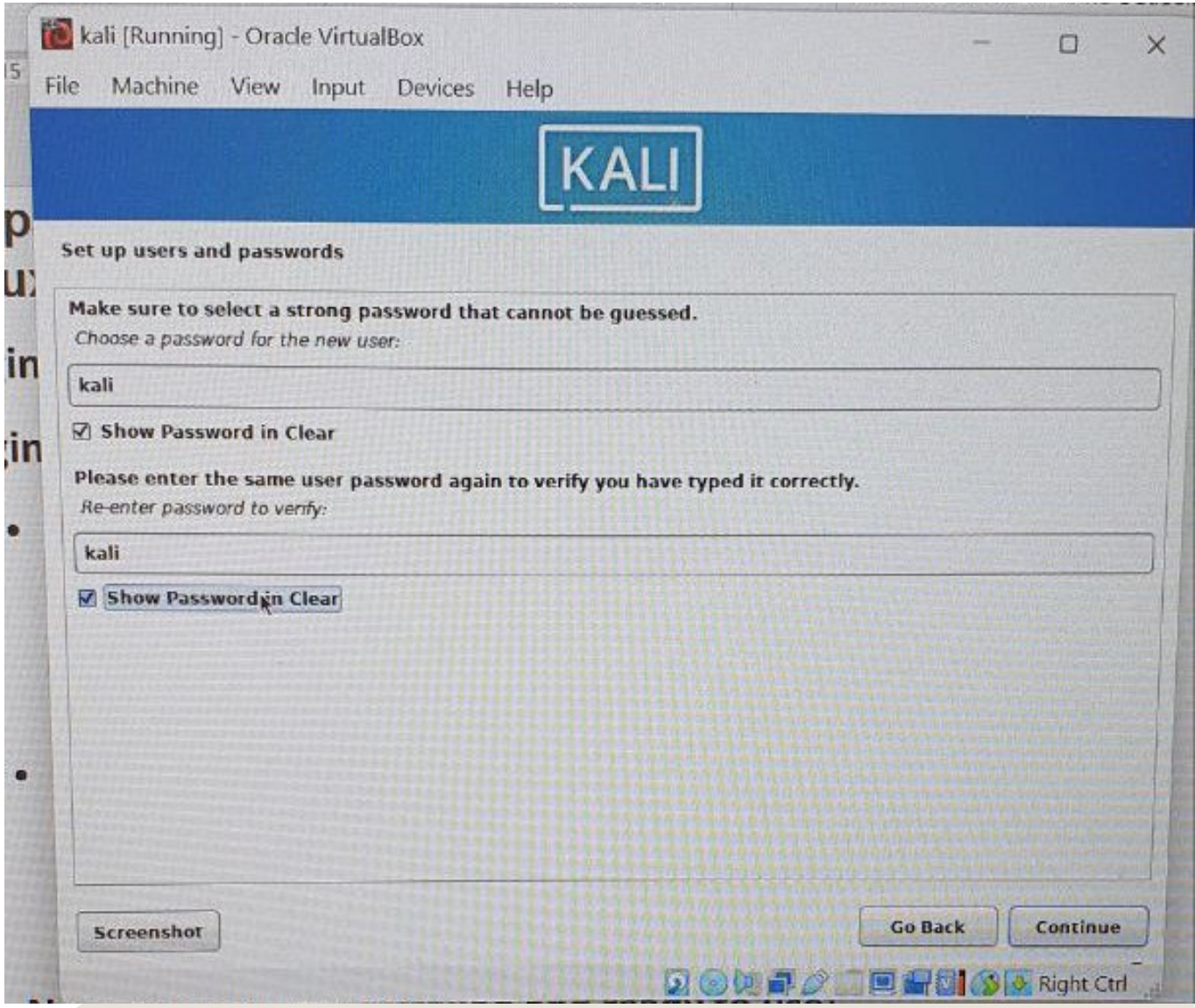

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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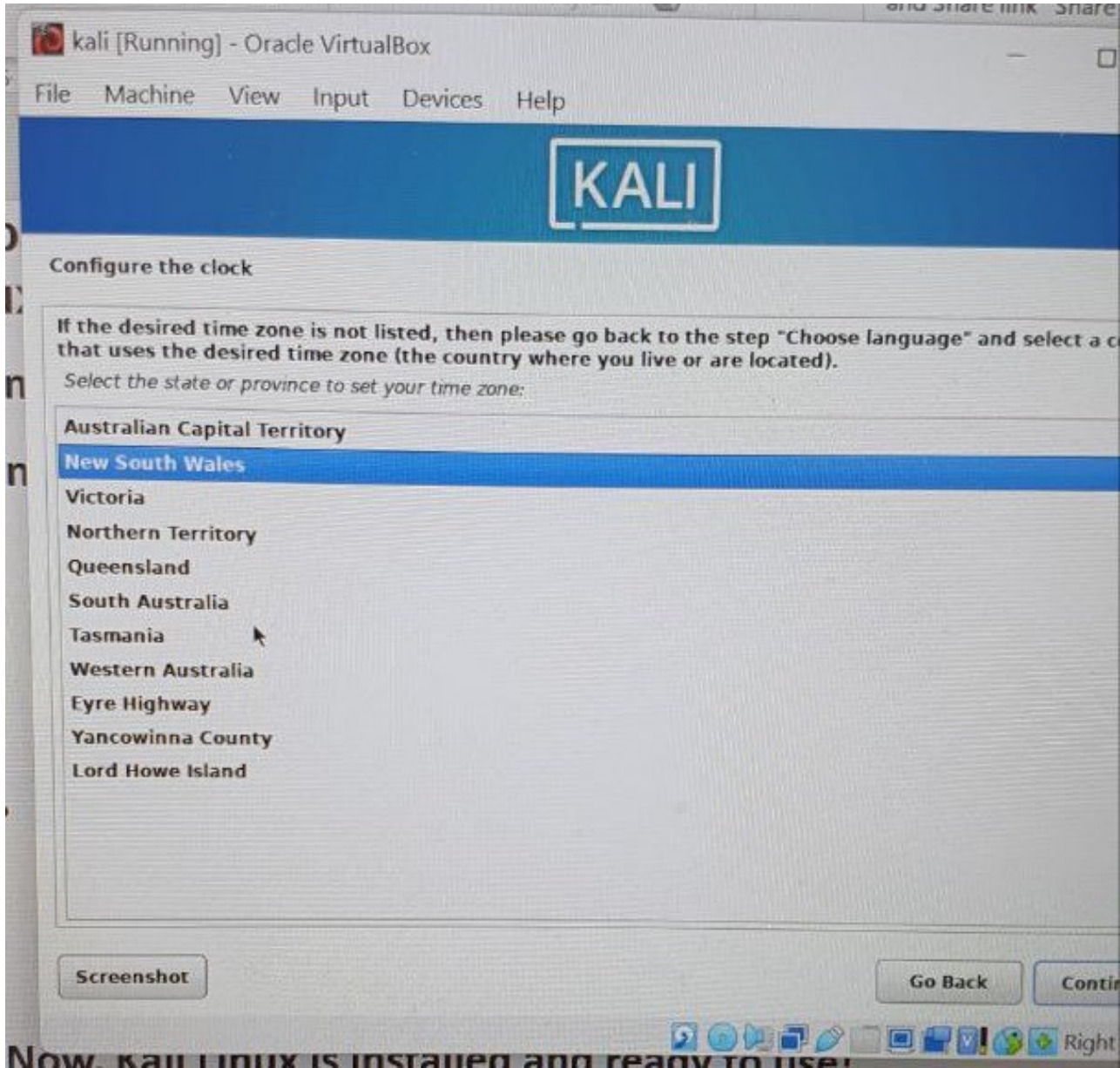

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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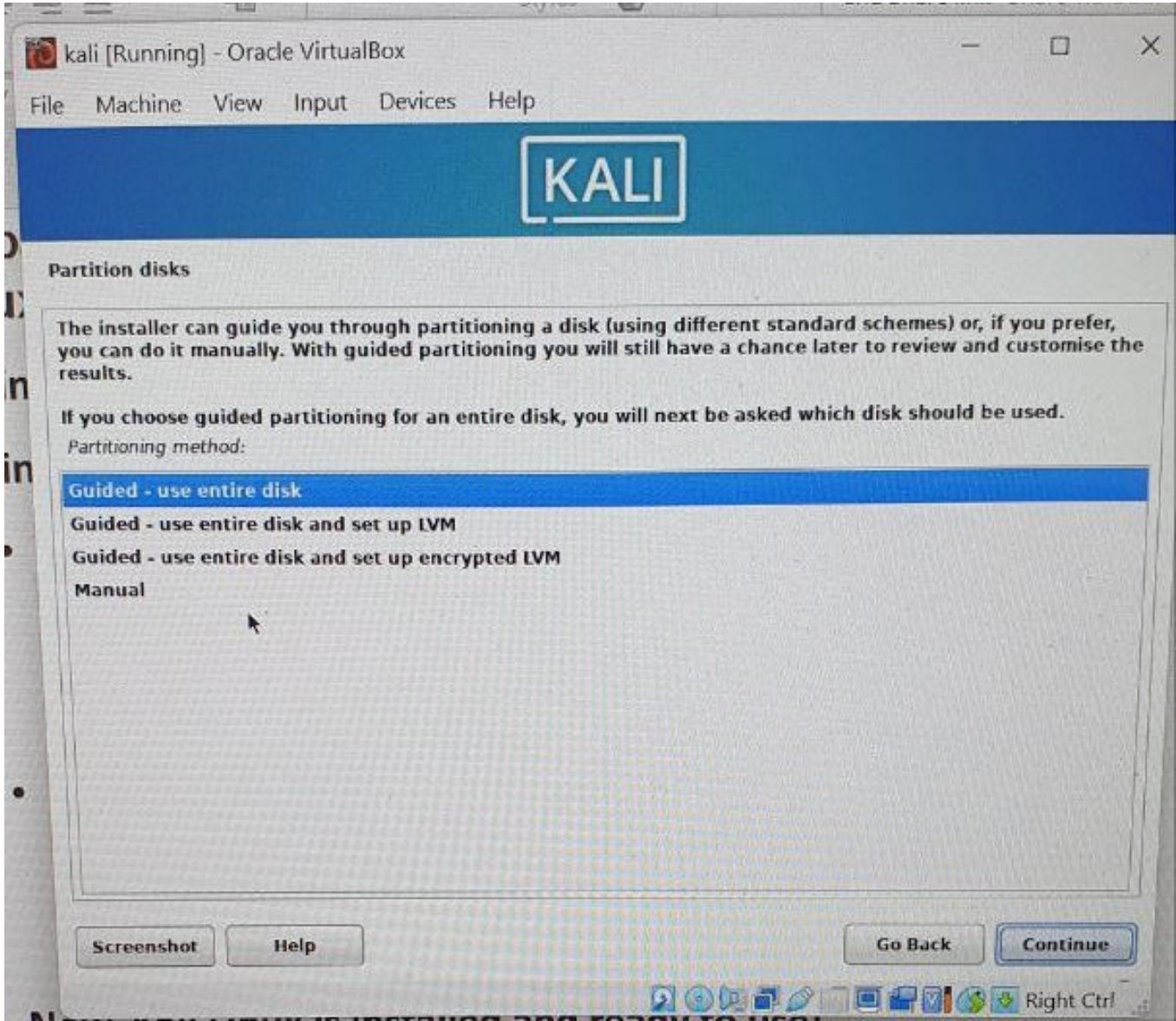

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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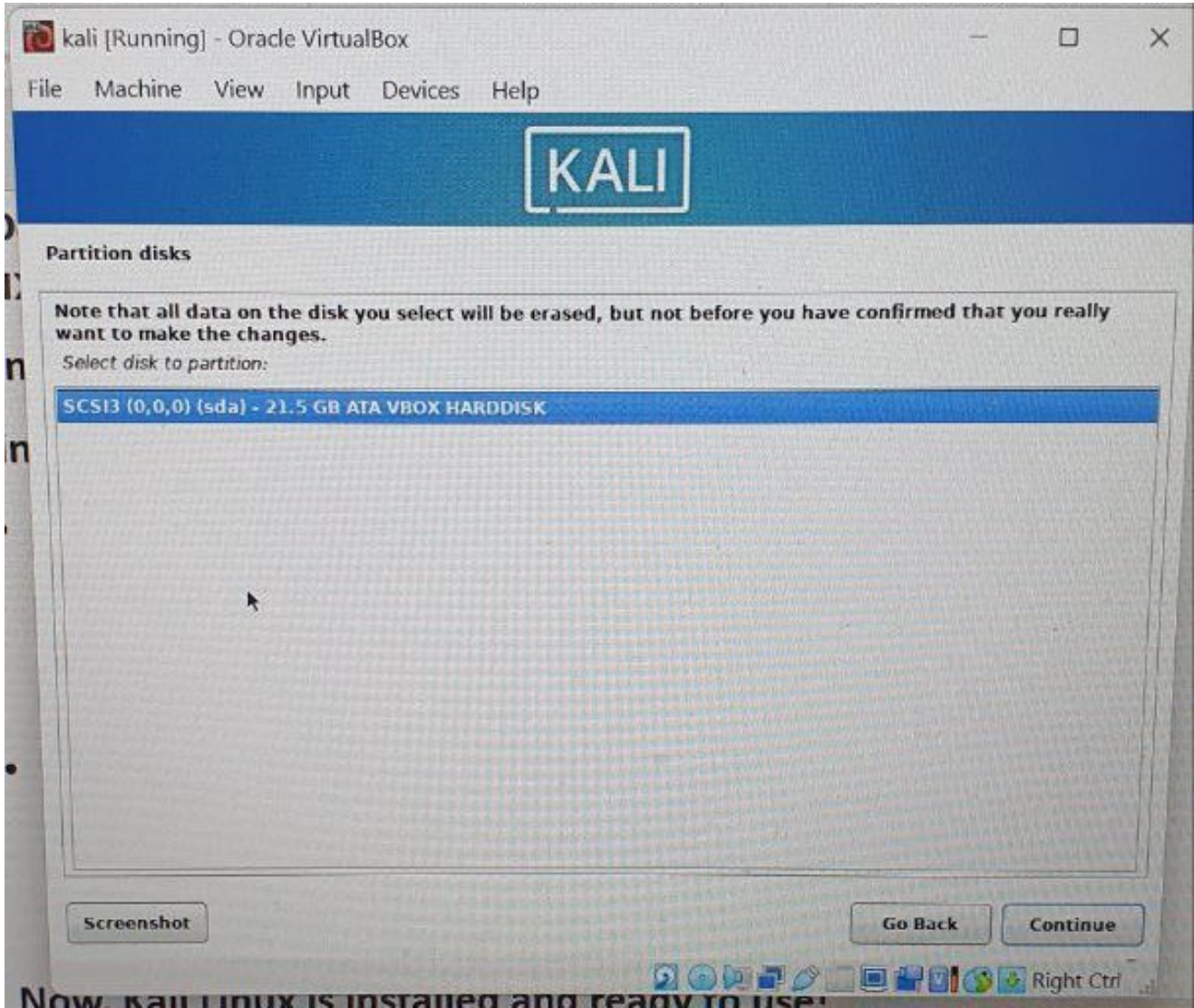

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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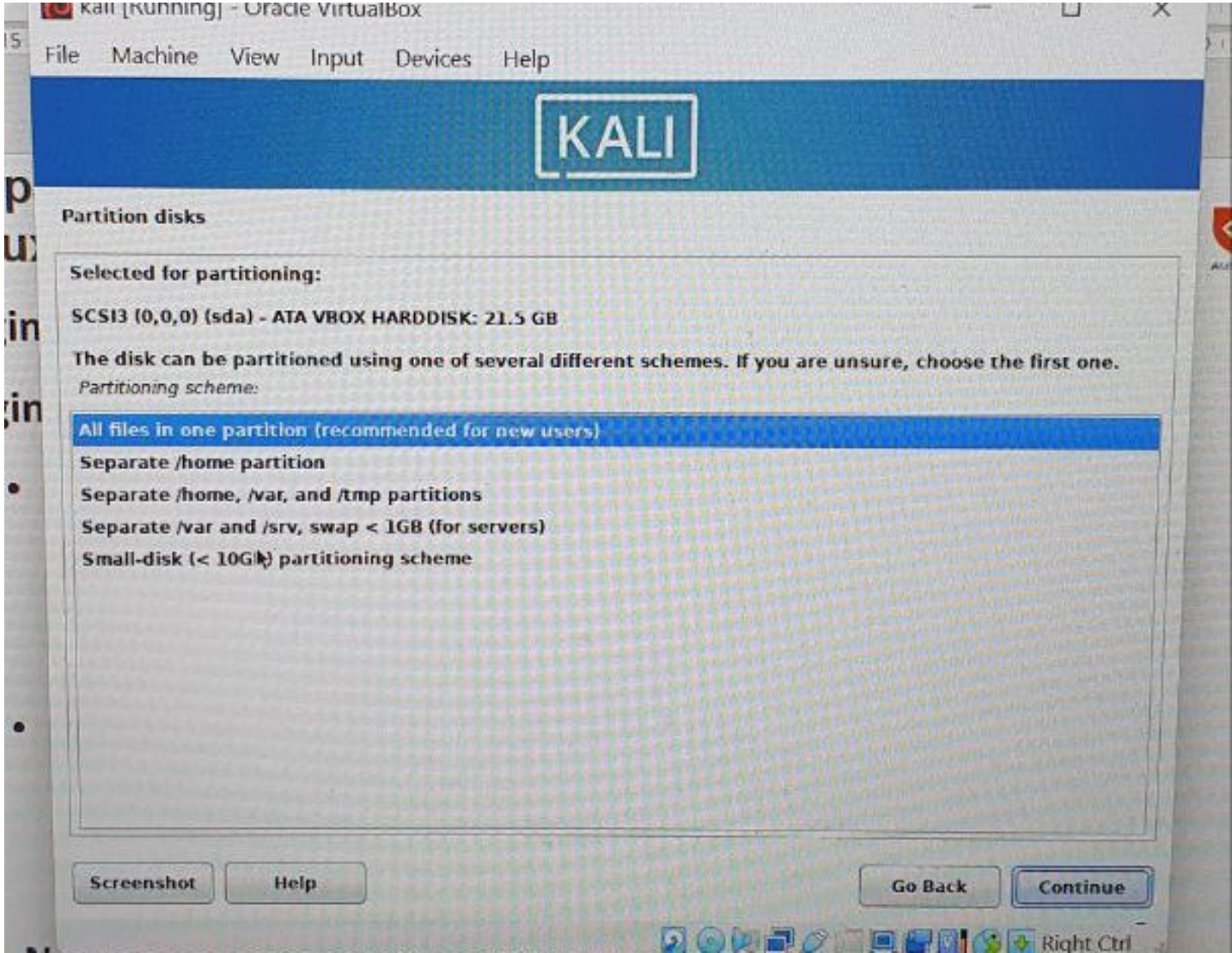

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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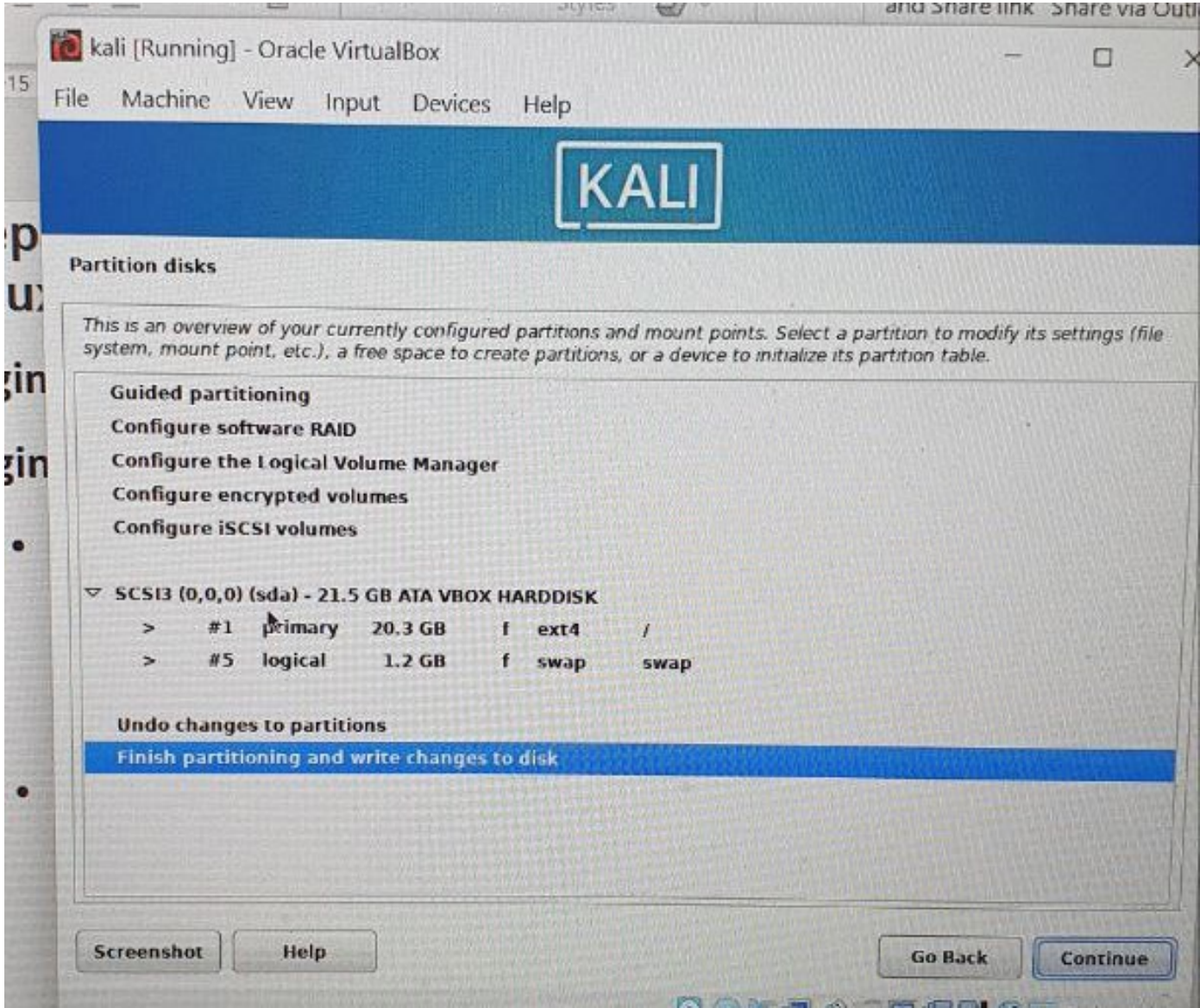

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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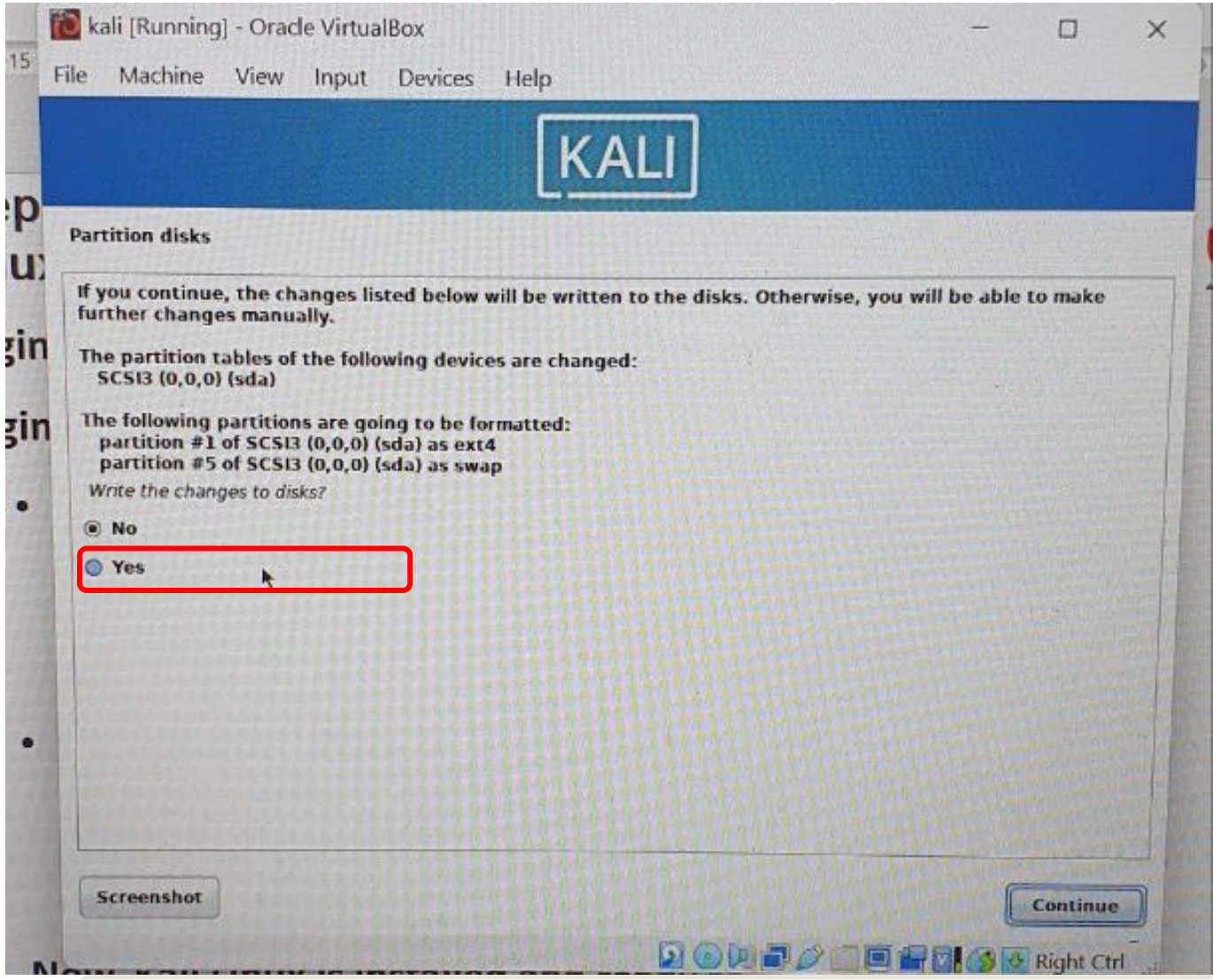

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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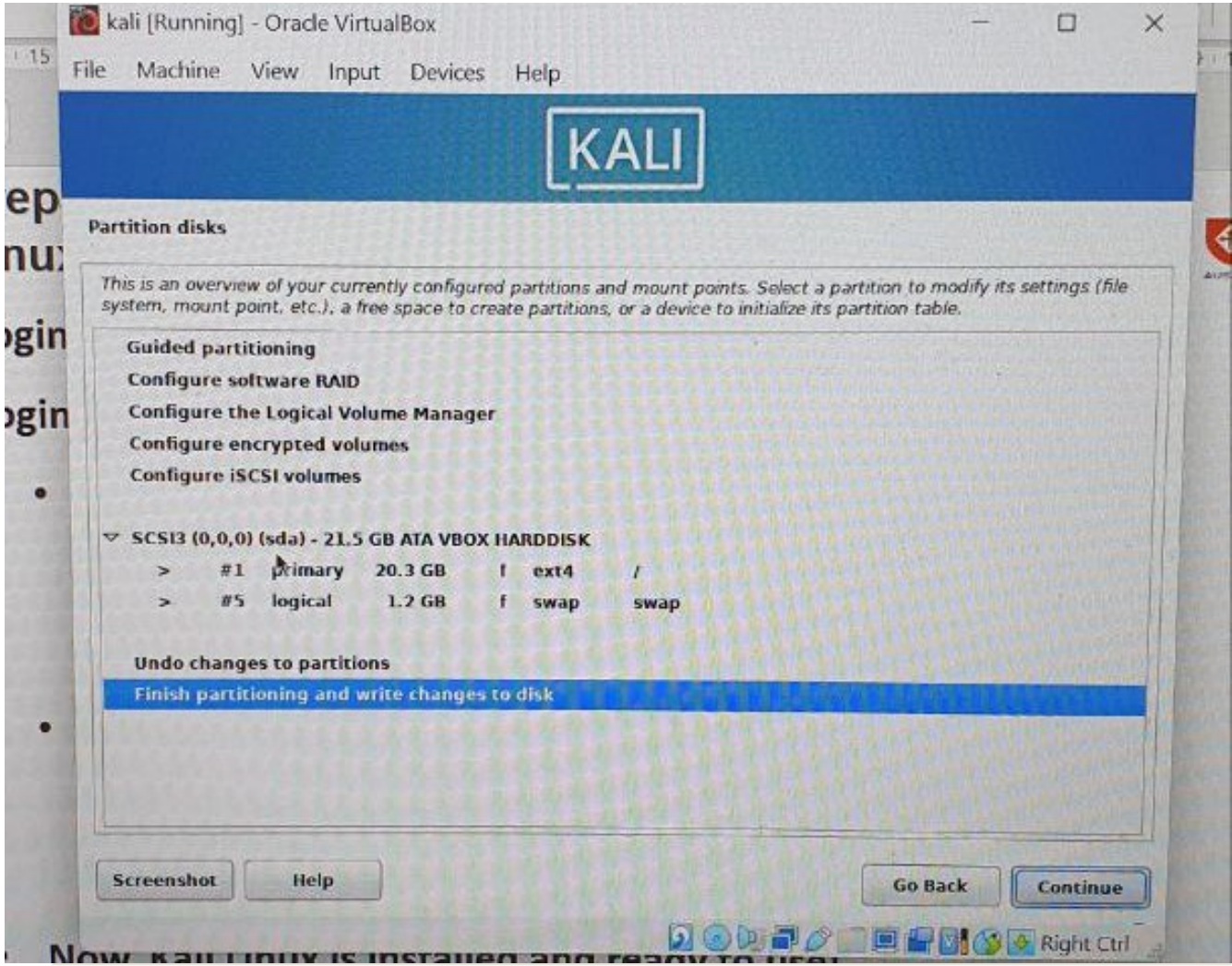

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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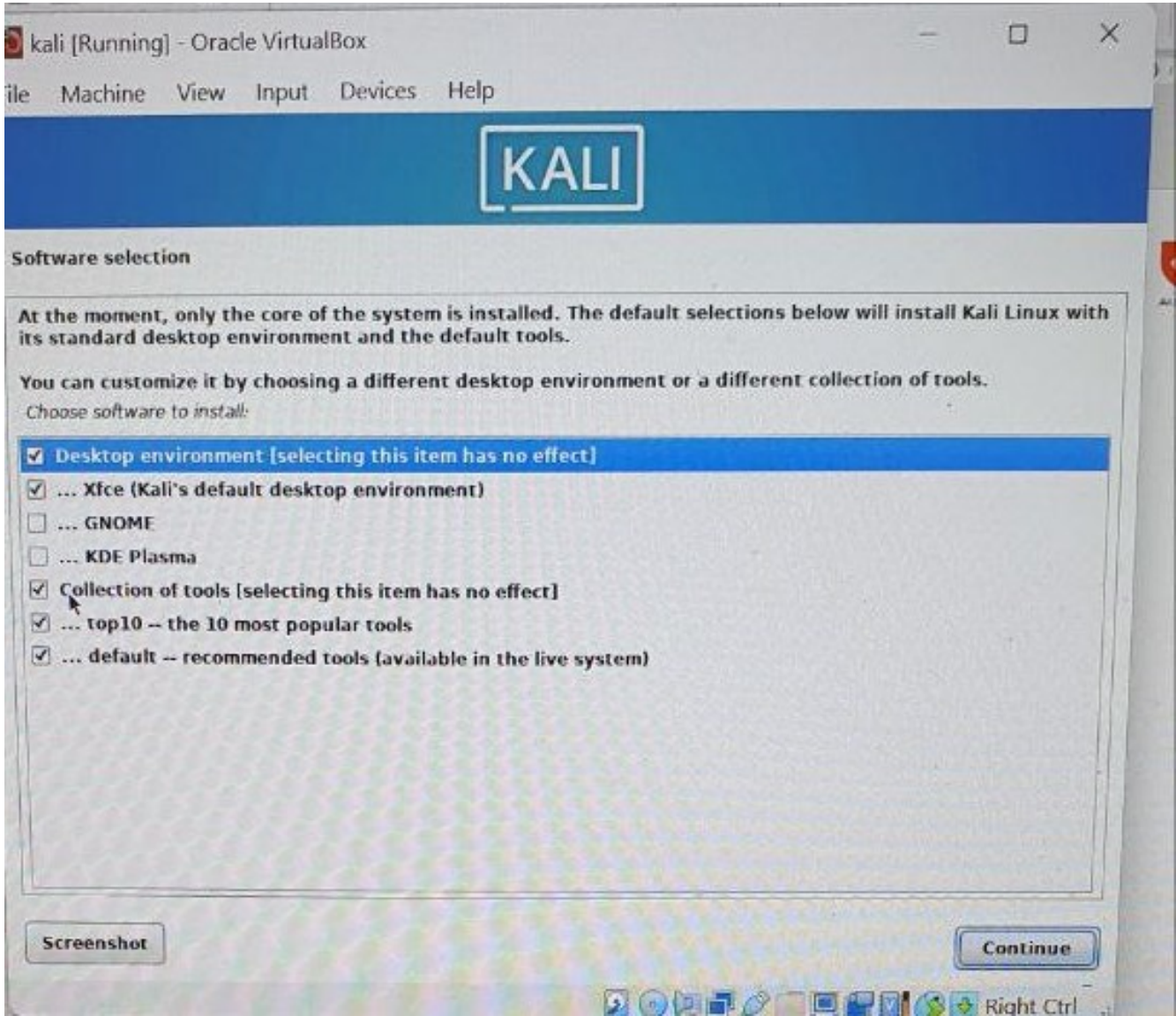


Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Complete Lab Tasks

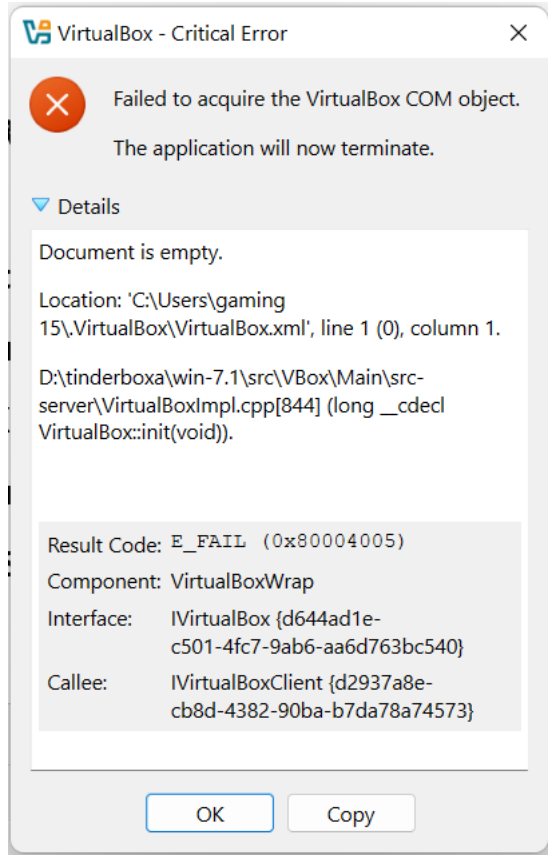
1. **Take a screenshot** of your Kali Linux desktop after a successful installation.
2. **List all problems** you encountered during this lab and provide **recommendations** to fix them.

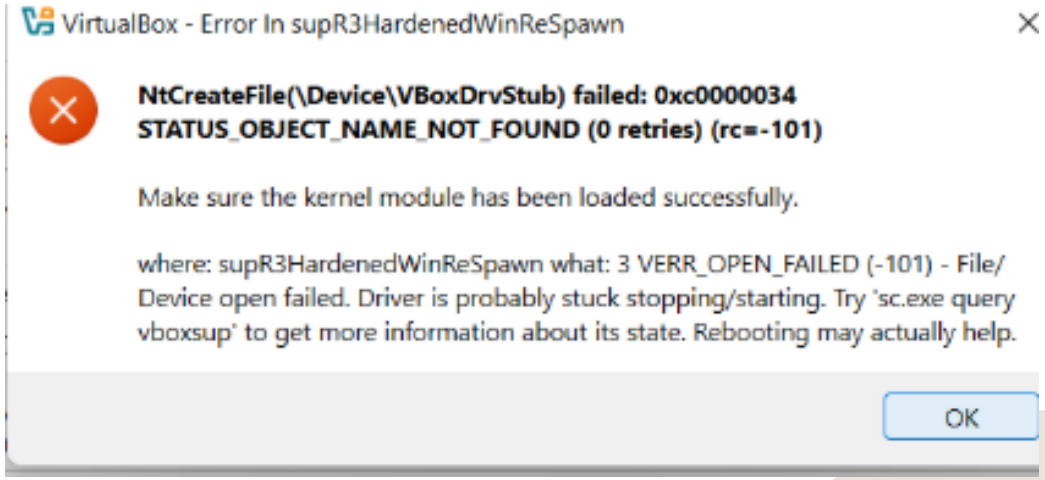
Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

In case, if you saw an error like these:

Solution 1: Restart Your Computer

- **First, restart your computer** and try starting Kali Linux again.
- If the issue continues, move to **Solution 2**.

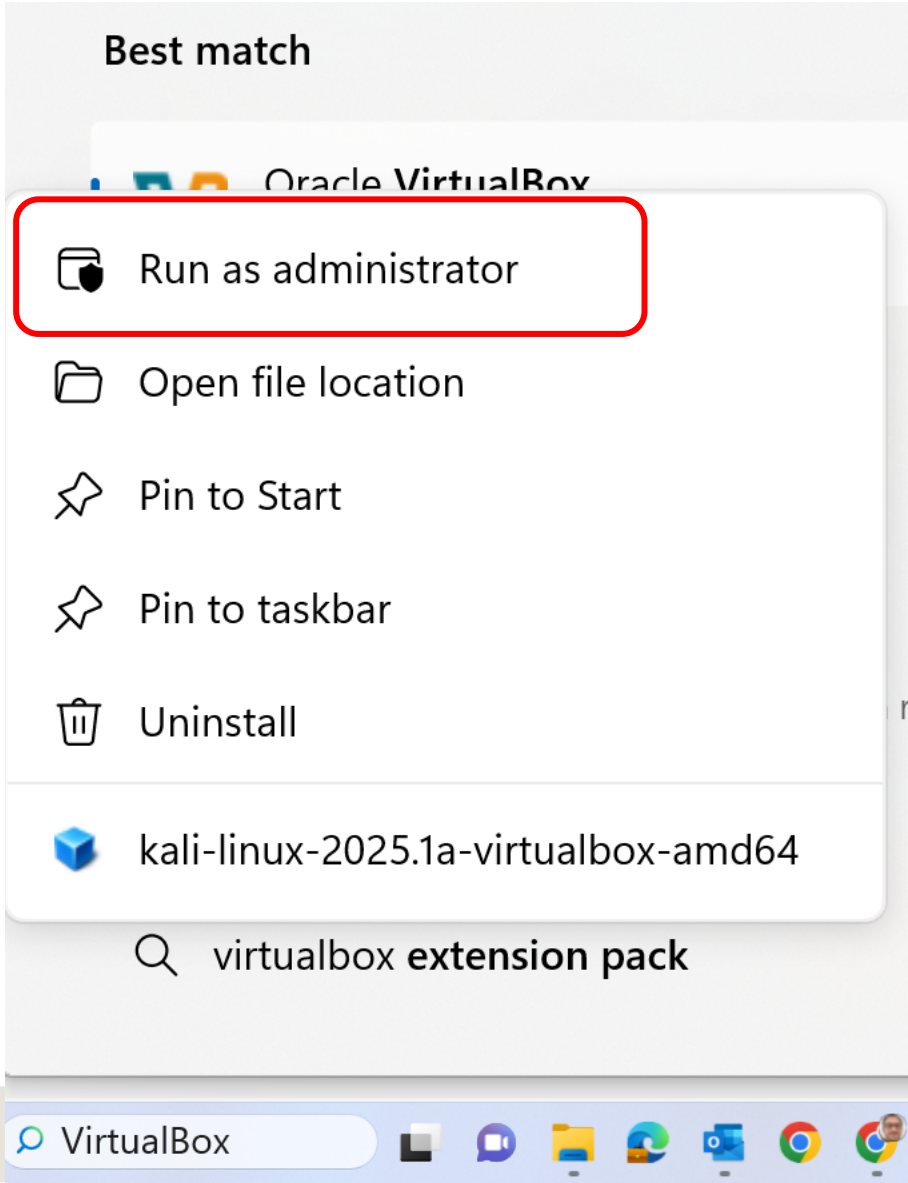




Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Solution 2: Run VirtualBox as Administrator

1. **Close VirtualBox completely.**
2. **Right-click on the VirtualBox icon** and select **"Run as administrator"**.
3. Try **starting Kali Linux** again.



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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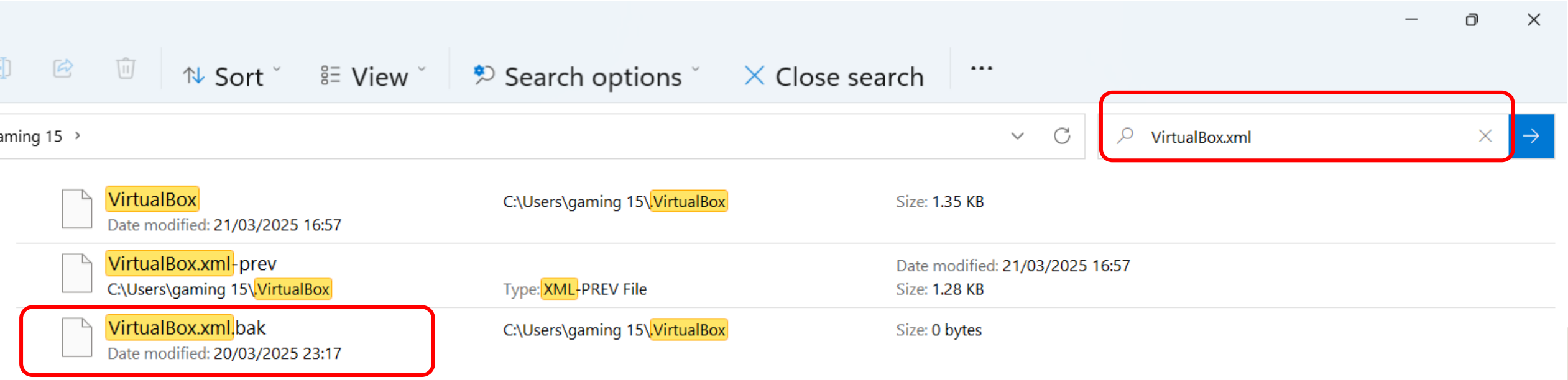
Solution 3: Reinstall VritualBox Drivers and VirtualBox Program

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Solution 4:

- Find the VirtualBox.xml file in your File Explorer: C:\Users\...
- If the file is empty or corrupt, rename it to VirtualBox.xml.bak.
- Restart VirtualBox to let it generate a new configuration file.



Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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✓ **Things to Remember:**

- Follow the steps carefully.
- If you face errors, double-check your settings and ensure you downloaded the correct files.
- Take notes on issues and how you fixed them – this will help in troubleshooting future problems.

- **Final Tip:** Always back up important data before making significant changes to your system!

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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Summary of Lab 2 (Week 4)

- **Step 1: Install VirtualBox**
  - Download **Oracle VirtualBox**.
  - Install it on your **Windows** computer.
- **Step 2: Download Kali Linux**
  - We need the **right version** for VirtualBox.
  - There are **two ways** to do this:
    1. **Easier Method (Recommended):** Download the **Kali Linux VirtualBox Image** (.iso file).
    2. **Harder Method:** Download the **Kali Linux ISO** file and install it manually.

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Summary of Lab 2 (Week 4)

- **Step 3: Import Kali Linux into VirtualBox**
  - If you downloaded the .ova file, just **import** it into VirtualBox.
  - If you downloaded the .iso file, you will **install Kali Linux manually** in VirtualBox.
- **Step 4: Start and Use Kali Linux**
  - Once installed, **start Kali Linux inside VirtualBox**.
  - Use Kali Linux to complete the lab tasks.

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Summary of Lab 2 (Week 4)

- **Step 5: Complete Lab Questions**
  - Take a **screenshot** of Kali Linux running inside VirtualBox.
  - **List any problems** you faced and how you solved them.

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

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Summary of Lab 2 (Week 4)

This lab helps us:

- ✓ Understand **virtualization** and how to run different operating systems.
- ✓ Learn how to install and configure **VirtualBox** and **Kali Linux**.
- ✓ Prepare for **cybersecurity tasks** in a safe virtual environment.
- ✓ Use **Kali Linux tools** without affecting our main Windows system.

Preparation for Lab 2 (Week 4) – VirtualBox and Kali Linux

Summary of Lab 2 (Week 4)

Final Thought

Think of **Oracle VirtualBox** as a **TV** and **Kali Linux** as a **video game console.**

- **VirtualBox (TV)** is the platform that runs different operating systems.
- **Kali Linux (Game Console)** is the system we use inside VirtualBox to practice cybersecurity

Submission of Labs & Assessments

- These guidelines are designed to **support your learning** and help you apply necessary techniques effectively. For **lab or assessment submissions**, please follow instructions and complete tasks based on **Canvas**. If you have any questions, feel free to ask—I'm happy to help!

Thank You

- *Have a Great Learning Day!*
- Feel free to reach out with any questions!
- Dr. Farshid Keivanian