UNIVERSIDAD DEL VALLE – EISC
SISTEMAS OPERATIVOS

Class Activity on Virtual Machines and Containers
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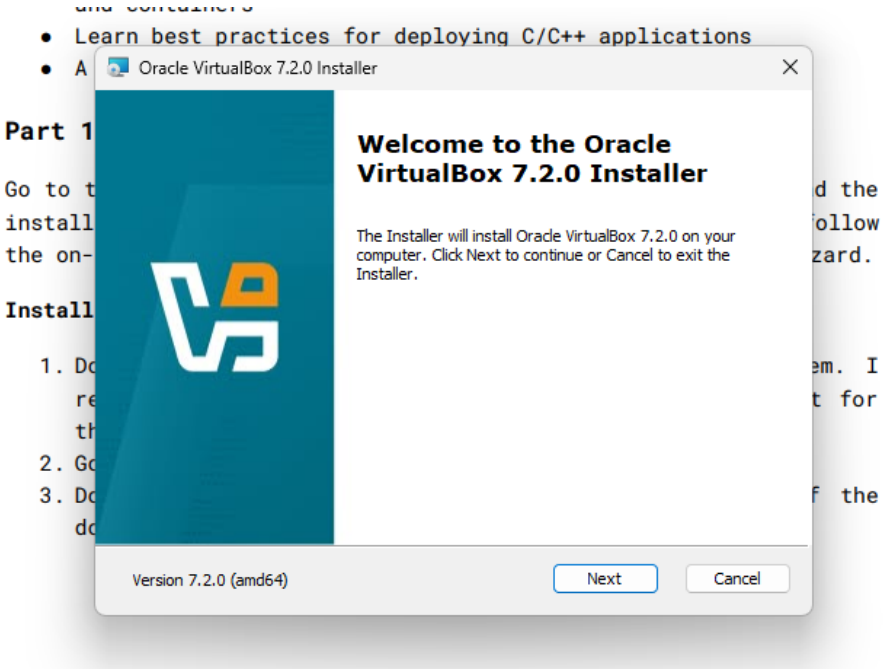
INTRODUCTION

This document presents the activities proposed in class by the teacher regarding virtual machines and containers, using the resources VirtualBox and Docker. It will include excerpts from the step-by-step instructions provided by the teacher, along with their respective screenshots. The conclusions of the activity can be found at the end of the document.

Part 1: Running Linux with VirtualBox

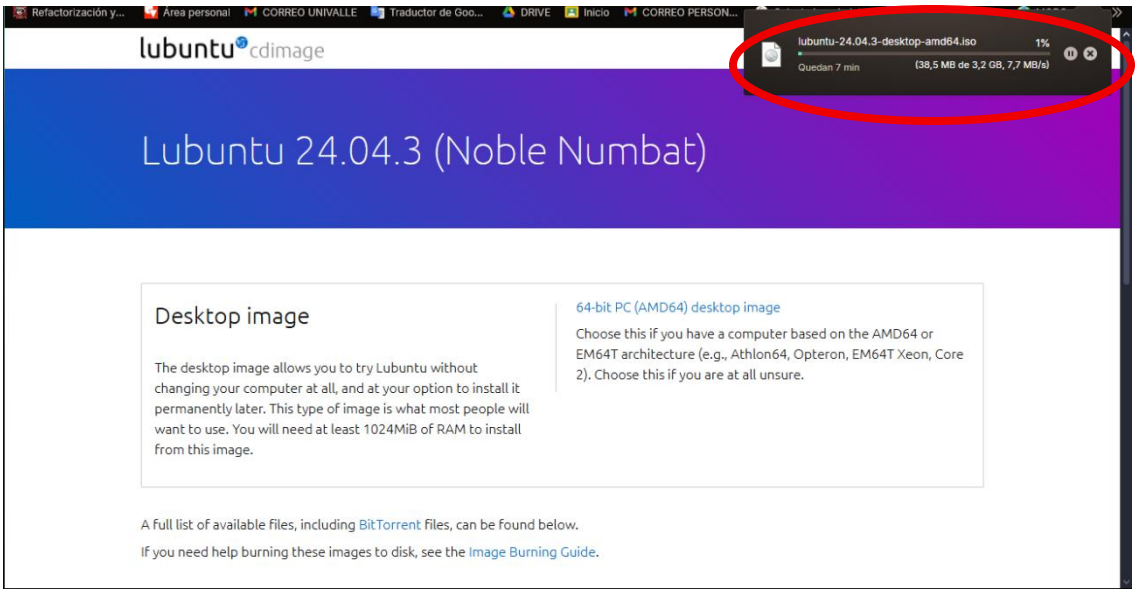
Instruction: *Go to the official VirtualBox website (virtualbox.org). Download the installer for your operating system. Run the installer and follow the on-screen prompts.* ***Take a screenshot of the installation wizard.***

Screenshot:



Instruction: *1. Download an ISO image file of a Linux operating system. I recommend Ubuntu Desktop as it's lightweight and perfect for this test. 2. Go to https://ubuntu.com/download/desktop 3. Download the latest LTS version.* ***Take a screenshot of the download page with the download progress (if possible).***

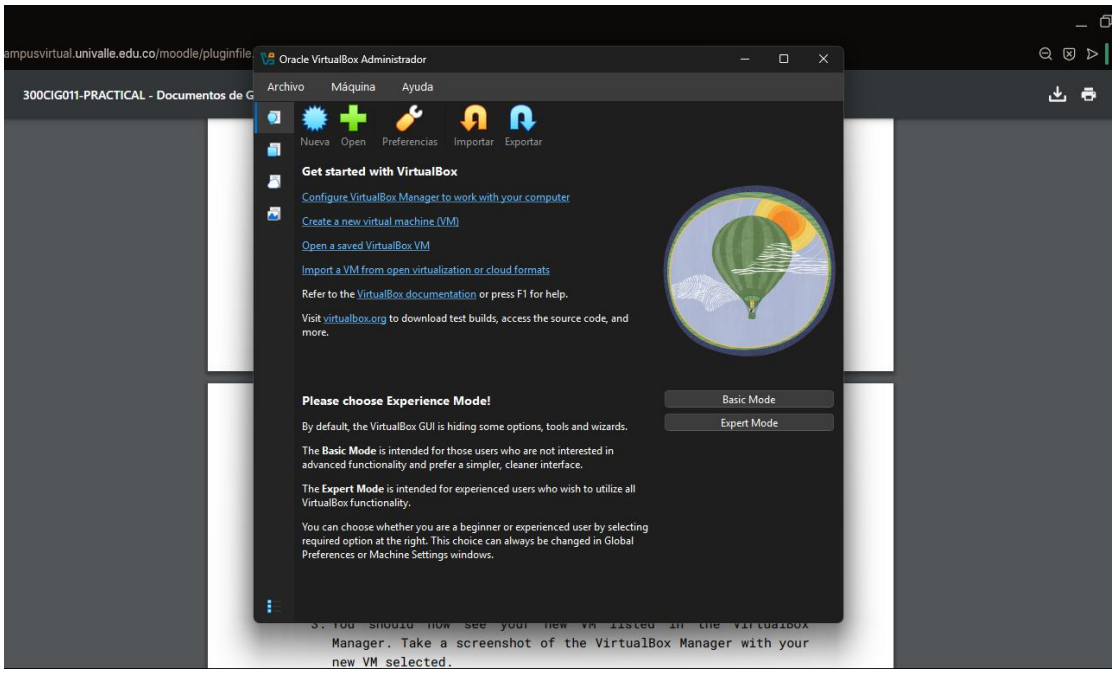
Screenshot:



Note: The Lubuntu OS was selected for storage reasons.

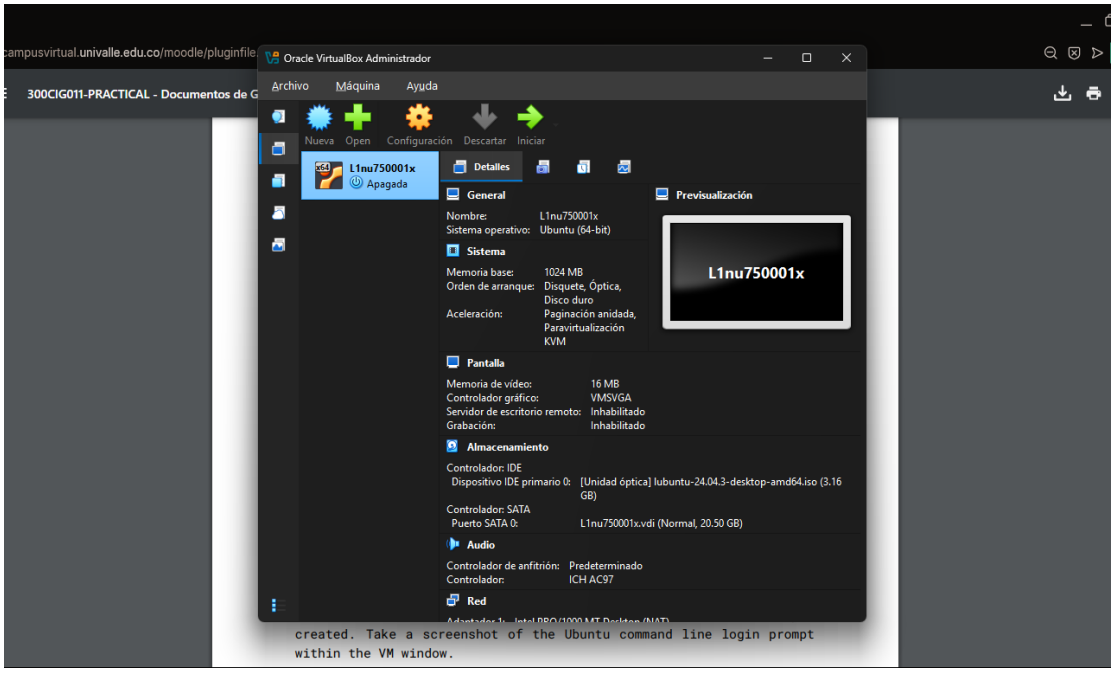
Instruction: *Open VirtualBox. You should see the main manager window.* ***Take a screenshot of the Main window of the VirtualBox.***

Screenshot:



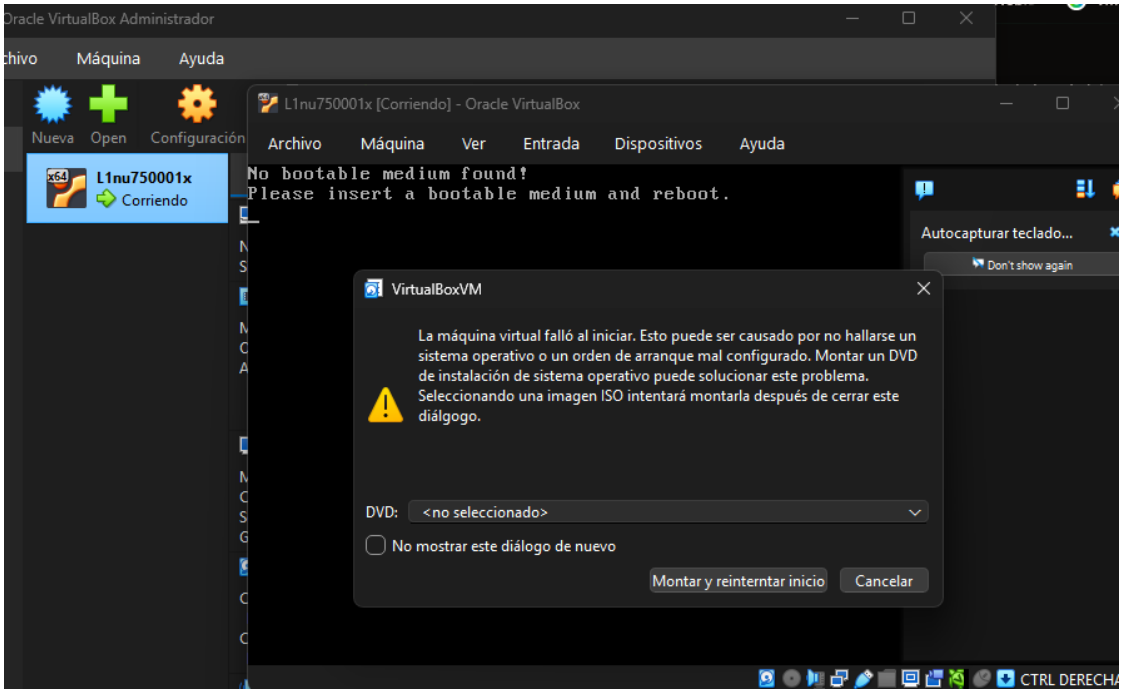
Instruction: *Create a new Virtual Machine a. Name: L1nu750001x b. Allocate at least 1024 MB (1 GB) (if possible) c. Create a virtual hard disk now. You should now see your new VM listed in the VirtualBox Manager.* ***Take a screenshot of the VirtualBox Manager with your new VM selected.***

Screenshot:



Instruction: *Select your "My Linux VM" and click the "Start" button. Click "Start".* ***Take a screenshot of the "Select start-up disk" window.***

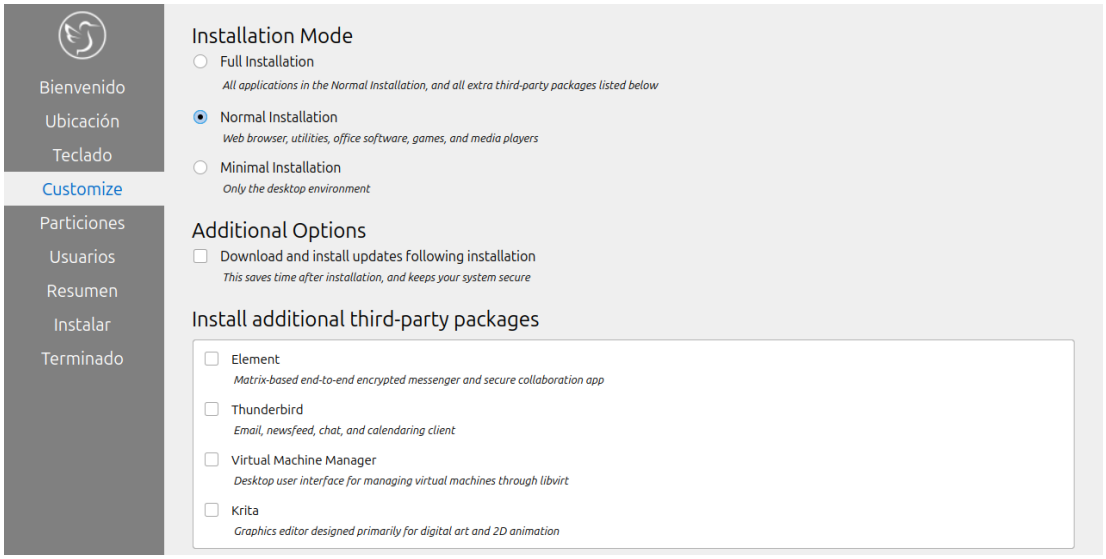
Screenshot:



Note: The 'Select start-up disk' dialog did not appear.

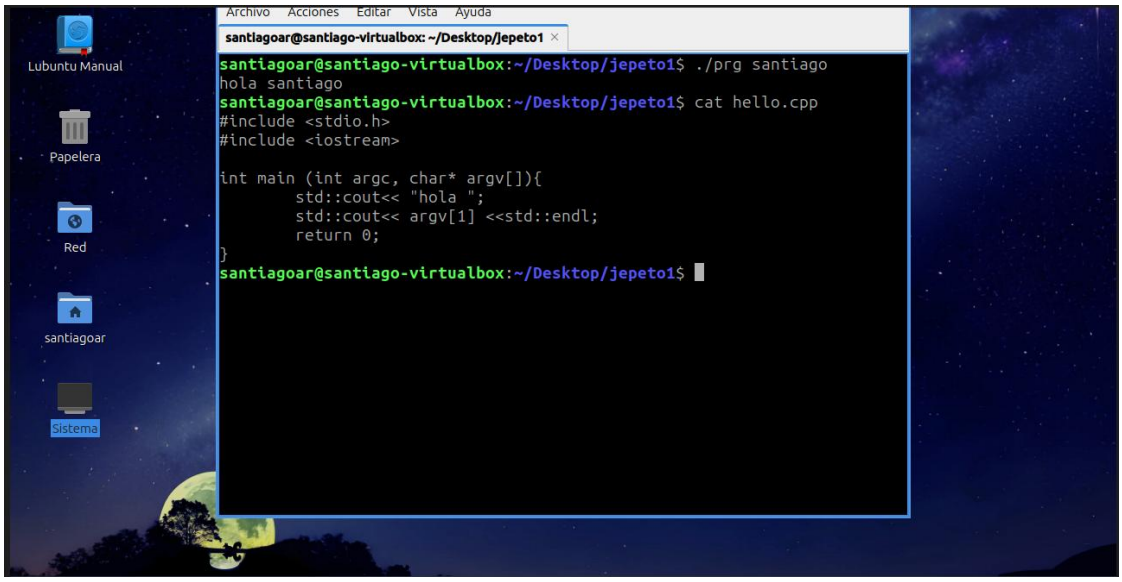
Instruction: ***Take at least two screenshots during the Ubuntu installation process (e.g., language selection, user setup).***

Screenshots:



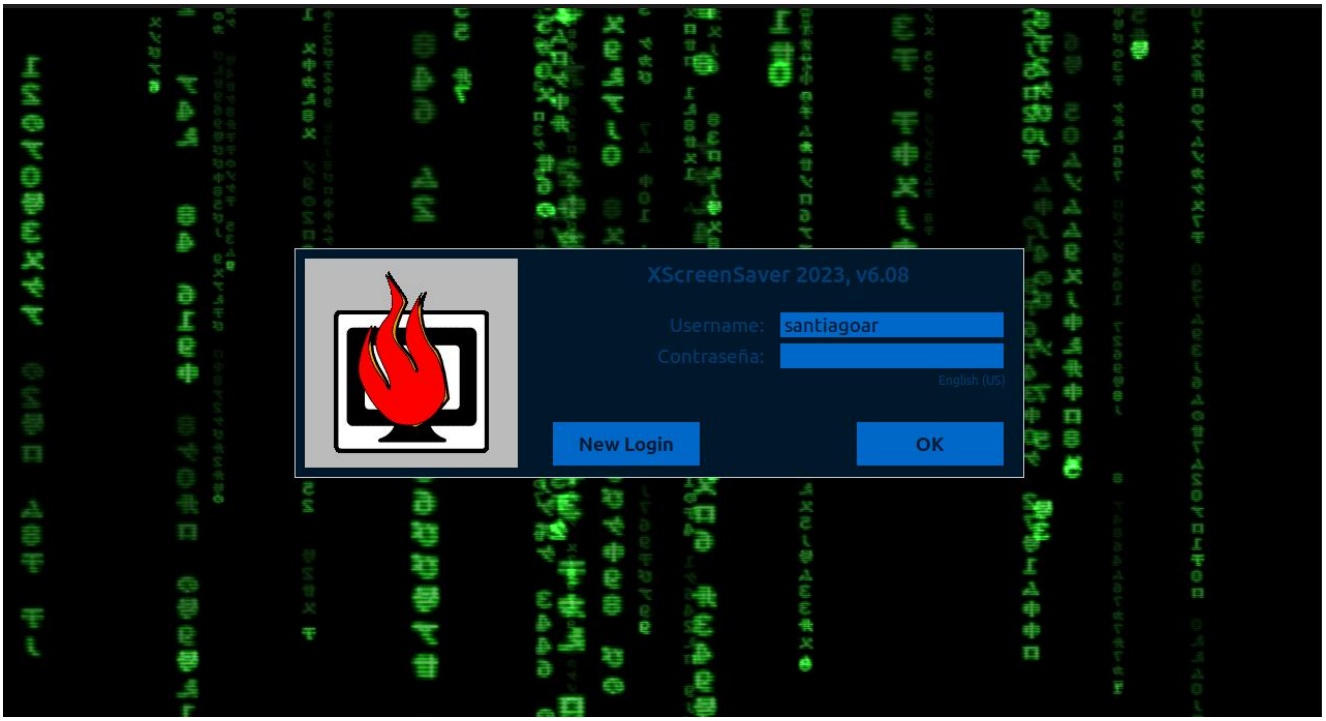
Instruction: *Create el hello world into VM. Compile and run the program.* ***Take a screenshot of the code and execution.***

Screenshot:



Instruction: *You're Done! After rebooting, your VM will boot into the Ubuntu command line. You can log in with the username and password you created.* ***Take a screenshot of the Ubuntu command line login prompt within the VM window.***

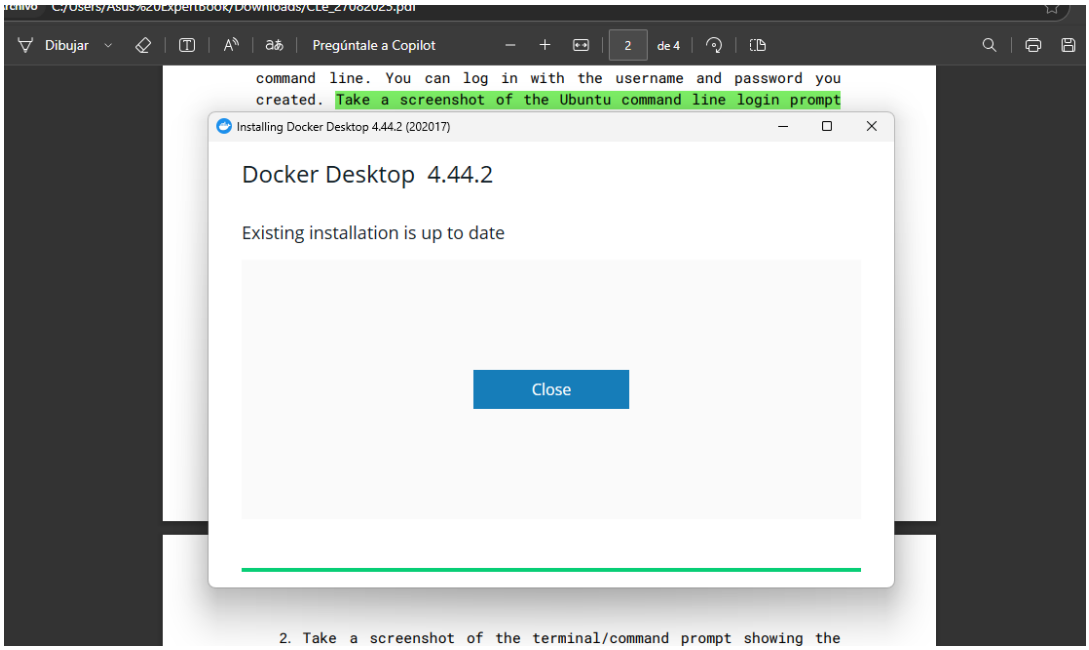
Screenshot:



Part 2: Running Linux with Docker

Instruction: *Go to the official Docker Desktop website (docker.com/products/docker-desktop). Download the appropriate installer for your OS (Windows, macOS, or Linux). Run the installer and follow the instructions. This may require a system reboot.* ***Take a screenshot of the Docker Desktop installation wizard or the successful installation message.***

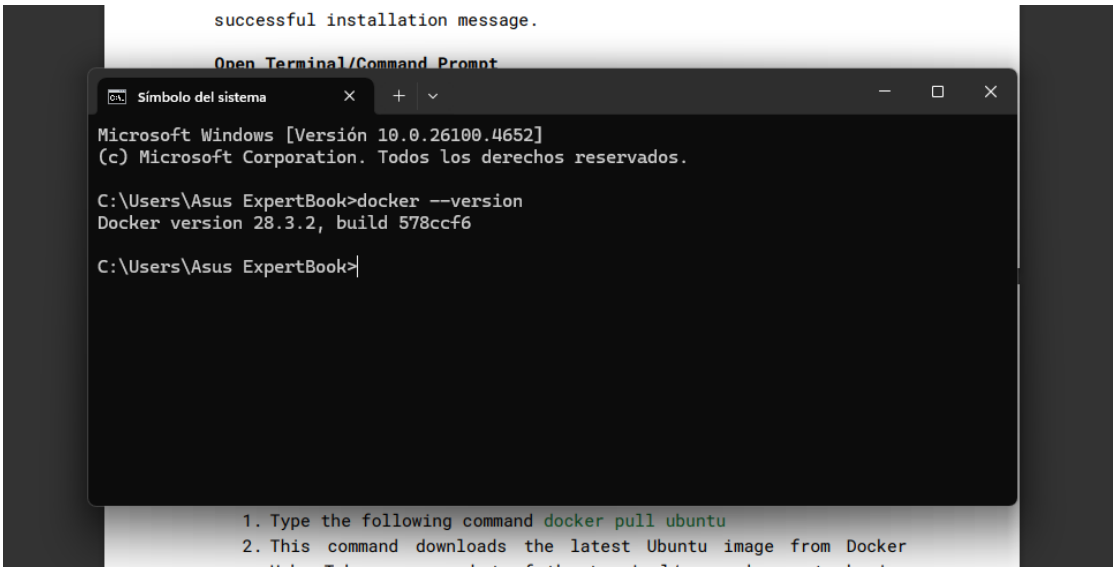
Screenshot:



Note: Docker had already been installed.

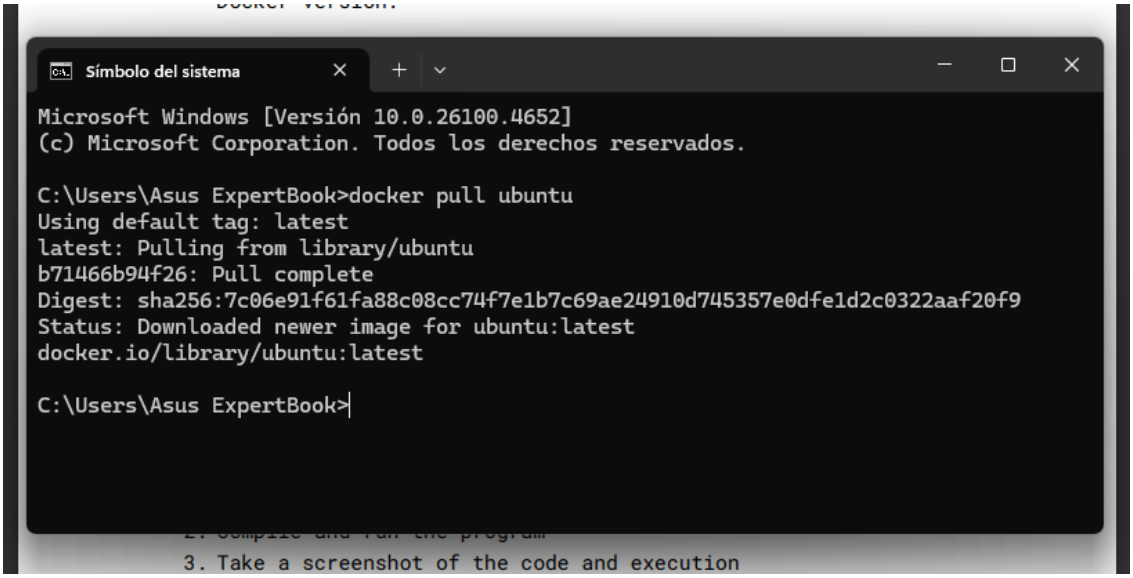
Instruction: *Verify Docker is running by typing: docker --version.* ***Take a screenshot of the terminal/command prompt showing the Docker version.***

Screenshot:



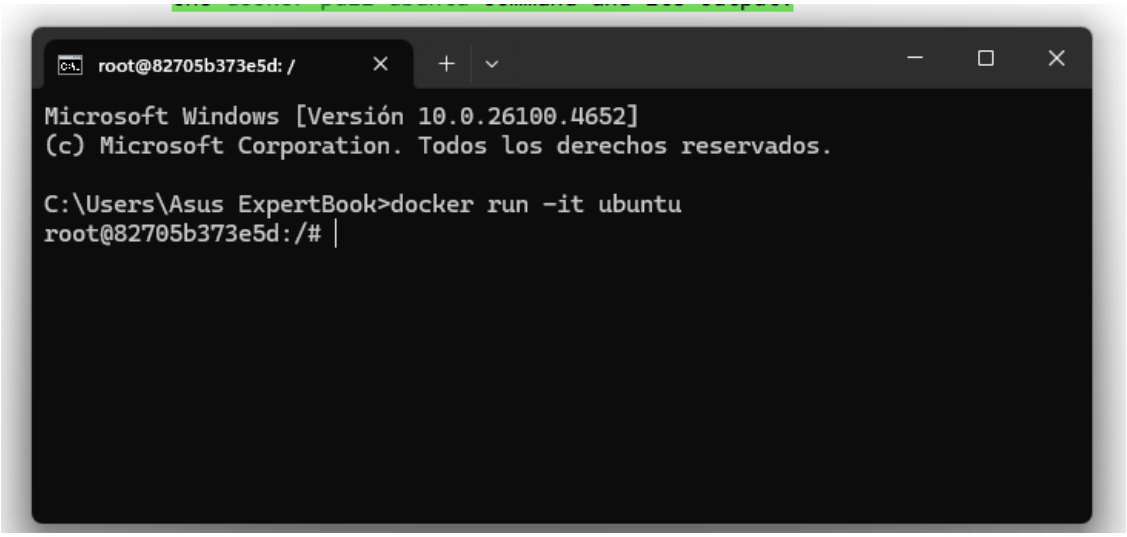
Instruction: *Type the following command docker pull ubuntu. This command downloads the latest Ubuntu image from Docker Hub.* ***Take a screenshot of the terminal/command prompt showing the docker pull ubuntu command and its output.***

Screenshot:



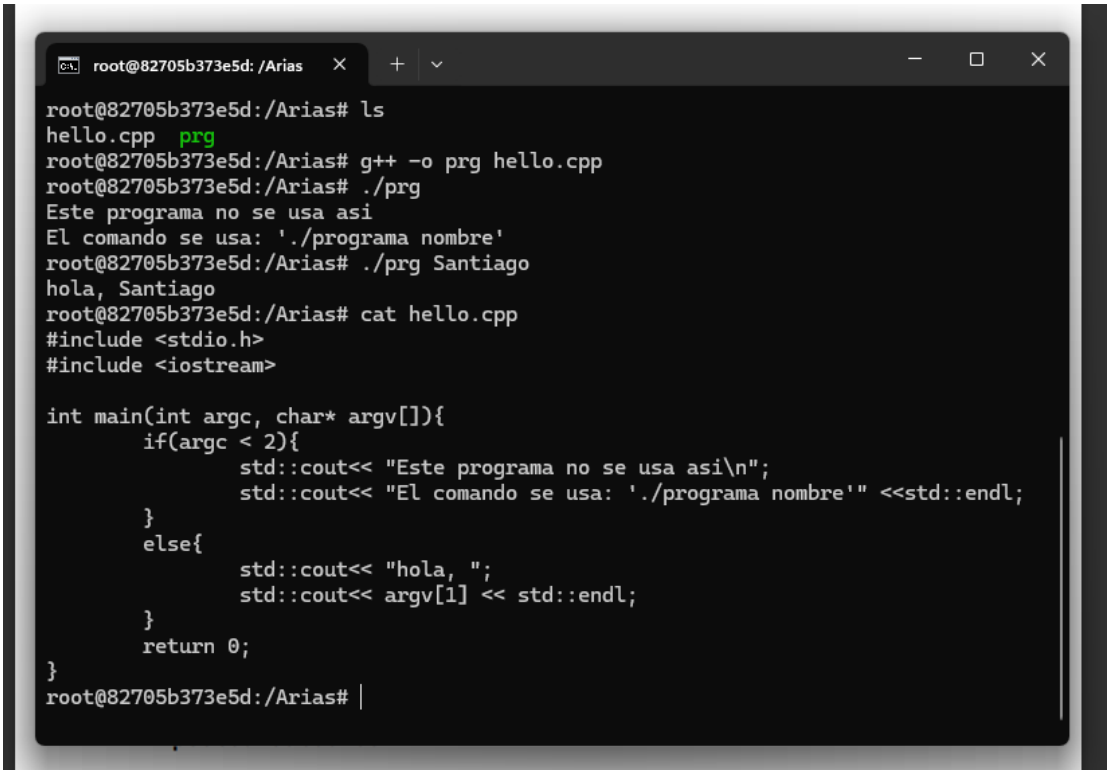
Instruction: *Type the following command docker run -it ubuntu.* ***Take a screenshot of the terminal/command prompt showing the docker run -it ubuntu command and the prompt changing to inside the Ubuntu container (e.g., root@:/#).***

Screenshot:



Instruction: *Create el hello world into VM. Compile and run the program.* ***Take a screenshot of the code and execution***

Screenshot:



Part 3: Conclusions

How long did it take you to complete each part (VirtualBox vs. Docker)?

Using VirtualBox took me about an hour and a half, specifying among other things the disk storage I was going to allocate to the virtual machine, downloading the operating system (Lubuntu), setting the language, etc., in addition to the constant appearance of errors that made the process more difficult. In contrast, with Docker I was able to complete the proposed activity in about 15 minutes at most.

Which of the two processes did you find easier or more difficult, and why?

I found Docker easier because it did not require many steps to run, and it also didn't ask for hard drive or storage specifications as VirtualBox did. On the other hand, VirtualBox was a more complicated process, during which errors occurred that delayed running Linux.

Did you notice a difference in your computer's performance or resource usage while using each tool?

I noticed greater efficiency when using Docker compared to the virtual machine, mainly because of the high specifications I assigned to the VM. The virtual machine often kept loading in many situations, and from the moment I created it until I reached the Linux menu, at least five minutes had passed, whereas with Docker I was able to access the Linux shell in about one minute.

Based on your experience, in which scenarios or projects would you use VirtualBox, and in which would you prefer Docker?

I could use VirtualBox when I need an operating system different from my own, or if I want to run an application that only works on a specific OS. On the other hand, I would use Docker when I need to isolate just an application rather than a whole operating system, and when I require a fast deployment. In the activity we just completed, I would prefer to use Docker in order to access the Linux shell during the course.

What is the most important thing you learned about the difference between virtualization (VMs) and containers?

Although virtual machines and containers behave in a similar way, a virtual machine runs an entire operating system different from ours, while a container uses the same kernel as our OS. While virtual machines provide greater isolation, in terms of efficiency containers are much better. In conclusion, both tools are very good and essential for a programmer.