Lab01 – Linux Operating System Preparation

Overview

- This lab is completed independently by students outside the lab, as there is no physical lab session in Week 1.
- Install the miniOS linux distribution
- File structure of the Linux OS
- Shell and basic commands

Section 1: Getting miniOS and booting the OS

1.1. About MiniOS

MiniOS is positioned as a portable and versatile Linux distribution derived from the Debian operating system, utilizing the proprietary minios-live scripts for its construction. The project's central objective is the provision of a comprehensive and ergonomically sound computing environment—encompassing productivity, leisure, and creative applications—for use on any x86-compatible hardware platform. A salient feature of its design is the capacity to maintain data persistence by storing personal user files on removable storage media [https://minios.dev/docs/#!./About-MiniOS.md].

1.2. MiniOS Editions

The MiniOS distribution is offered in three distinct editions, each specifically customized to meet varying user requirements, ranging from general daily use to advanced system administration and comprehensive workstation deployment [https://minios.dev/docs/#!./About-MiniOS.md].

1. Standard Edition: The Foundational Profile
   The Standard edition serves as the reliable base of the MiniOS product family. It is optimized for essential daily computing tasks, providing a stable, well-provisioned, and immediately functional platform for general-purpose operation

2. **Toolbox Edition: The System Administration Profile (Selected to be used in this course)**
   The Toolbox edition is engineered for technical professionals and power users. This profile integrates a comprehensive suite of advanced utilities focused on system administration, including specialized capabilities for disk partitioning, diagnostic operations, and data recovery. It functions as the definitive resource for complex system management requirements.

3. Ultra Edition: The Comprehensive Workstation Profile
   The Ultra edition represents the most exhaustive version available. It achieves its designation as an "all-in-one powerhouse" by consolidating the full feature set of both the Standard and Toolbox editions. Furthermore, the Ultra profile includes supplementary software components for professional application development, advanced multimedia processing, and sophisticated networking configurations, making it the ideal choice for

users seeking a complete, portable workstation solution with immediate out-of-the-box readiness.

1.3. Downloading the Toolbox edition

It can be downloaded from the following link [https://minios.dev/#toolbox]. Make sure you are downloading the correct iso.

- Windows PCs: amd64
- Mac laptops: ARM64 architecture for laptops with M1, M2, M3, and M4 processors

1.4. Create a bootable USB drive (https://minios.dev/docs/#!./Installing-MiniOS.md)

You are expected to have a USB (3.0 or 3.1) disk with minimum capacity of 16 GB.

You can install and create a USB live boot disk using the following installation methods:

1. Windows: you can use any of the following two applications:

   Rufus - https://minios.dev/docs/#!./Rufus.md
   Balena Etcher - https://minios.dev/docs/#!./Balena-Etcher.md

2. macOS: you can use any of the following two methods:

   Balena Etcher - https://minios.dev/docs/#!./Balena-Etcher.md
   dd command - https://minios.dev/docs/#!./dd.md

1.5. Boot and explore

You must enable the USB boot option from the BIOS. This varies from machine to machine based on the BIOS used. Usually restart the machine and press the DEL or F12 key until you get the BIOS screen. Mody the BOOT section to boot from the USB drive where the miniOS is installed.

Upon successful boot execution from the USB medium, students are advised to conduct an exploratory review of the MiniOS desktop environment (DE). The primary DE, XFCE, is utilized to achieve an optimal equilibrium between feature richness and operational efficiency.

Watch the following video to get an idea on how to install and boot miniOS:
https://www.youtube.com/watch?v=GeXFgJUYoco

1.6. Boot Menu Options

A full explanation for the process is explained in the main documentation of miniOS [https://minios.dev/docs/#!./Boot-Menus.md].

Section 2: Linux File Structure

You are expected to watch the following video to understand the file structure or layout of the linux operating system.

https://www.youtube.com/watch?v=ISJ44S5sZu8

Section 3: Linux Shell and Basic Commands

Exercise:

1. Create a main workspace directory named **linux_test_area** in your current home directory.
2. Navigate into the newly created directory.
3. Create three empty files inside the workspace: **file_A.txt**, **file_B.dat**, and **config_temp.cfg**.
4. Create two new subdirectories inside the workspace: **documents** and **archives**.
5. Create a copy of **file_A.txt** and name it **copy_A.txt**.
6. Move the file **file_B.dat** into the **archives** subdirectory.
7. Rename the directory **documents** to **reports**.
8. Create a new file named **project_summary.txt** inside the newly renamed **reports** directory.
9. Display the content of the current directory to verify that **file_A.txt**, **copy_A.txt**, **config_temp.cfg**, **archives**, and **reports** are present, and nothing else.
10. Use a single command to delete the empty **archives** subdirectory.

Section 4: Installing and Removing Packages

4.1. Listing the packages available in the miniOS repository

The best way to see what packages are available for installation is by using the apt-cache or apt command. Note that you must run sudo apt update first to ensure your local package index is current.

Command	Output
apt list	Lists all packages, showing their availability (e.g., [installed], [available]). **Warning:** This output is usually very long and scrolls quickly.

4.2. Targeted Search

Because the full list is so massive, it is usually more practical to search for specific software or keywords:

Command	Example	Description

Command	Example	Description
apt search [keyword]	apt search vlc	Searches package names and descriptions for the specified keyword, which is the most common way to find new software.
apt-cache search [keyword]	apt-cache search mail-client	Performs the same search function as apt search.

4.3. Update the system packages

Task	Command	Description
Update	sudo apt update	Fetches the latest information on packages and versions available from the MiniOS and Debian repositories.

4.4. Install a package

Task	Command Syntax	Example
Install	sudo apt install [package-name]	sudo apt install vim
Search	apt search [keyword]	apt search image-editor

4.5. Remove a package

Task	Command Syntax	Description
Remove	sudo apt remove [package-name]	Removes the binary files for the package but leaves configuration files behind. This is useful if you plan to reinstall the package later.
Purge	sudo apt purge [package-name]	**Completely removes** the package, including its binary files and all system-wide configuration files. This is the cleanest way to uninstall software.

4.6. Clean the system

Task	Command	Description
Autoremove	sudo apt autoremove	Removes packages that were automatically installed as dependencies for other software but are no longer needed by any currently installed package.
Clean	sudo apt clean	Clears out the local repository cache of retrieved .deb package files, freeing up disk space.

Exercise:

Execute the following commands to install the development tools in addition to vscode.

sudo apt update

sudo apt install build-essential

sudo apt install vscodium