Template Week 5 – Operating Systems

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Assignment 5.1: Unix-like

a) Find out what the difference is between UNIX and unix-like operating systems?
UNIX is a proprietary operating system developed in the late 1960s and early 1970s at AT&T's Bell Labs.
It adheres to the Single UNIX Specification (SUS), which certifies compliance with the standard.
Examples include macOS and AIX.
It is typically closed-source and not freely distributed.
Unix-like:
Unix-like operating systems are those that behave similarly to UNIX but may not be certified to comply with the SUS.
They are often open-source, like Linux, and follow similar principles and command structures.

b) Study the image above named UNIX timeline. Find out who Ken Thompson, Dennis Ritchie, Bill Joy, Richard Stallman, and Linus Torvalds are and what they have contributed to the development of UNIX or unix-like systems and to IT in general. **TIP!** English-language sources often contain more detailed information about these individuals.

c)

1.Ken Thompson: Co-created UNIX at Bell Labs in 1969 and developed the B programming language, a precursor to C. His work laid the foundation for modern operating systems.

2.Dennis Ritchie: Co-created UNIX alongside Ken Thompson and developed the C programming language, which became essential for system programming and modern software development.

3.Bill Joy: Developed the BSD (Berkeley Software Distribution), an influential UNIX derivative, and co-founded Sun Microsystems, contributing to networking innovations like TCP/IP.

4.Richard Stallman: Founded the GNU Project in 1983, advocating for free software. He created key GNU tools and the GPL license, which are integral to Linux and the open-source ecosystem.

5.Linus Torvalds: Created the Linux kernel in 1991, forming the core of modern Linux distributions. His work revolutionized server infrastructure, mobile platforms (Android), and open-source development.

Together, these pioneers significantly shaped the evolution of UNIX, Unix-like systems, and IT as a whole.

d) What is the philosophy of the GNU movement?
The GNU movement advocates for free software, ensuring users can run, modify, share, and distribute software freely, opposing restrictions from proprietary software.

e) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.

Partially. While Ubuntu is mostly open-source and includes GNU tools, it also incorporates proprietary drivers and software, which conflicts with the strict GNU philosophy.

f) Find out what is the Windows Subsystem for Linux?
WSL is a feature in Windows that lets users run a Linux environment, including command-line tools and applications, without using a virtual machine or dual boot. WSL 2 includes a full Linux kernel.

g) Find out, which operating system family belongs to Android, iOS and ChromeOS?

- **Android: Linux family.**
- **iOS: Unix family (based on Darwin/BSD).**
- **ChromeOS: Linux family.**

Assignment 5.2: Supercomputers and gameconsoles

a) Research on this site what supercomputers are used for and write a short summary of it: https://www.computerhistory.org/timeline/search/?q=Supercomputer

Supercomputers are powerful computing systems designed to perform complex calculations at high speeds, enabling advancements in various scientific and engineering fields. Their applications include:
•**Scientific Research and Simulations**: Supercomputers model intricate physical phenomena, such as climate patterns, nuclear reactions, and cosmic events, providing deeper insights into natural processes.
•**Data-Intensive Analysis:** They process vast datasets, essential for tasks like analyzing satellite imagery, conducting seismic studies, and handling large-scale scientific data.
•**Engineering and Design:** Supercomputers assist in designing and testing engineering projects, including aircraft, automobiles, and complex structures, by performing simulations that predict performance under various conditions.
•**Artificial Intelligence and Machine Learning:** They provide the computational power necessary to train complex AI models, enabling advancements in machine learning, natural language processing, and other AI applications.
•**Cryptography and Security:** Supercomputers are utilized in cryptanalysis to test the strength of encryption algorithms, ensuring data security and integrity.

b) IBM is a company that has already built a number of supercomputers. One of them is IBM's Roadrunner. The CPU developed for this supercomputer was further developed at a later stage as the CPU for the PlayStation 3 console. Find out what a **PlayStation 3 cluster** is and what it was used for?:

A PlayStation 3 cluster is a network of interconnected PS3 consoles configured to function as a high-performance computing cluster. The Cell Broadband Engine, originally developed for IBM's Roadrunner supercomputer, was adapted for use in the PlayStation 3, enabling powerful parallel processing.

Uses of a PlayStation 3 Cluster:
1. Scientific Research: PS3 clusters were used for protein folding studies, astrophysics simulations, and climate modeling.
2. Military Applications: Systems like the Condor Cluster (built with PS3 consoles) analyzed high-definition satellite imagery and conducted image recognition tasks.
3. Cost-Effective Supercomputing: The Condor Cluster achieved these tasks at one-tenth the cost of a traditional supercomputer, highlighting the PS3's efficiency and affordability.

c) You can build a supercomputer by combining a few in a cluster. Here's what Oracle did with a collection of Raspberry Pi's, for example: https://blogs.oracle.com/developers/post/building-the-worlds-largest-raspberry-pi-cluster What specific operating system is running on this cluster?
Oracle Linux for ARM

d) Does Oracle's Raspberry Pi supercomputer appear in the list of the 500 fastest supercomputers in the world? Make a logical decision for this, without going through the entire list.
https://www.top500.org/lists/top500/list/2023/06/

No, Oracle's Raspberry Pi supercomputer does not appear in the list of the 500 fastest supercomputers in the world.

e) What CPU architecture is used for the PlayStation 5 and Xbox Series X?
What operating systems run on these consoles?
What conclusion can you draw from the answer to the previous question?

CPU Architecture: **x86-64 (AMD Ryzen Zen 2)**
Operating System: Likely a version of **Orbis OS**, Sony's proprietary OS, which is based on **FreeBSD**.
Operating System: A custom OS derived from the **Windows NT kernel**, developed by Microsoft and optimized for gaming.

Both consoles use x86-64 architecture, aligning with PC-like standards, and proprietary operating systems tailored for gaming performance. The shared architecture simplifies game development and porting between consoles and PCs, while their custom operating systems ensure optimal performance for their respective hardware. This design approach bridges the gap between traditional PCs and gaming consoles.

Assignment 5.3: Working with Windows

Take relevant screenshots of the assignments bel ow

a) Practice for about 10 minutes with the ⊞ keyboard shortcuts combinations, skip the general shortcuts in this exercise. Take a look at which screens are opened.

b) The file explorer can be opened with ⊞ + E, Which key combination could you also use?

c) Open the system properties with a ⊞ key combination, take a screenshot of the open screen. Paste this screenshot into this template.

d) Open task manager with a key combination. Take screenshots of the tabs: processes (shows active processes), performance, and users. Place these three screenshots in this template.

e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector, or the second screen. Which key combination should you use for this?

f) If you leave the classroom for a while and you leave your laptop behind, it is wise to lock the screen. Your Apps will continue to run in the background. So, for example, if you're waiting for a download that takes a while, lock the screen and get a cup of coffee. Which key combination do you use for this?

g) Open the Run screen with a key combination. On this screen, type CMD and press <enter>. Take a screenshot of this result and paste it into this template.

Working in the File Explorer

Relevant screenshots **copy** command:

Relevant screenshots **tree** command:

Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.

Terminating Processes

Relevant Screenshots Task Manager Window:

Install Software

Relevant screenshots that the following software is installed:

- WinSCP
- Notepad++
- 7zip

Assignment 5.4: Working with Linux

Relevant screenshots + motivation

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation

Assignment 5.6: View the contents of files

Relevant screenshots + motivation

Assignment 5.7: Digital forensics

Relevant screenshots + motivation

Assignment 5.8: Steganography

Relevant screenshots + motivation

Bonus point assignment – week 5

Make relevant screenshots + motivation:

Note: I have not been able to complete the bonus assignment due to compatibility issues with my Mac device. Despite troubleshooting, I was unable to resolve the issue. I have also discussed this matter with my teacher during the course.

- Proof that the FOG server is installed and is functioning correctly.

- Proof that the FOG server has made a back-up of the Windows11 VM or the Ubuntu 24.04 Desktop VM.

Ready? Save this file and export it as a pdf file with the name: **week5.pdf**