

# CSC-203 Operating Systems[3]

Lecture: 1

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Date: May 2, 2019

# Course Synopsis & Goal

## Synopsis

- Fundamental concepts of uniprocessor operating systems.
- Evolution process management, Memory management, File systems, I/O processing

## Goal

- This course introduces fundamental concepts of contemporary uniprocessor operating systems

**Textbooks:** Andrew S. Tanenbaum, Modern Operating Systems, 2 nd Edition, Prentice-Hall.

**References:** Silberschatz, Galvin and Gagne, Operating System Concepts, 6th Edition, Addition Wesley.

1. **Unit 1 [6Hrs]**
  - a. Historical background
2. **Unit 2 [14Hrs]**
  - a. Process management b. Interprocess Communication and Synchronization
3. **Unit 3 [13Hrs]**
  - a. Memory Management b. File Systems
4. **Unit 4 [12Hrs]**
  - a. Device Management b. Disk Management c. Case Studies

### Historical Background

- Operating system evolution
- Hardware review
- Operating system structure
- Overview of operating system: batch system, multiprogramming, time-sharing, real-time, mainframe operating systems, personal computer operating systems, system calls.

### **Process management**

Process creation, process termination, process states, attributes; thread creation, termination, process scheduling.

### **Interprocess communication and synchronization**

Race conditions, critical regions, mutual exclusion, busy waiting, sleep and wakeup, semaphores, monitors, message passing, classical IPC problems and deadlock

### **Memory management:**

Absolute and relocable partition, multiprogramming, swapping, overlays, virtual memory, paging, page replacements algorithms, segmentation, segmentation with paging

### **File systems:**

File system interface, File system implementation.

### **Device management:**

I/O hardware and software, software layers.

### **Disk management:**

Disk structure, Disk scheduling, error handling and formatting, RAID, stable storage management.

### **Case studies (Linux and Window 2000)**

**We will study about Linux Kernel & Linux Based Operating System(Ubuntu & Arch)**



1. Attendance & Class Performance
2. Assignments
- 3. Project & Lab**
4. Terminal Exam

### Lab Works:

- Creating Bootable Disks/Portable OS(Oracle Virtual Machine)
- Linux Based Operating System Installation
- Basic Linux Commands
- Listing Processes, Killing Processes via Terminal
- Programming assignment of process creation
- Thread creation, termination

### Project:

**Explore about Linux Kernel**

## What To Expect?

- Overview of the Course **CSC-203**
- Fundamentals of Operating Systems
- Ideas about Processes, Threads
- Linux Based Operating Systems
- Some Idea Linux Kernel

# **UNIT 1: HISTORICAL BACKGROUND**

# UNIT 1

## Historical Background

Guess Who?



# UNIT 1

## Historical Background

1987, 32 years ago, **Andrew S. Tanenbaum** developed a Unix-Like operating system based on a microkernel architecture caled **MINIX**.  
**Minix was written in C**



# UNIT 1

## Historical Background

Guess Who?





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torvalds Merge tag 'fsnotify\_for\_v5.1-rc8' of git://git.kernel.org/pub/scm/lin...

Latest commit f2bc9c9 21 hours ago

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Documentation	Merge tag 'usb-5.1-rc8' of git://git.kernel.org/pub/scm/linux/kernel/...	a day ago
LICENSES		
arch	x86: make ZERO_PAGE() at least parse its argument	2 days ago
block	bfq: update internal depth state when queue depth changes	18 days ago
certs	kexec, KEYS: Make use of platform keyring for signature verify	3 months ago
crypto	crypto: lrw - Fix atomic sleep when walking skcipher	13 days ago
drivers	Merge tag 'usb-5.1-rc8' of git://git.kernel.org/pub/scm/linux/kernel/...	a day ago
fs	Merge tag 'fsnotify_for_v5.1-rc8' of git://git.kernel.org/pub/scm/lin...	21 hours ago
include		
init	init: initialize jump labels before command line option parsing	12 days ago
ipc	Merge branch 'work mount' of git://git.kernel.org/pub/scm/linux/kern...	2 months ago



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## What would you like to see most in minix?

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**Linus Benedict Torvalds**

8/26/91



Hello everybody out there using minix -

I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

Linus ([torv...@kruuna.helsinki.fi](mailto:torv...@kruuna.helsinki.fi))

PS. Yes - it's free of any minix code, and it has a multi-threaded fs. It is NOT portable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that's all I have :-).

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### **Microkernel-**

Near-minimum amount of software that can provide mechanisms needed to implement an operating system(OS)

Mechanisms include:

- Low-level address space management
- Thread management
- Inter-process communication(IPC)

## UNIT 1

# Historical Background

## UNIX

- Family of **multitasking, multiuser computer operating systems** that derive from the original AT&T Unix., development starting in the 1970s at the Bell Labs Research center
- Developers: Ken Thompson, Dennis Ritchie, Brian Kernighan, Douglas McIlroy, and Joe Ossanna
- UNIX was originally spelled “Unics” which stands for **UNiplexed Information and Computing System**

## Historical Background

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# Q&A

For Further Queries:  
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[NISTBanepa]

# THANK YOU