Part 1

OPERATING SYSTEMS

CSYE 6230– *Spring 2025*

***Please Mute Your Microphone**

***Make sure you are using your FULL Name for attendance**

Important notes

- Please **mute** your microphone
- If you have any questions please use the **Chat feature of zoom , no microphones.**
- Please make sure zoom is showing **your full name**
- **No Recording** of my lectures
- **No make up** of Quizzes or classwork
- You need to be **in class** for quiz or classwork
- **Tests/Exams/Quizzes** answers from PPT and class notes, no outside sources.
- For **Homework and Research Paper you can** use **outside sources**

Netiquette

- Keep messages short and to the point.
- Never post a message that is in all capital letters — it comes across to the reader as SHOUTING
- Keep in mind that chat messages are meant to be constructive
- Be respectful and treat everyone as you would want to be treated yourself.
- **Be on Time**
- If you came late don’t disturb the class , join us quietly, *no need to apologize*
- I don’t read emails during the lecture
- You will be removed from zoom if you disrupt the class

Important Notes

- Its your responsibility to check **Canvas**
- All Homework are typed
- Copy of **every week-PPT** will be posted on the weekend on the “**Announcements section**” of **Canvas**
- **Always Check “the Announcements section”**
- **10 Minutes Break** every hour
- Quiz in the **last hour** of the class

I would like to reiterate some important points that I discussed during our first session:

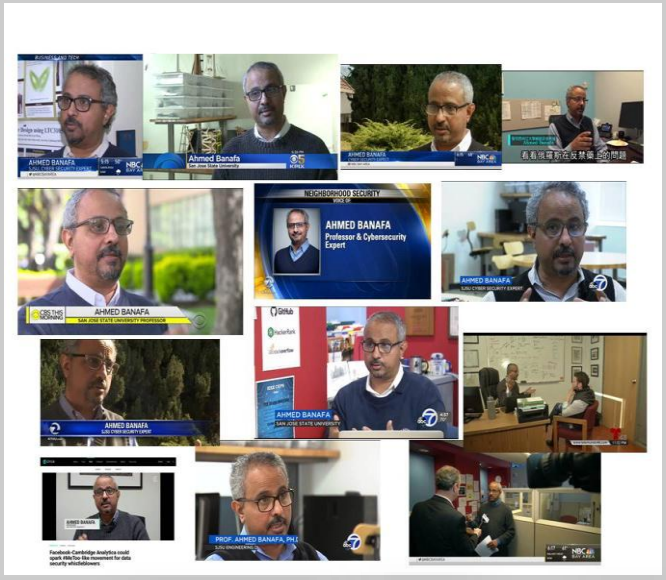
1**. No Makeup for Quizzes**: There will be no makeup options for quizzes; your presence during the scheduled quiz time is mandatory.

2. **Extra Credit Opportunities**: Later in the term, there will be opportunities for extra credit to compensate for any points you may have missed due to absence during quiz sessions.

3. **Class Attendance Permissions**: I do not grant permissions for missing classes; attendance is your responsibility and decision.

Don’t come at the end of the class just to take the quiz or do it without attending the class, you will receive zero as the TA is taking attendance.

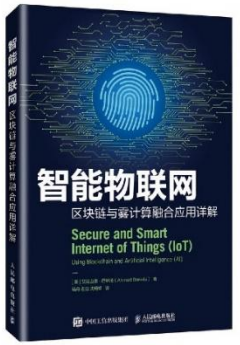
Prof. Ahmed Banafa



- **Prof. Ahmed Banafa** is an expert in IoT, Blockchain, Cybersecurity, and AI.
- Strong background in research, operations, and management.
- Received the Certificate of Honor from the City and County of San Francisco.
- Awarded the Haskell Award for Distinguished Teaching from the University of Massachusetts Lowell.
- Received the Author & Artist Award from San Jose State University.
- Recognized as the No.1 tech voice to follow by LinkedIn with over 54,000 followers.
- Featured in Forbes, IEEE-IoT, and MIT Technology Review.
- Frequently appears on ABC, CBS, NBC, BBC, and Fox TV and Radio stations.
- Studied Cybersecurity at Harvard University.
- Studied Digital Transformation at the Massachusetts Institute of Technology (MIT).
- Holds a Master's Degree in Electrical Engineering.
- Holds a PhD in Artificial Intelligence.

700+

Universities a & Colleges



620+

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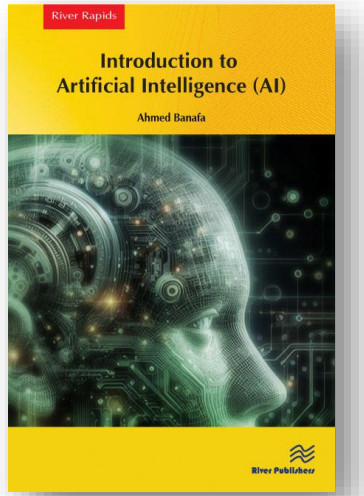
New Books


River Rapids
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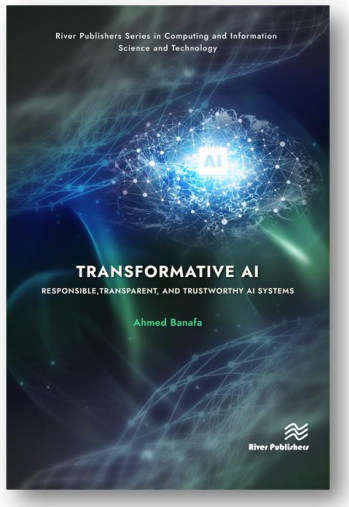
Artificial Intelligence (AI)
Ahmed Banafa
River Publishers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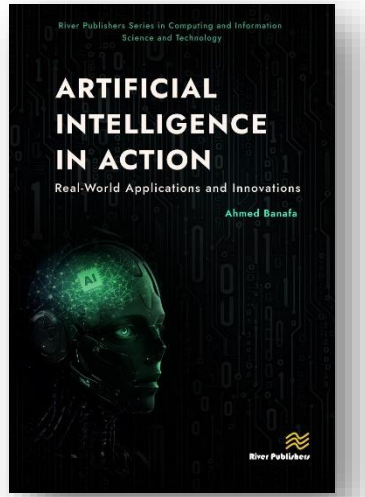
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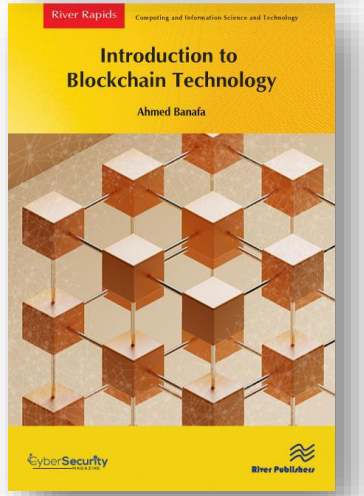
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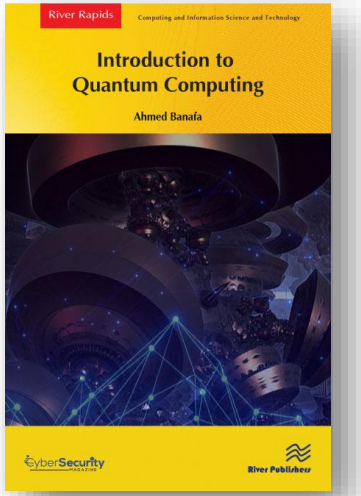
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IOT
Internet of Things
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CSYE 6230- Operating Systems

Textbook

Operating System Concepts Tenth Edition (older edition accepted)

Avi Silberschatz, Peter Baer, Galvin, Greg Gagne

John Wiley & Sons, Inc.
ISBN 978-1-118-06333-0

Course Description

- Principles of operating system design and implementation.
- Concurrent processes, interprocess communication, job and process scheduling, deadlock.
- Issues in memory management (virtual memory, segmentation, paging) and auxiliary storage management (file systems, directory structuring, protection mechanisms).
- Performance issues. Programming projects.

- Prerequisites: Knowledge of C/C++, Assembly Language, and Data Structure
- Units: 4

Select ONE topic from the following list , write a research paper of min 8 pages + Cover Page and References page with min 3 references (Use APA Style) .This is an individual assignment NOT group assignment:

1. Definition and Basic Components of an Operating System
2. Types of Operating Systems: Overview and Characteristics
3. Process Management in Operating Systems
4. Process Scheduling Algorithms: A Comparative Analysis
5. Memory Management Techniques in Operating Systems
6. Paging vs. Segmentation: A Comparison of Memory Allocation Methods
7. Virtual Memory: Concepts, Benefits, and Implementation
8. File Systems: Structure, Organization, and Performance
9. File Allocation Methods: Sequential, Indexed, and Linked Allocation
10. Input/Output Operations and Device Management
11. Device Drivers: Role and Importance in Operating Systems
12. Interprocess Communication: Mechanisms and Synchronization
13. Deadlock Detection and Prevention in Operating Systems
14. Security Features in Operating Systems: Access Control and Authentication
15. Encryption and Data Protection in Operating Systems
16. Virtualization: Concepts, Types, and Benefits
17. Virtual Machines vs. Containers: A Comparative Study
18. Cloud Computing and its Impact on Operating Systems
19. Case Study: Analysis of a Specific Operating System (e.g., Linux, Windows, macOS)
20. Future Trends in Operating Systems: Challenges and Innovations

Create OS

Create OS

Published | Edit

Create your own OS and this is some of the resources

Read LFS Online

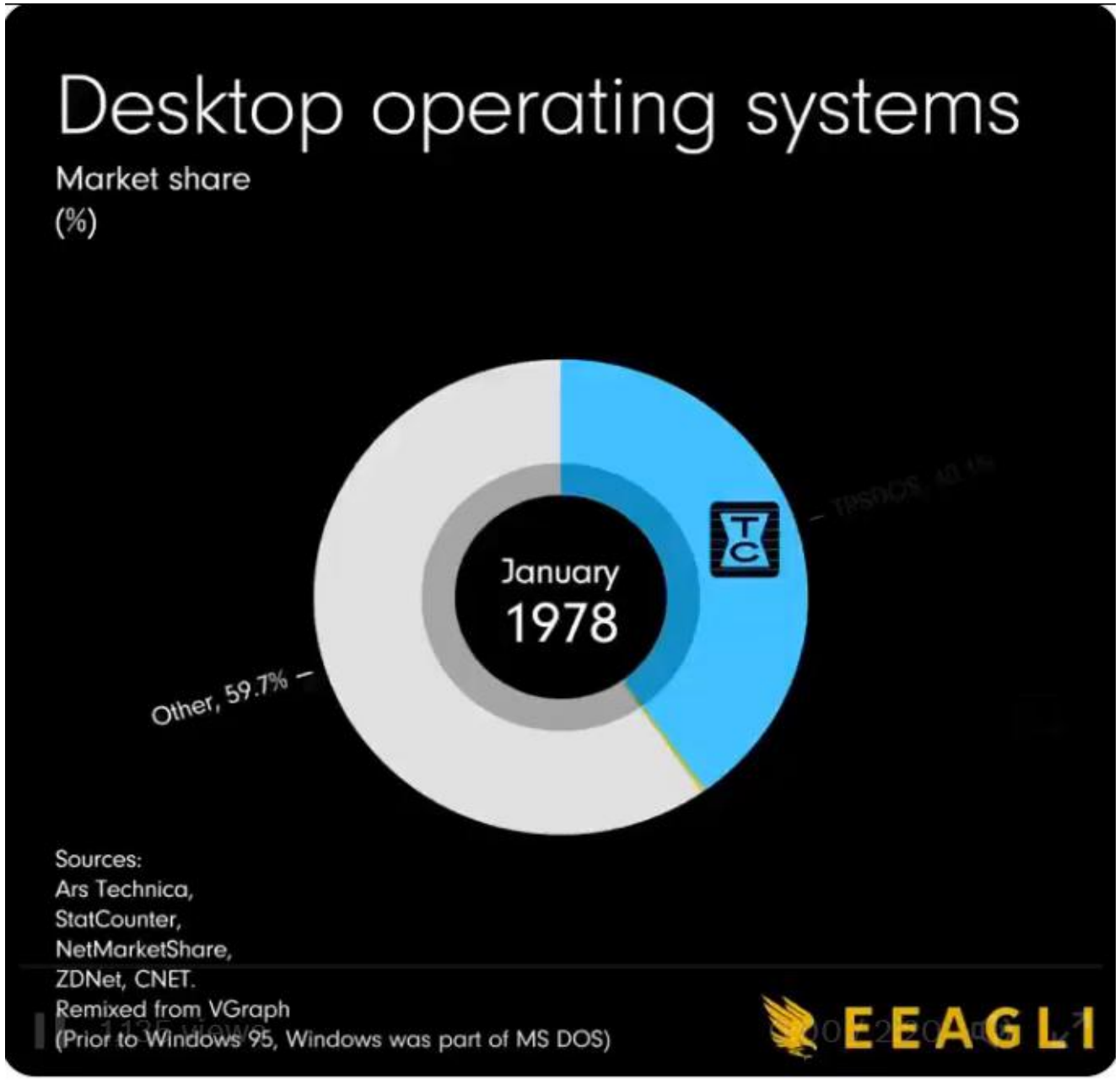
Click here

cfenollosa/**os-tutorial**

How to create an OS from scratch

Hi, My Name is Bill Gates
and I'll teach you how
to count to ten :

1, 2, 3, 95, 98, NT, 2000, XP, VISTA, 7, 8, 10


Desktop operating systems
Market share
(%)
January
1978
Other, 59.7%
Sources:
Ars Technica,
StatCounter,
NetMarketShare,
ZDNet, CNET.
Remixed from VGraph
(Prior to Windows 95, Windows was part of MS DOS)
EEAGLI

a simple operating system kernel might look like in C:

```
scss
#include <stdio.h>
#include <stdlib.h>

void kernel_main(void) {
    /* Initialize hardware */
    init_hardware();

    /* Initialize memory */
    init_memory();

    /* Initialize process manager */
    init_process_manager();

    /* Initialize file system */
    init_file_system();

    /* Start the shell */
    start_shell();
}

void init_hardware(void) {
    /* Initialize hardware devices, such as keyboard, display, and disk */
}

void init_memory(void) {
    /* Allocate memory for the kernel and user processes */
}

void init_process_manager(void) {
    /* Initialize the process table and create the first user process */
}

void init_file_system(void) {
    /* Initialize the file system and mount the root file system */
}

void start_shell(void) {
    /* Run the shell process */
}
```

This code represents a basic skeleton for an operating system kernel. It initializes the hardware, memory, process manager, and file system, and then starts the shell process. This is just an example and a real operating system kernel would be much more complex and include many more components and features.


MAC
WINDOWS
LINUX

OSES

33

Windows 12: Savior of PC makers, or just an apology for Windows 11?

Looking into our crystal ball we can see the end of 2024 will be filled with … AI. So much AI

Richard Speed

Sat 23 Dec 2023 // 09:57 UTC

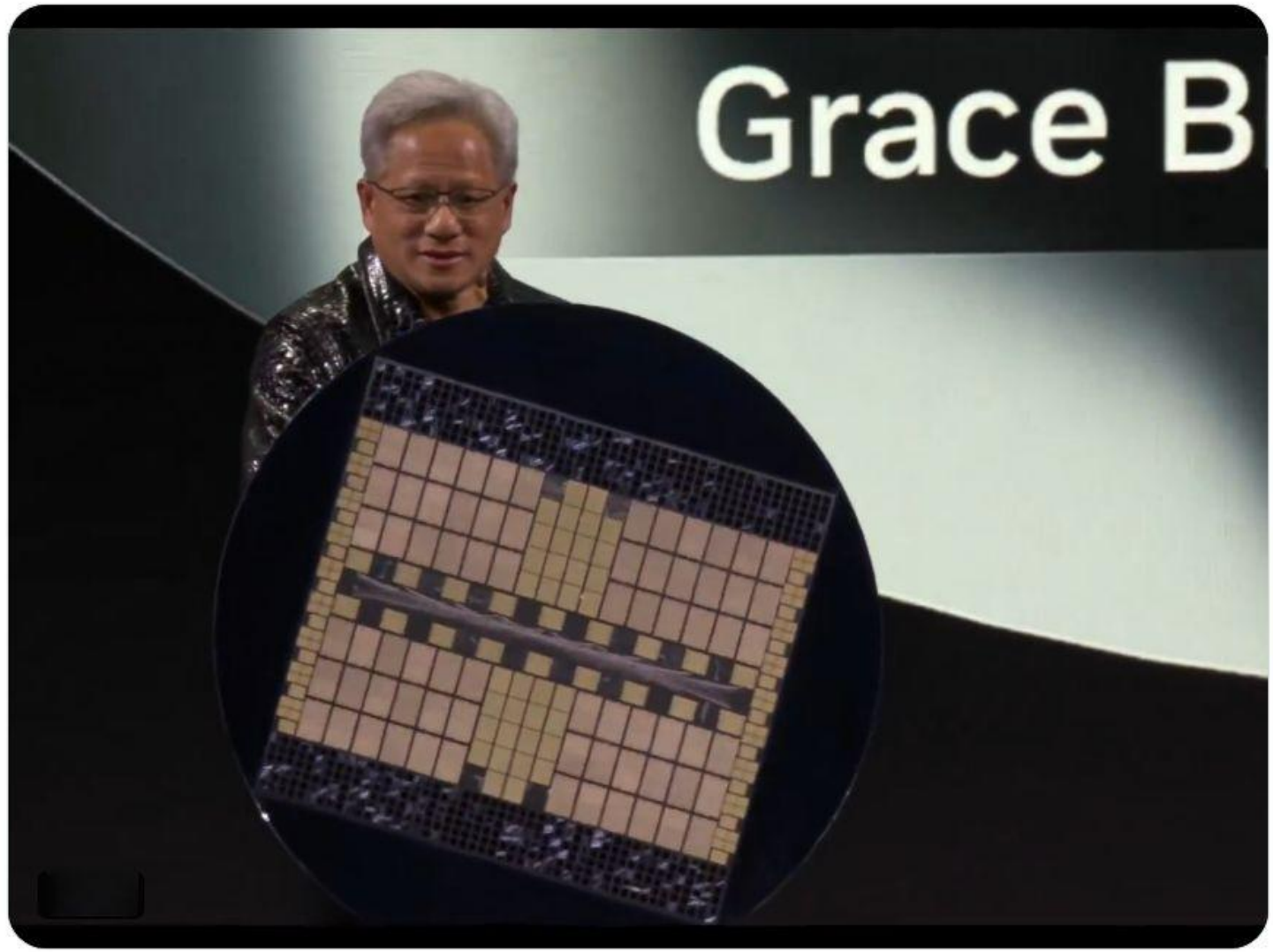
ANALYSIS Microsoft is betting the farm on AI apathy not hitting before it makes a return on its investments. This is positive and negative news for PC makers and points to what might be Microsoft's next major Windows release.

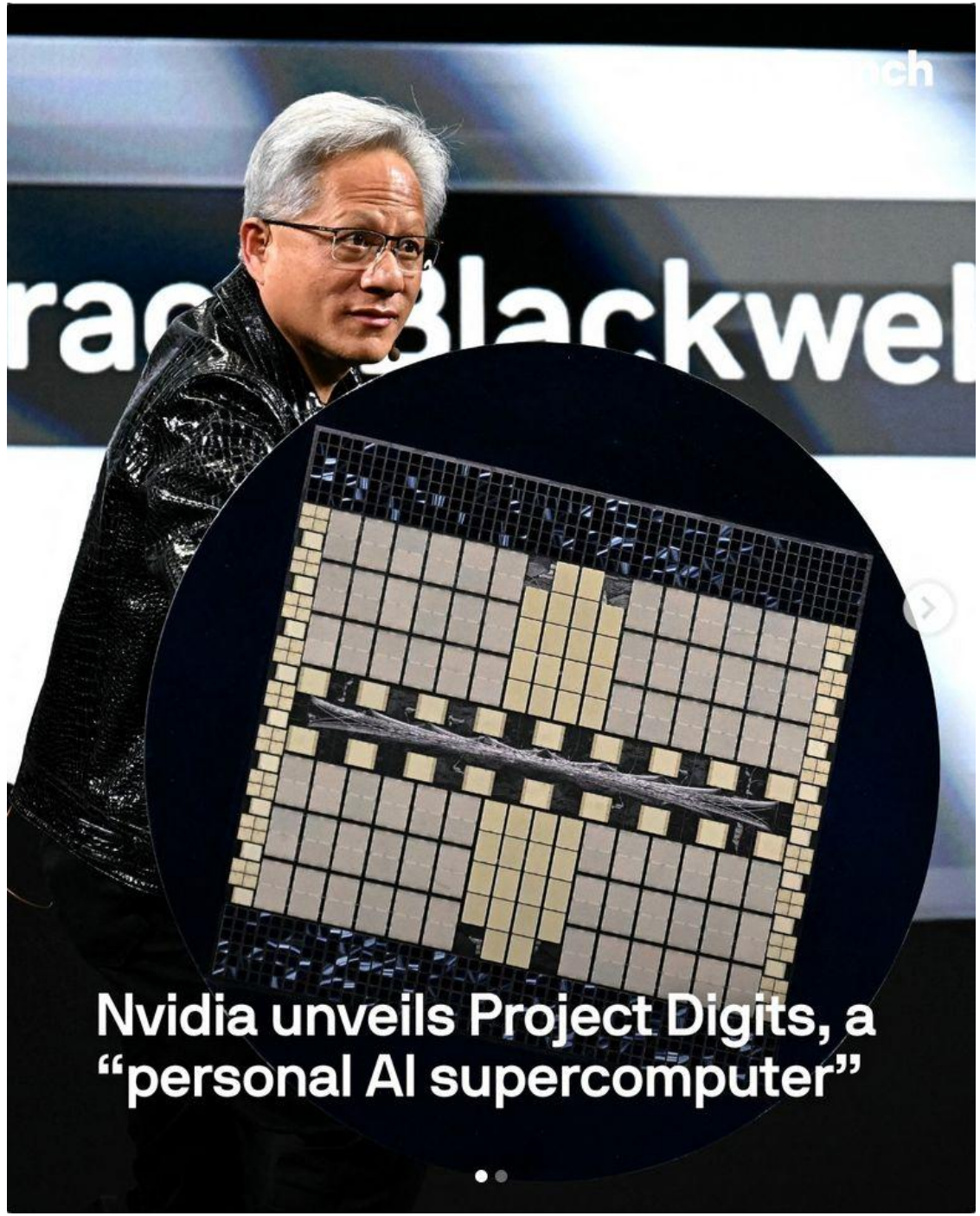
Windows 11 continues to be a less-than-stellar success for Microsoft. The most recent set of figures it reported were uninspiring. Despite a looming end of support for Windows 10 - although customers can pay for an extension - the OS remains dominant, and Windows 11 trails behind where its predecessor had been in terms of installations at the same point in its lifecycle.

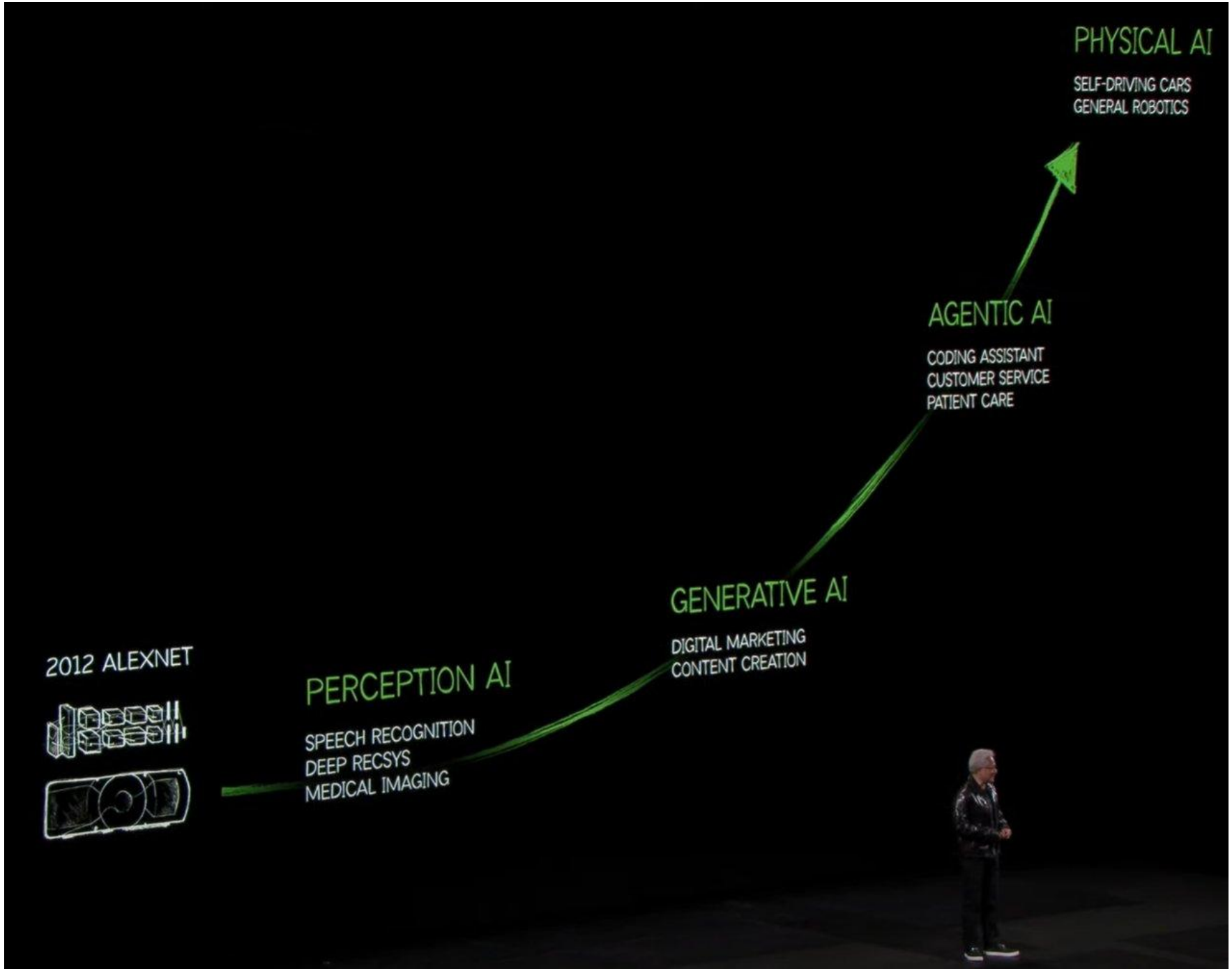
- Toyota revealed at CES 2025 that its upcoming vehicles will feature automated driving capabilities, powered by Nvidia’s Drive AGX Orin supercomputer and DriveOS, a safety-focused operating system.
- This collaboration promises real-time AI processing for advanced driving and cockpit features.
- Nvidia’s Drive AGX, part of its comprehensive self-driving toolkit, processes real-time sensor data, ensuring safe and efficient autonomous driving


TechCrunch
Cruncbase data shows Silicon Valley startups raised 57%, or $90B, of all global VC funding in 2024

Jensen Huang shows off the NVIDIA GB200 NVL72: a data center superchip with 72 Blackwell GPUs, 1.4 exaFLOPS of compute and 130 trillion transistors




Nvidia unveils Project Digits, a
“personal AI supercomputer”


PHYSICAL AI
SELF-DRIVING CARS
GENERAL ROBOTICS
AGENTIC AI
CODING ASSISTANT
CUSTOMER SERVICE
PATIENT CARE
GENERATIVE AI
DIGITAL MARKETING
CONTENT CREATION
PERCEPTION AI
SPEECH RECOGNITION
DEEP RECSYS
MEDICAL IMAGING
2012 ALEXNET

Some of The Topics Covered

- What is an OS?
- What Operating Systems Do
- Computer-System Organization
- Computer-System Architecture
- Operating-System Operations
- Resource Management
- Security and Protection
- Virtualization
- Distributed Systems
- Kernel Data Structures
- Computing Environments
- Open-Source Operating Systems

We will answer the following Questions

- Describe the general organization of a computer system and the role of interrupts
- Describe the components in a modern, multiprocessor computer system
- Illustrate the transition from user mode to kernel mode
- Discuss how operating systems are used in various computing environments
- Provide examples of free and open-source operating systems

Computer System Structure

- Computer system can be divided into **four components**:
  - **Hardware** – provides basic computing resources
    - CPU, memory, I/O devices, Storage
  - **Operating system**
    - Controls and coordinates use of hardware among various applications and users
  - **Application programs** – define the ways in which the system resources are used to solve the computing problems of the users
    - Word processors, compilers, web browsers, database systems, video games
  - **Users**
    - People, machines, other computers

- An operating system (OS) is a software that serves as the foundation for a computer system, providing essential functions and managing hardware and software resources.
- It acts as an intermediary between computer hardware and user applications, facilitating communication and coordination between various components.

- The primary purpose of an operating system is to enable the execution of user programs while ensuring the efficient and secure allocation of system resources, such as memory, processing power, storage, and input/output devices.
- It provides a standardized interface for interacting with the computer system, allowing users to run applications, manage files, and perform other tasks.


Keyboard not found
Press F1 to continue,DEL to enter Setup
VIA 9GAG.COM

- Key features of an operating system include process management, memory management, file system management, device management, and user interface. Process management involves scheduling and executing tasks or processes, ensuring fair allocation of CPU time. Memory management handles the organization and allocation of system memory to various programs and data.

- File system management allows users to store, access, and organize files on secondary storage devices. Device management involves controlling and coordinating input/output devices like keyboards, monitors, printers, and network interfaces.

- The user interface provides a means for users to interact with the computer system, either through a command-line interface or a graphical user interface (GUI).

- Overall, an operating system plays a vital role in managing and coordinating the various components of a computer system, providing a stable and secure environment for users to run applications and perform tasks efficiently.