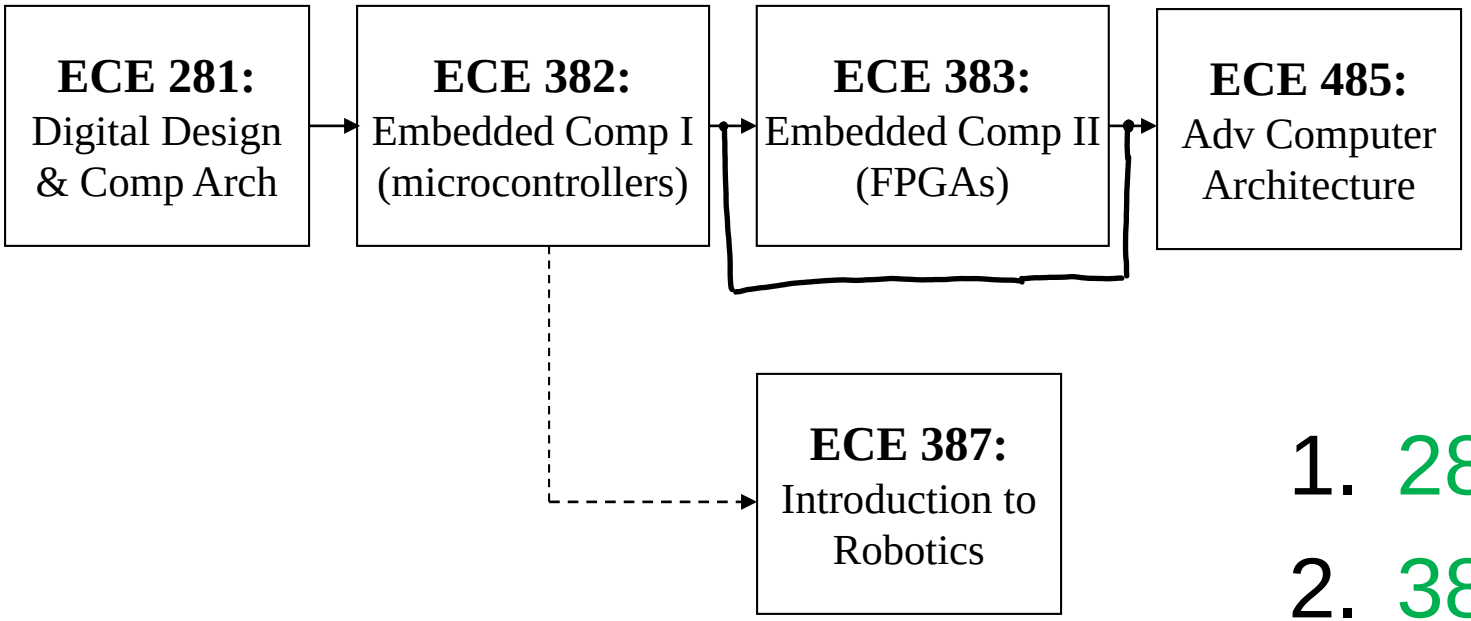
ECE485 Computer Architecture

Lesson 1

Computer Systems Courses

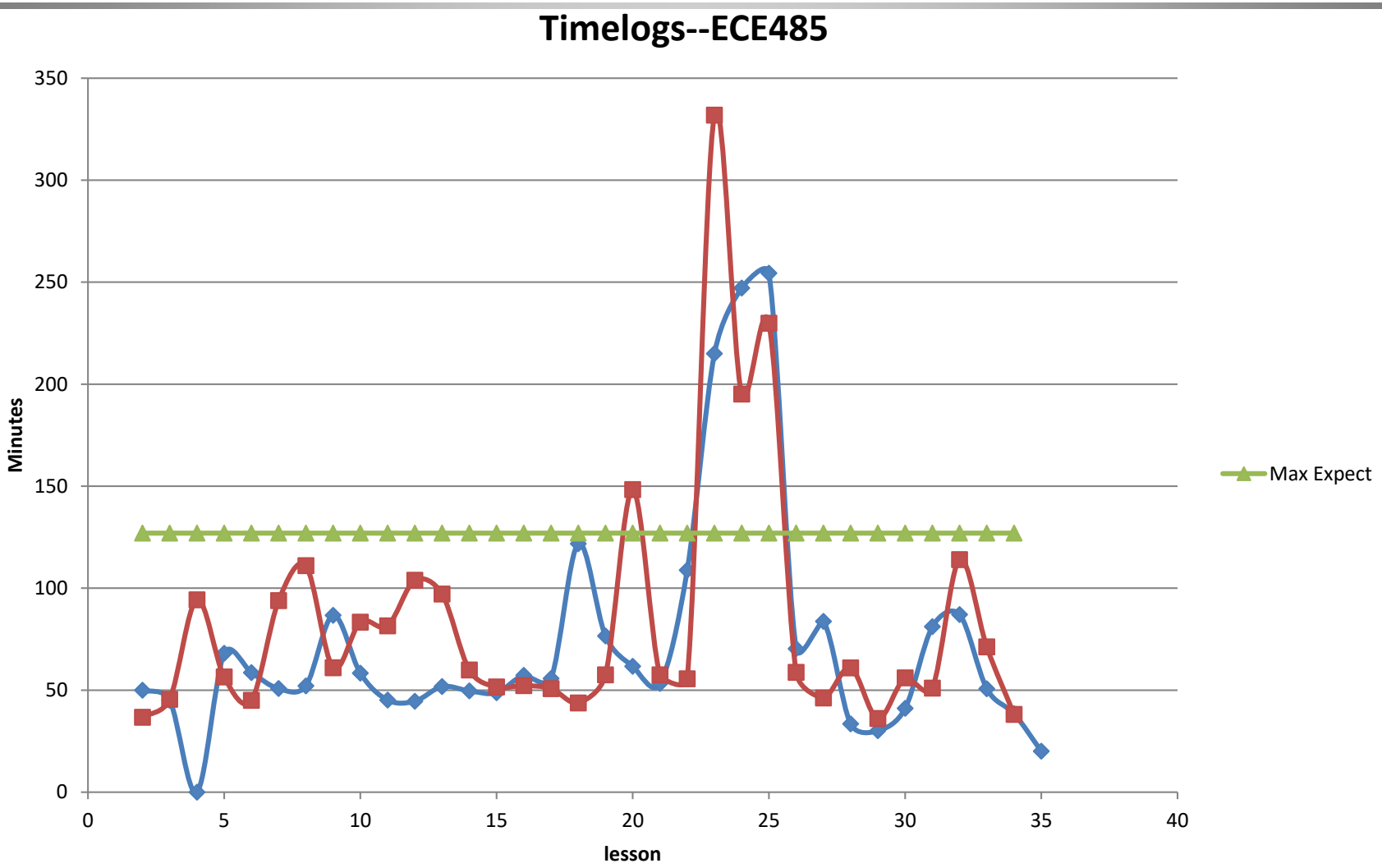


Which is the Best ECE CompE class?

1. 281
2. 382
3. 383
4. 387
5. 485

Course Overview

- Assess Architectures of Various Computers and their Subsystems
- Evaluate Architecture Performance Quantitatively
- Transition to Graduate Level Work
  - Resolve ill-Defined Problems
  - ~~Research paper~~
  - ~~Oral Presentation~~


Timelogs--ECE485
Minutes
lesson
Max Expect
0
50
100
150
200
250
300
350
0
5
10
15
20
25
30
35
40

What is the textbook for this course?

1. *Computer Architecture and Organization*
2. *Computer Architecture: From Microprocessors to Supercomputers*
3. *Computer Architecture: A Quantitative Approach*

Course Overview

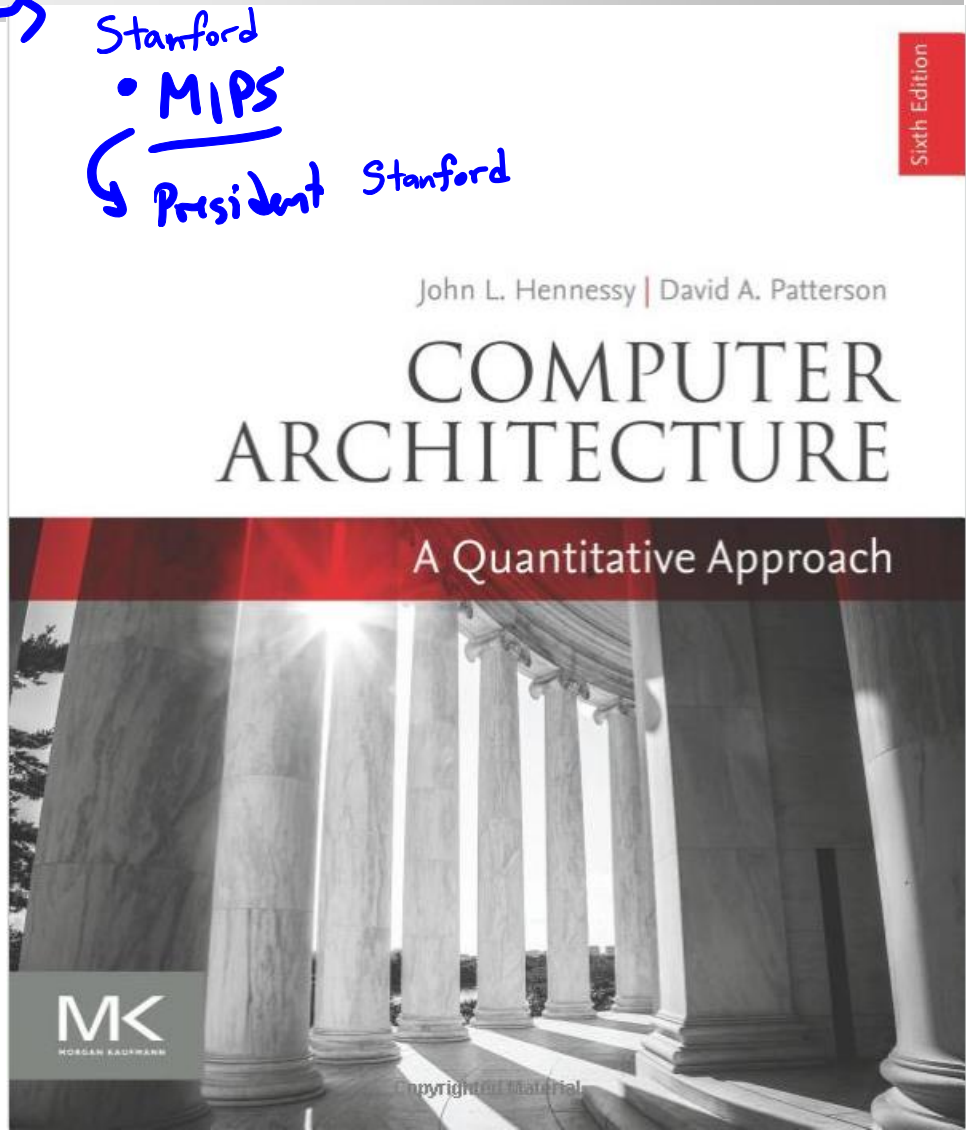
- Textbook
  - *Computer Architecture: A Quantitative Approach*, **Sixth Edition, 2019**

    by **John Hennessey & David Patterson**
  - The **Definitive Text** on computer architecture

Stanford
- MIPS

President Stanford

Berkley
- SPARC → SUN
- RAID



I have my textbook already?

1. yes
2. no
3. It is in the mail
4. I do not plan on getting the textbook

Course Website and Syllabus

- https://usafa.blackboard.com

202530-G-DFEC-ECE485-T2A : ADVANCED COMPUTER ARCHITECTURE

- Skills Review (due BOC M4)

- CPH (CPH1 due BOC M2)

- No extensions (like for TDYs) for assignment deadlines
  - Vivado → not need until lesson 19
  - Teams
  - Gradescope

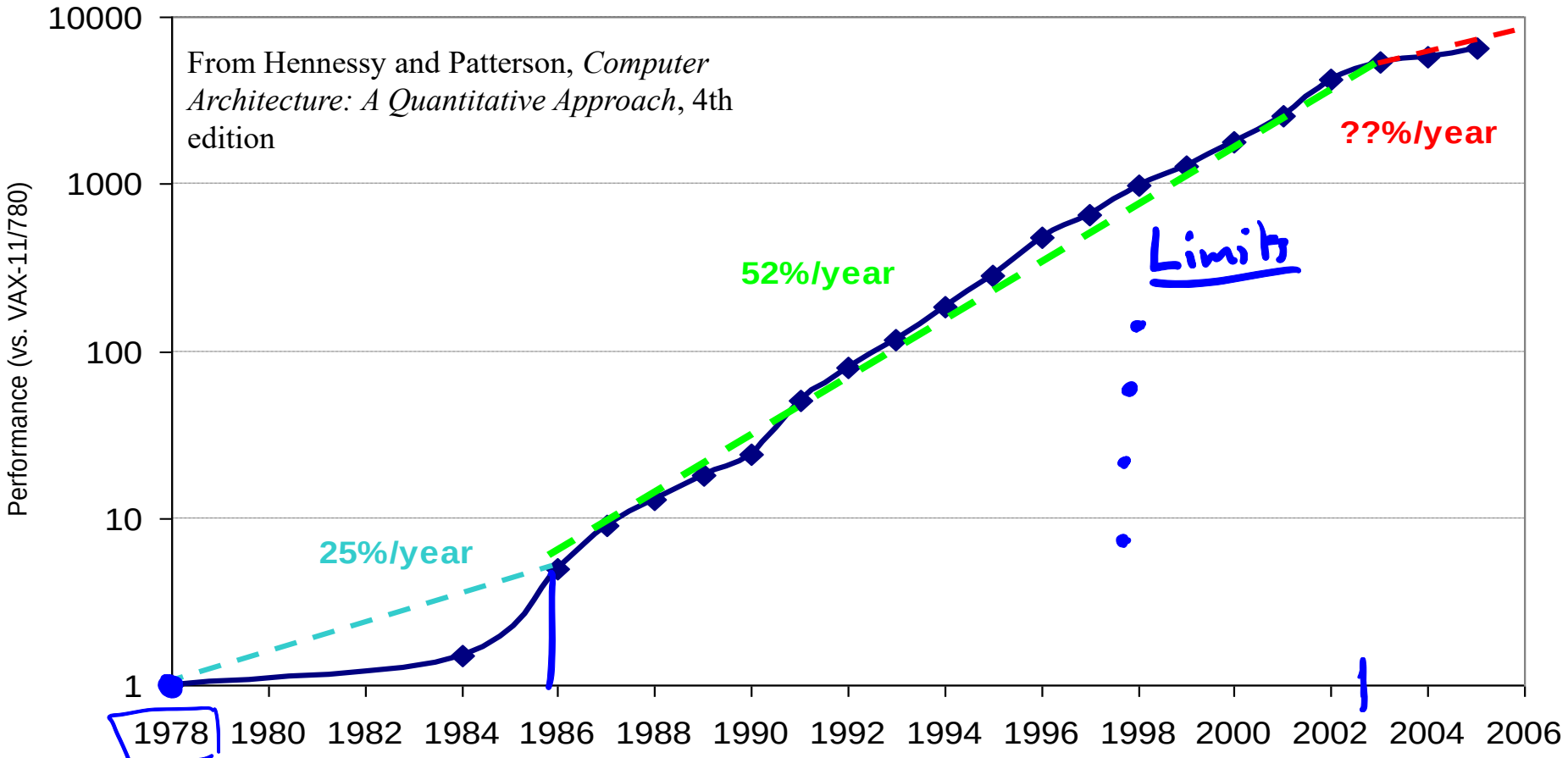
Computer Generations

- 1st gen: vacuum tubes
- 2nd gen: transistors
- 3rd gen: MSI, LSI devices
- 4th gen: packing as many transistors onto one chip
- 5th gen: multiple cores

SSI

VLSI

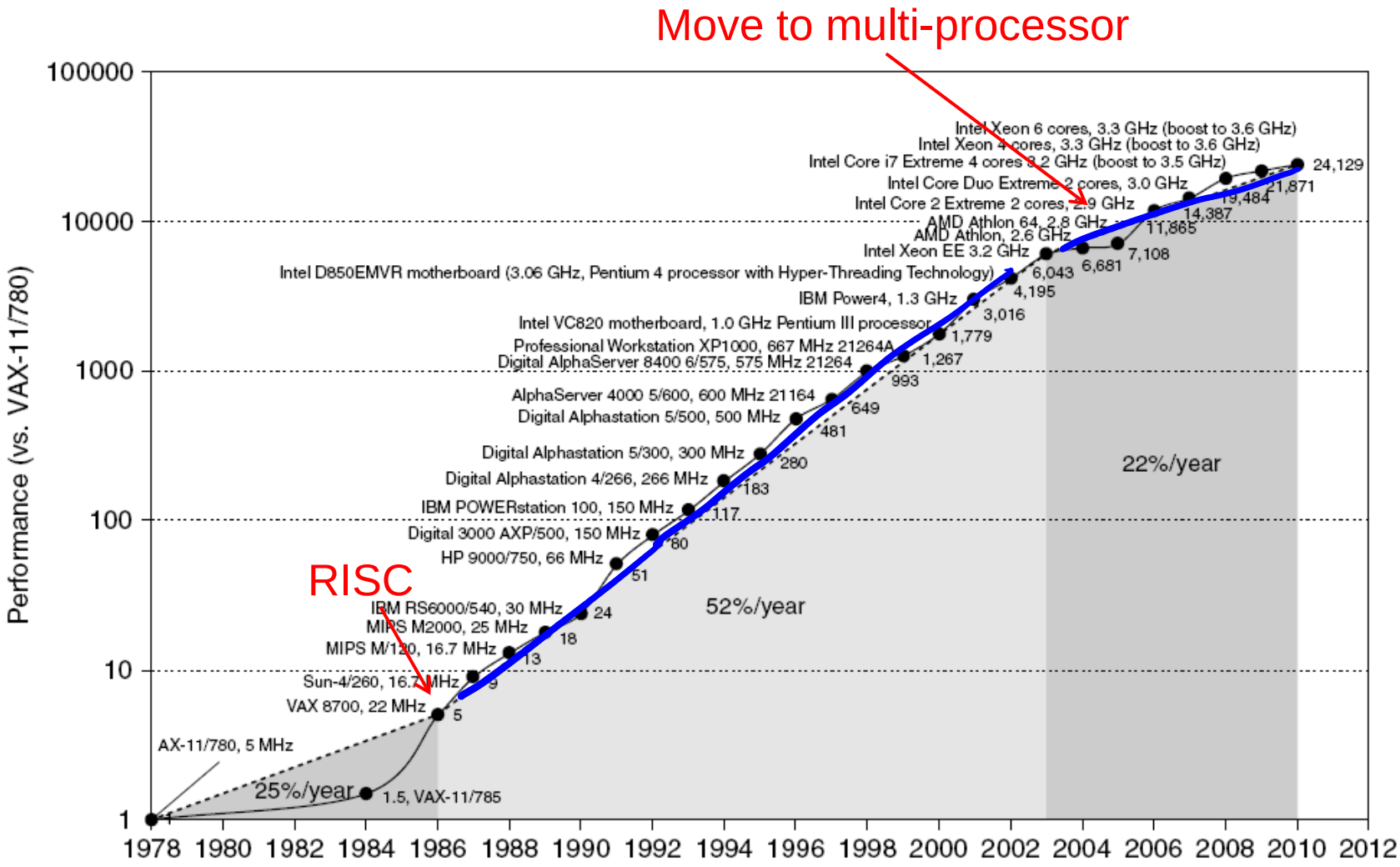
Crossroads: Uniprocessor Performance (2006 textbook)



- **VAX : 25%/year 1978 to 1986**
- **RISC + x86: 52%/year 1986 to 2002**
- **RISC + x86: ??%/year 2002 to present**

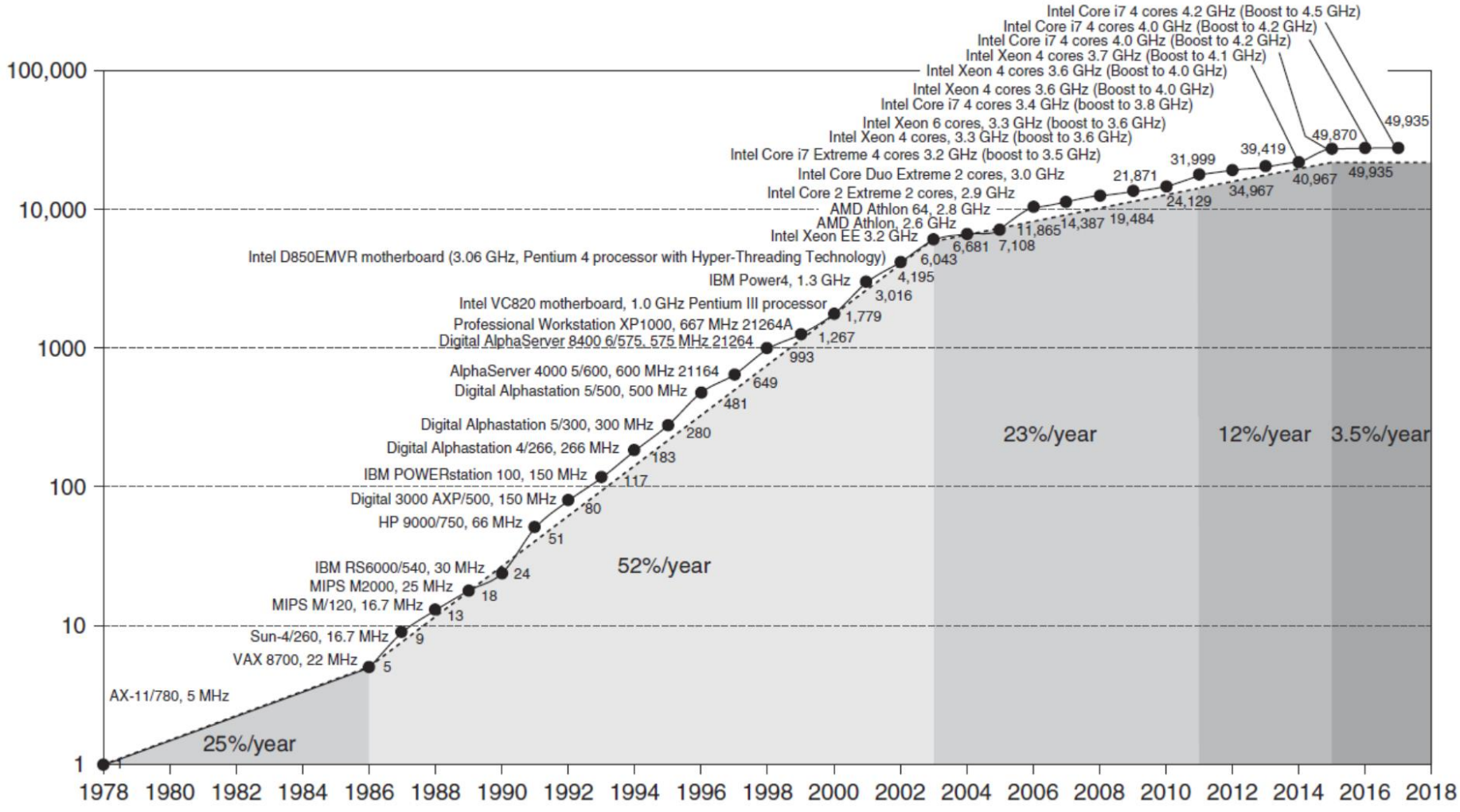
Single Processor Performance

2012 textbook



Single Processor Performance

2019 textbook



Bandwidth versus Latency?

1. Latency is the time it takes from the beginning to the end of an individual task
2. Bandwidth is the average throughput for all the tasks
3. If you increase the bandwidth, you also decrease the latency
4. 1 and 2 above
5. All the above

Trends in Hardware

Log-log plot of bandwidth and latency milestones

Which is easier to improve?

1. Bandwidth
2. Latency