The Mythical Man-Month (1975-2025)

Planning, Implementing, and Managing Statistical Software Projects

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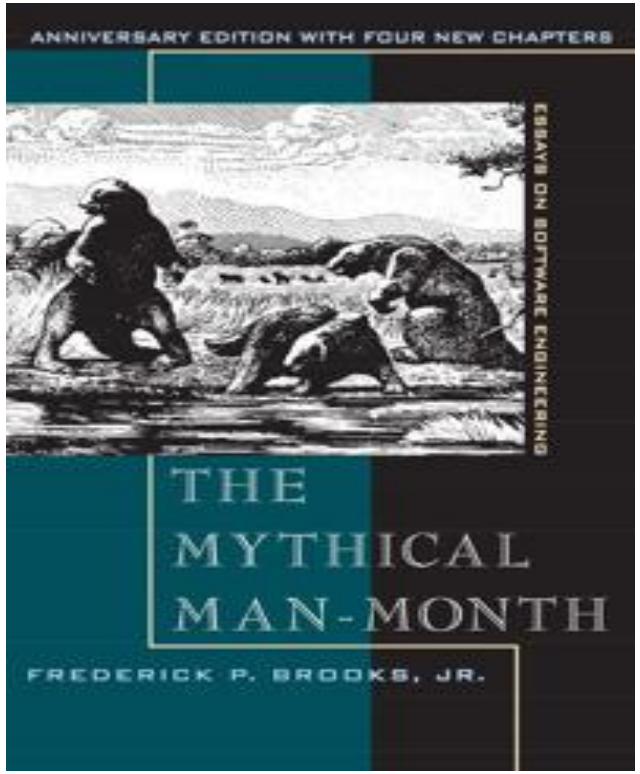
Veranex

Introduction

- **50th anniversary (1975-2025)**
- "**Bible**" of Software Engineering
- **Overview of the current state-of-the-art** of planning, implementing, and managing software engineering projects
  - established truths
  - novel insights
- **Open-source statistical software** in the pharma industry

Brooks' Law:
"Adding manpower to a late software project makes it later."



Cover with
"Mural of the La Brea Tar Pits"
(C. R. Knight)

50 years of IT Development

IBM System/360 (197x)

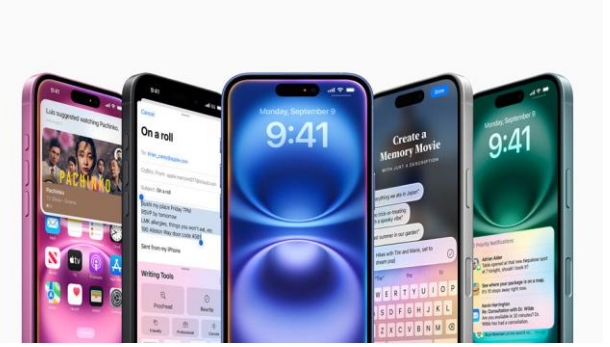
- **1975: Monolithic programs on punch cards for stationary mainframe computers**

…

- **Hardware,** eg, Moore's Law, PCs, Internet via cable/satellite
- **Operating Systems,** eg, Wirth's law, MS Windows, MacOS/iOS, Linux/Android
- **Programming languages,** eg, OOP, FP, Abstract Languages
- **Networking/Internet,** eg, TCP/IP, WWW, XMPP, Cloud, REST APIs
- **Collaboration**, eg DevOps, open-source, eg, Linux, Git(Hub)

…

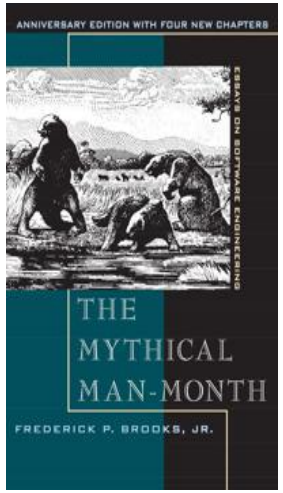
- **2025: Mobile mini-computers (smartphones) communicating with AI-power services on cloud servers via standardized protocols & interfaces**



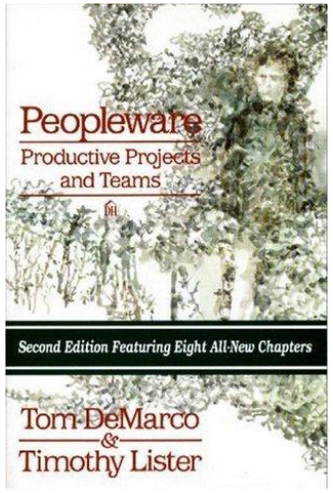
iPhone 16 (2025)

TM3 is still up-to-date

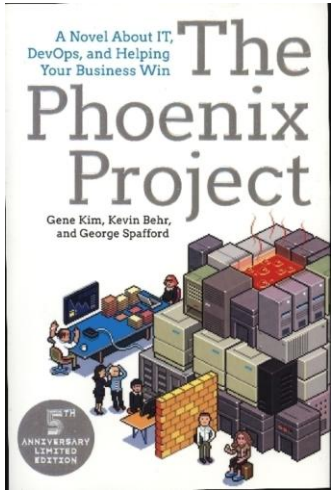
- **Updated 2nd edition (1995)** with 3 additional chapters
- Focus on **people and teams**
- **Style** (holistic, figurative-metaphorical, blunt, open, self-critical)



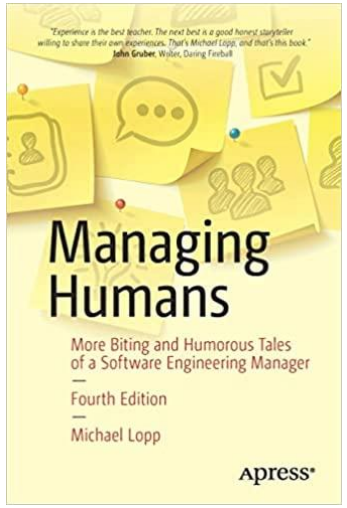
1975/1995



1987/1999



2013/2014



2007/2021

TM3 is out-dated

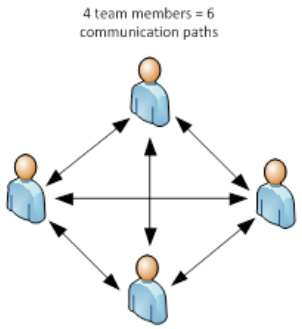
- **Progress of**
  - hardware (cf, Moore's law)
  - software (tools) (cf, Wirth's law, version control, CI/CD)
- **Examples are outdated**
- **Disruptive paradigm shift** by AI,
  eg, Deep Learning, Large Language Models
- **Style** (male-oriented, patriarchal, euro-centric, Christian)
  ("*A team of two, with one leader, is often the best use of minds. [Note God's plan for marriage.]*" Brooks, 1975/1995, p. 232)

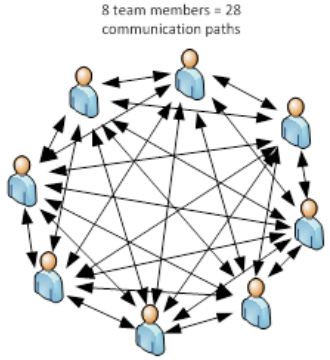
The Mythical Man-Month

- an **artificial unit** of human effort, but not useful for human work
- a **“myth”**, ie a common, but false (& dangerous) idea (cf Brooks law)
- depends on **dependency of subtasks** (cf, complex software)
- **Example**: If a software program is estimated to require **12 man-months**, **365x developers** programming for 1 day is expected to result in a **program of lower quality** (or no functioning program at all) relative to **1x developers** programming for 365 days.
- **Assessment**: still true, but simplistic

Brooks' Law (1)

- *"Adding manpower to a late software project makes it later."*





- Burden of **work & communication,**
  eg, number of communication paths is n(n-1)/2
- Delay depends on **timepoint, personality, process**
- **Extension to "Costs"**
- **Assessment**: true, progress made,
  but often not applied in practice

Brooks' Law (2) – Reasons for delays

- Managers target **too short timelines** (target vs commitment vs estimate)
- **Poor estimation techniques**, e.g. expert opinions
- **Effort confused for progress**, eg, re-work, non-essential features, debugging
- **Poor monitoring** of project progress, eg verbal report at team meetings
- **Inappropriate corrective actions**, eg adding more people
  (vs reducing scope, move timelines, postpone other projects)

Brooks' Law (3) - Rules of thumb

	Brooks (1975/1995)		Orosz (2024)		Jones (2024)
Planning	33%	Planning	20%	Planning	20%
Coding	17%	Coding + Testing	40%	Coding	30%
Testing of components	25%			Testing	25%
Testing of system	25%				
		Code review	20%		
		Release to Production	20%	Release to Production	15%

Orosz, 2024

No Silver Bullet

- ***No single development*** *(technology or management) will result in a* ***10x improvement*** *in productivity, in reliability, in simplicity over the next 10 years* (Brooks, 1986/1995)

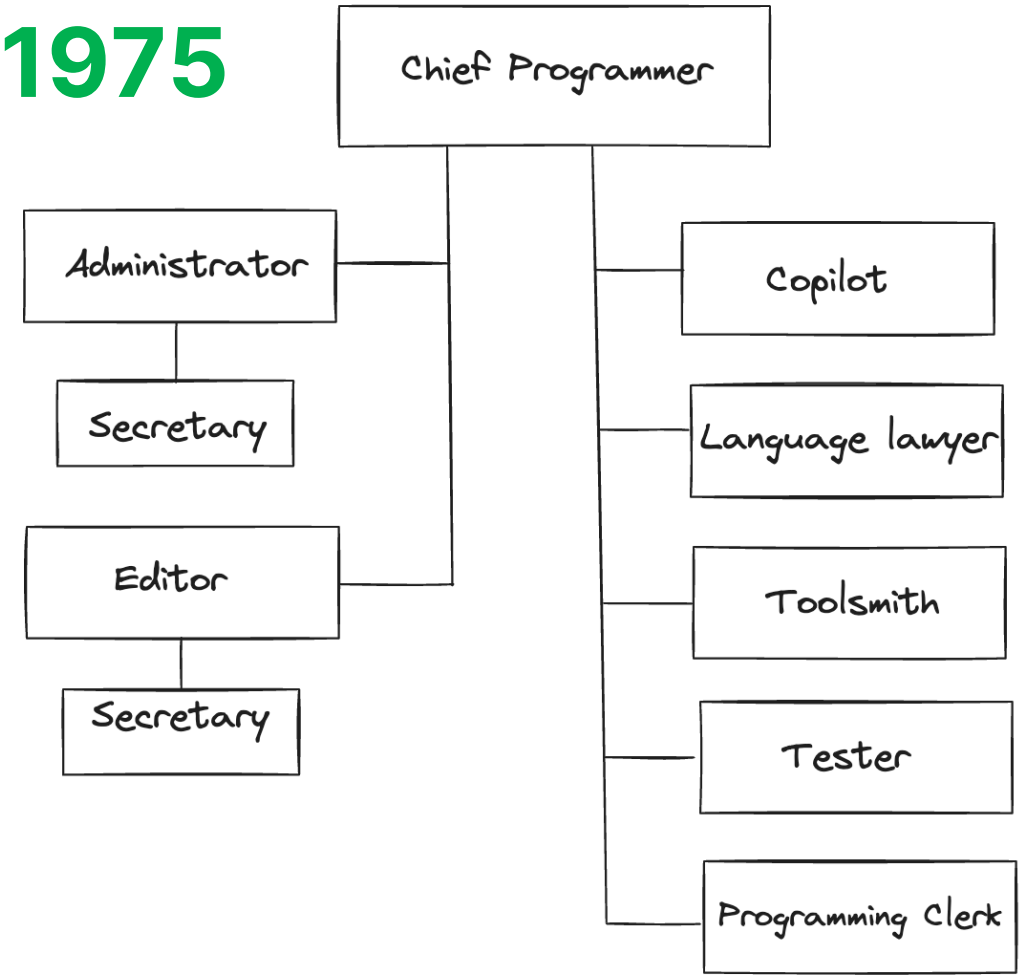
- **Examples:**
  - Multiple small improvements may have a combined effect of a 10-fold improvement (eg, $1.26^{10} \sim 10$)
  - Version control, eg GIT, Subversion
  - Continuous Integration/Continuous Delivery (CI/CD) Model
  - Open-source software development model
  - AI/Deep Learning/Large Language Models

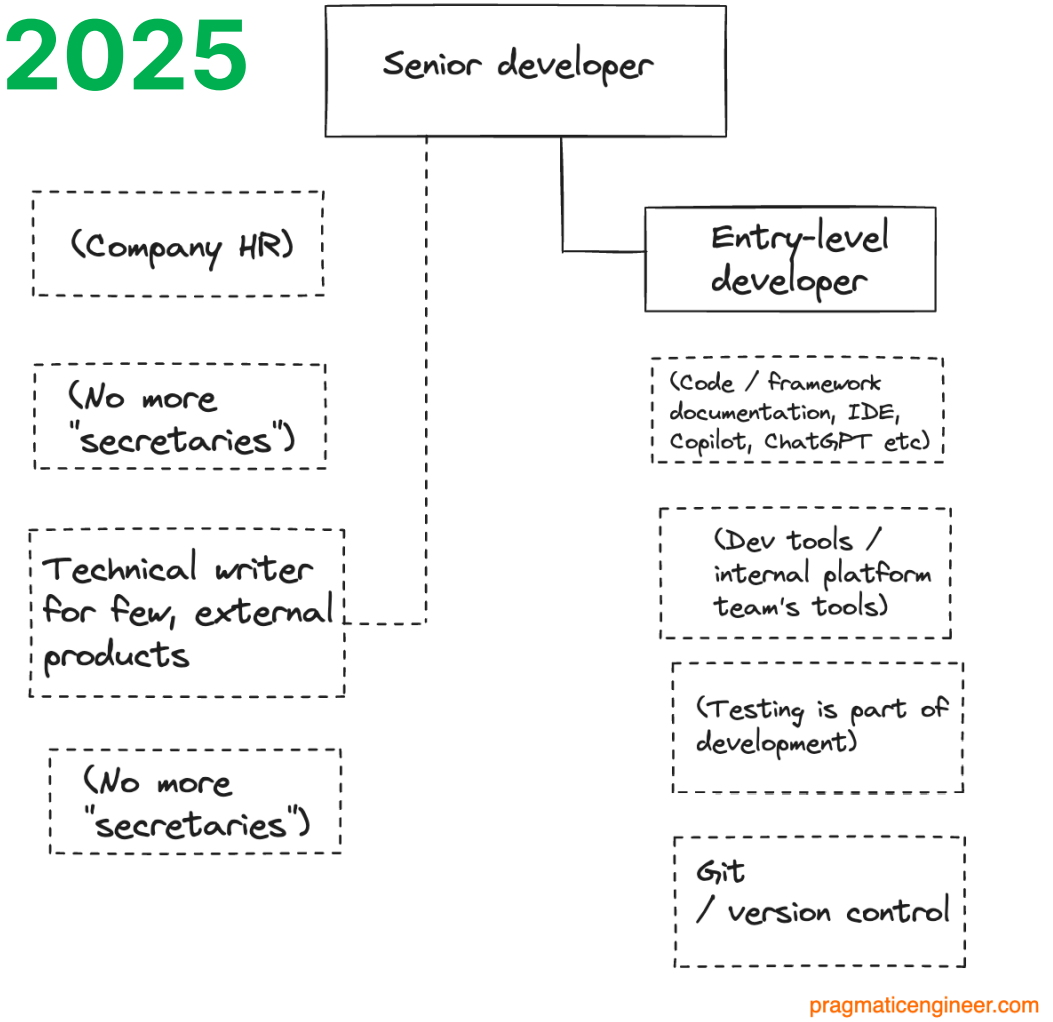
- **Assessment**: true at the time, less relevant today

People – (almost) everything

- The **major problem is sociological,** not technological.
- **Developers team** (> 4x tools) is largest factor for project progress
- **Managers:**
  - Function: to make it possible for people to work
  - Subsidiarity: the power of giving up power
- **Assessment:** still true,
  though tools have improved considerably
  (eg, version control, CI/CD)

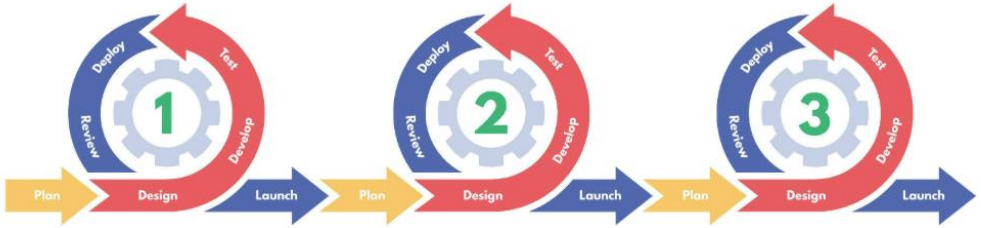
Surgical Team Concept





Progressive Refinement & Central Argument

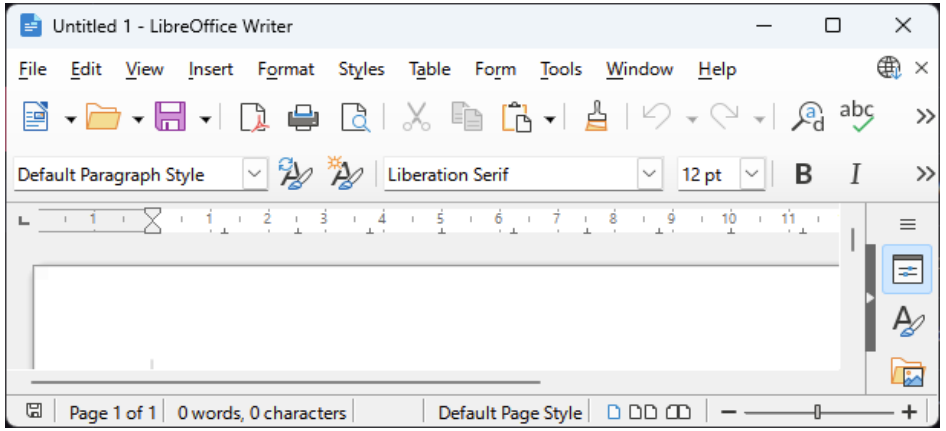
- **Progressive Refinement**
  - End-to-end skeleton system
  - Family of related products
  - Incremental builds



Example: Agile Development

- **The Central Argument**
  - Conceptual Integrity
  - Architecture vs Implementation
  - The Architect
  - Recursion of architects

- **Assessment**: true, though terminology has changed



Example: WIMP Interface

AI tools

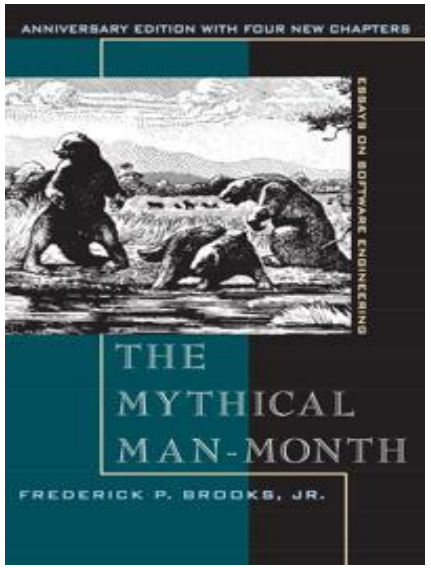
- **Release of Large Language Models**
  (ie, OpenAI/ChatGPT, DeepSeek, MS/CoPilot, Google/Gemini,..)

- **Pros:**
  - **Automatic creation, translation, debugging of programs**
    based on human, natural-language prompts
  - **Impressive performance**

- **Cons:**
  - **Misinterpretation** of prompts, bugs, hallucinations
  - **Additional QC review** of (overly) complex code
  - **Violation of intellectual property rights**

Conclusion

- *“**The Mythical Man-Month**” is still a classic*
  - *some anachronisms*
  - *(simplified) truths*
  - *prophetic insights*



- ***Large progress** in technology and management, but often not applied.*

- **Human personalities and social behaviors** have not fundamentally changed.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Danke
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