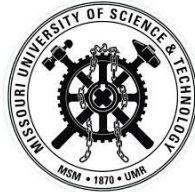
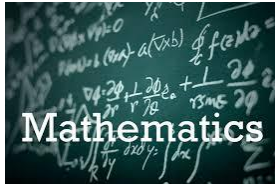


CS1000 Software History

Kim Tracy
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Software History 11/16/2015

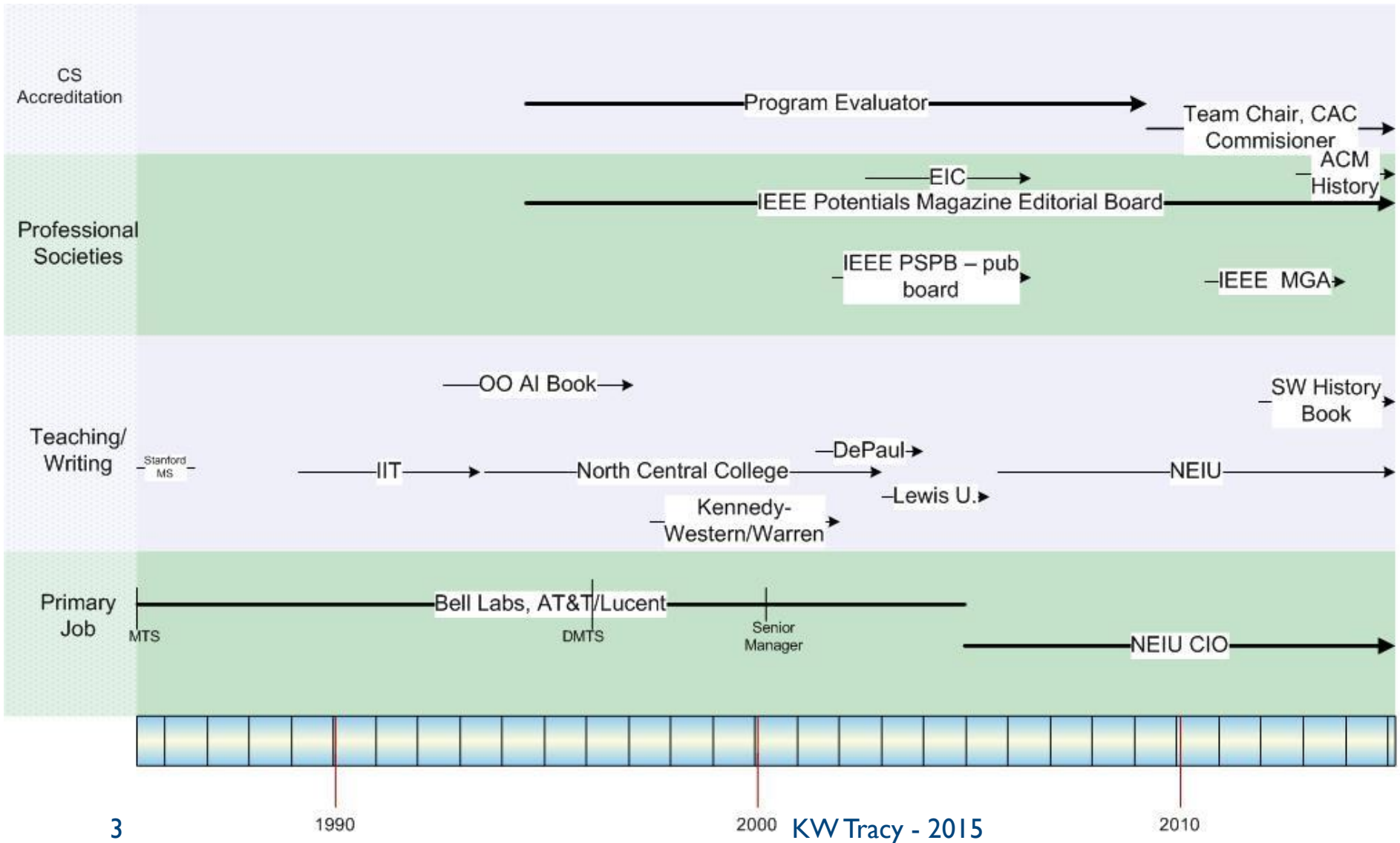
Getting into computing. . .



UNIX[®]



Experience Overview



Software and Engineering Experience

- ▶ Broad experience
 - ▶ Telecommunications software (5ESS, ISDN, etc.)
 - ▶ Operating Systems development (R&D Unix)
 - ▶ DBMS development (C RDBMS)
 - ▶ Database application experience (Monsanto, Bell Labs)
 - ▶ Information architecture
 - ▶ Consulting
 - ▶ Security Software
 - ▶ System Tester
 - ▶ Development methodologies, SW Quality
 - ▶ AI Software
 - ▶ Productization (Visualization, mapping, etc.)
 - ▶ Consulting (Enterprise Architecture/Information Architecture)
 - ▶ Network design and architecture
 - ▶ Systems engineering

IT Experience

- ▶ Across all IT areas (as CIO of NEIU)
- ▶ ERP (Enterprise Resource Planning) deployment
- ▶ IT Management
- ▶ ITIL – IT organization and processes
- ▶ Security
- ▶ IT Strategy, Applications, Operations and Infrastructure
- ▶ IT Roadmapping
- ▶ IT Consulting (reviewing other orgs, employment exam writing, security audit)
- ▶ Mobility application (3g/4g)
- ▶ Strategic application of IT – impact to business/organization

Teaching Experience

- ▶ Taught in a wide variety of institutions and modalities
- ▶ NEIU, North Central College, IIT, DePaul, Lewis, and online
- ▶ Wide variety of courses taught (DBMS, A&D, Networking, OS, AI, Discrete Math, ToC, Prog. Langs & Compilers, eBusiness, Security, Open Source, MS Projects, etc.)
- ▶ Now at MTU, teaching SW Engineering and Systems courses
- ▶ Teaching Software History this summer (CS3090)
 - ▶ Sidenote: the IBM 3090 was a popular mainframe. . .

Software History-Why

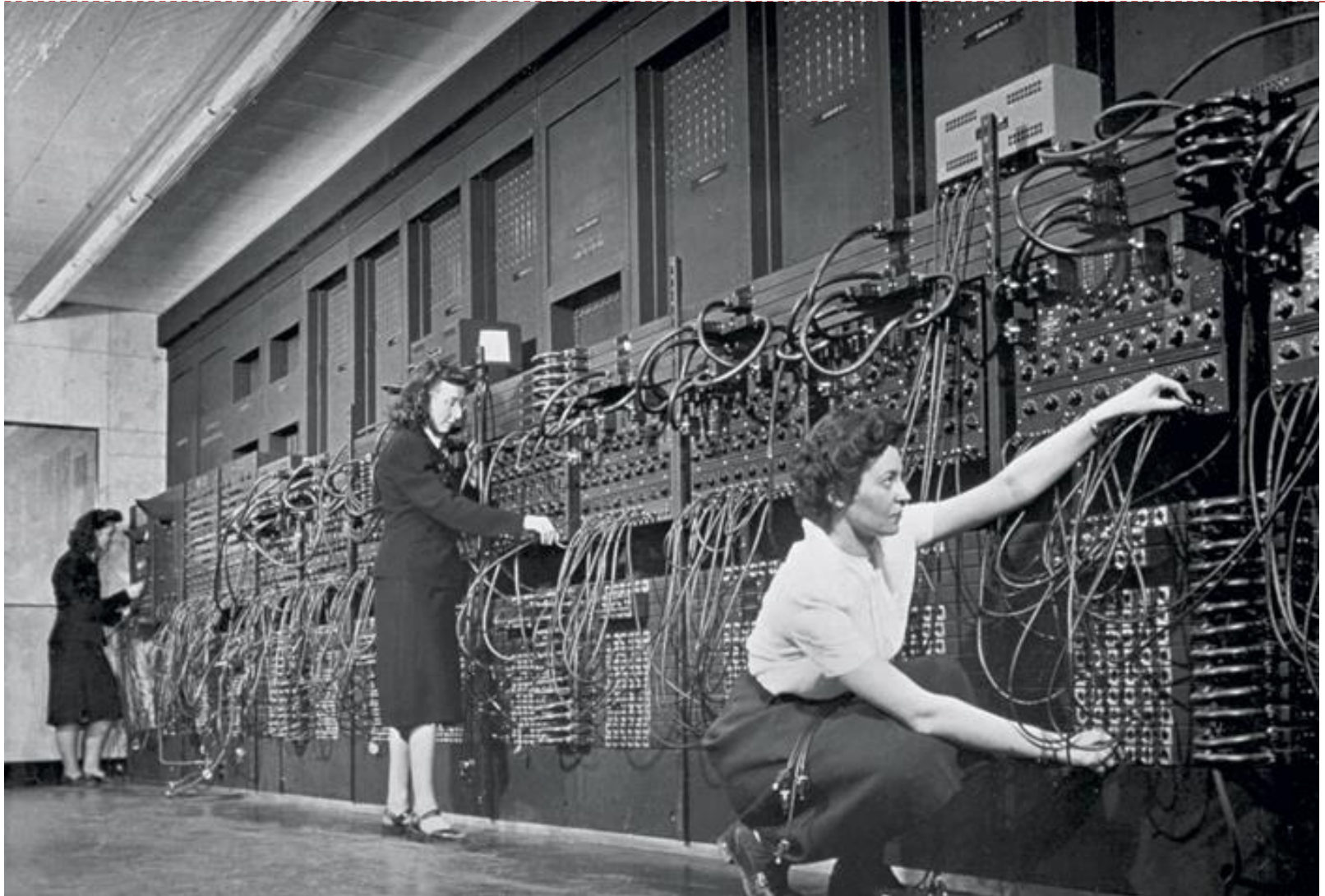
- ▶ Book on software history
 - ▶ Many current students have little knowledge of SW history
 - ▶ Get dribs and drabs in some courses and textbooks
 - ▶ Missing the big picture on software's evolution
 - ▶ There's a need to know
- ▶ The focus is on what technology students need to know

See: <http://books.acm.org/subjects/forthcoming-titles> for abstract.

Outline – Software History

- ▶ Issues to address
- ▶ How did we get to the point where a history is needed?
- ▶ Historiographical approach
- ▶ Examples

“Programming” the ENIAC



Corbis
Photo as
in Forbes

Issues Addressed

- ▶ No existing textbook on software technical history
 - ▶ Students are left with a sea of bits and pieces
- ▶ My foci:
 - ▶ Understanding software base and its evolution
 - ▶ Applying learnings to future systems

What has happened to make a software history necessary?

- ▶ To manage complexity, we've increased the levels of abstraction
 - ▶ Students often learn and use only the highest levels
- ▶ We're rarely teaching a lot of the lower levels (file systems, DBMS internals, OS internals, Assembler, etc.)
- ▶ We've rapidly specialized
- ▶ We've got over 60 years of history

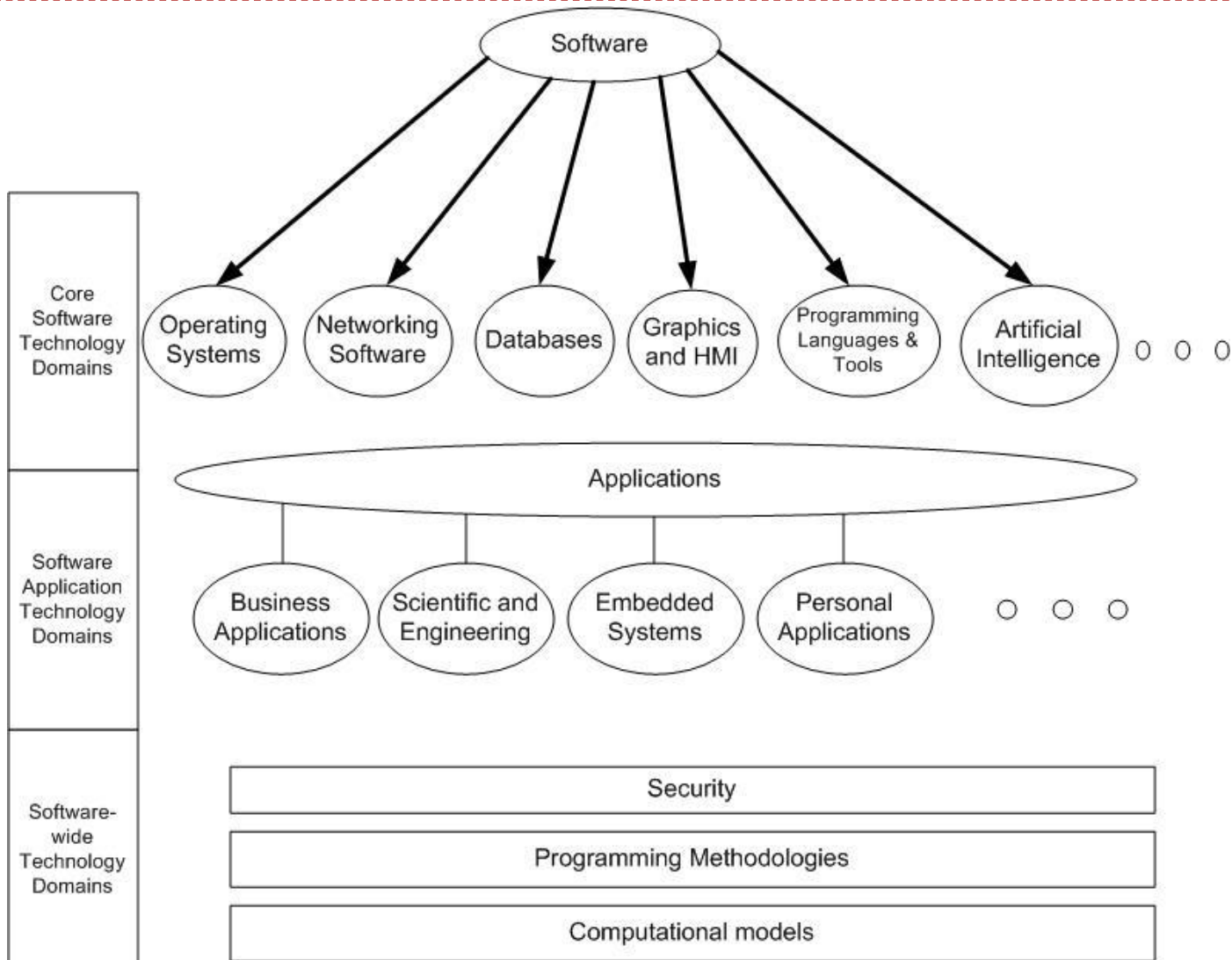


Historiographical method

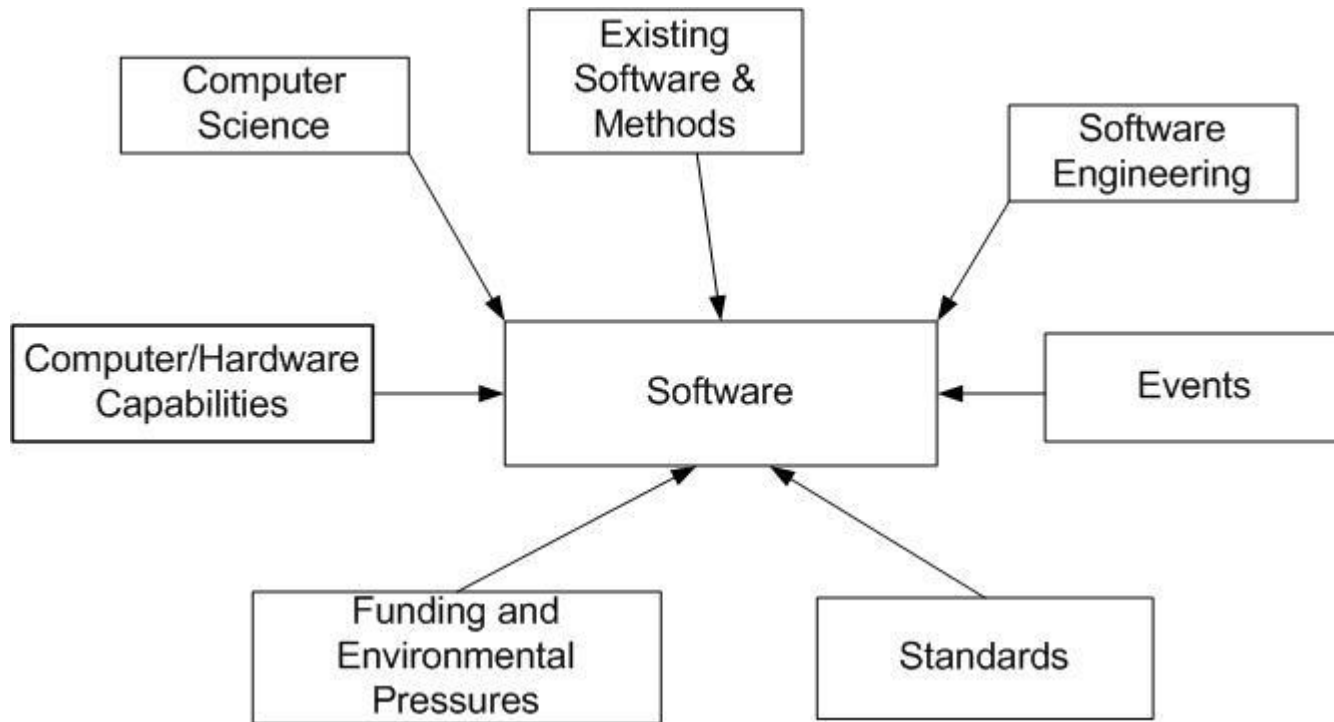
- ▶ Software *is* a technology
- ▶ Using a “domain” and “sub-domain” approach*
 - ▶ Focus on core domains: operating systems, programming environments, databases, networking, etc.
 - ▶ Other concepts: significant events, communities of practice, standard engineering
- ▶ Importance of primary sources
- ▶ Software is an unusual technology
 - ▶ Very loosely based on physical phenomena
 - ▶ More like mathematics in building on previous abstractions/results
- ▶ Why haven't historians of technology done this?

* As per a combined approach of Basalla, Arthur and Constant.

Software Taxonomy



Influences to Software Change

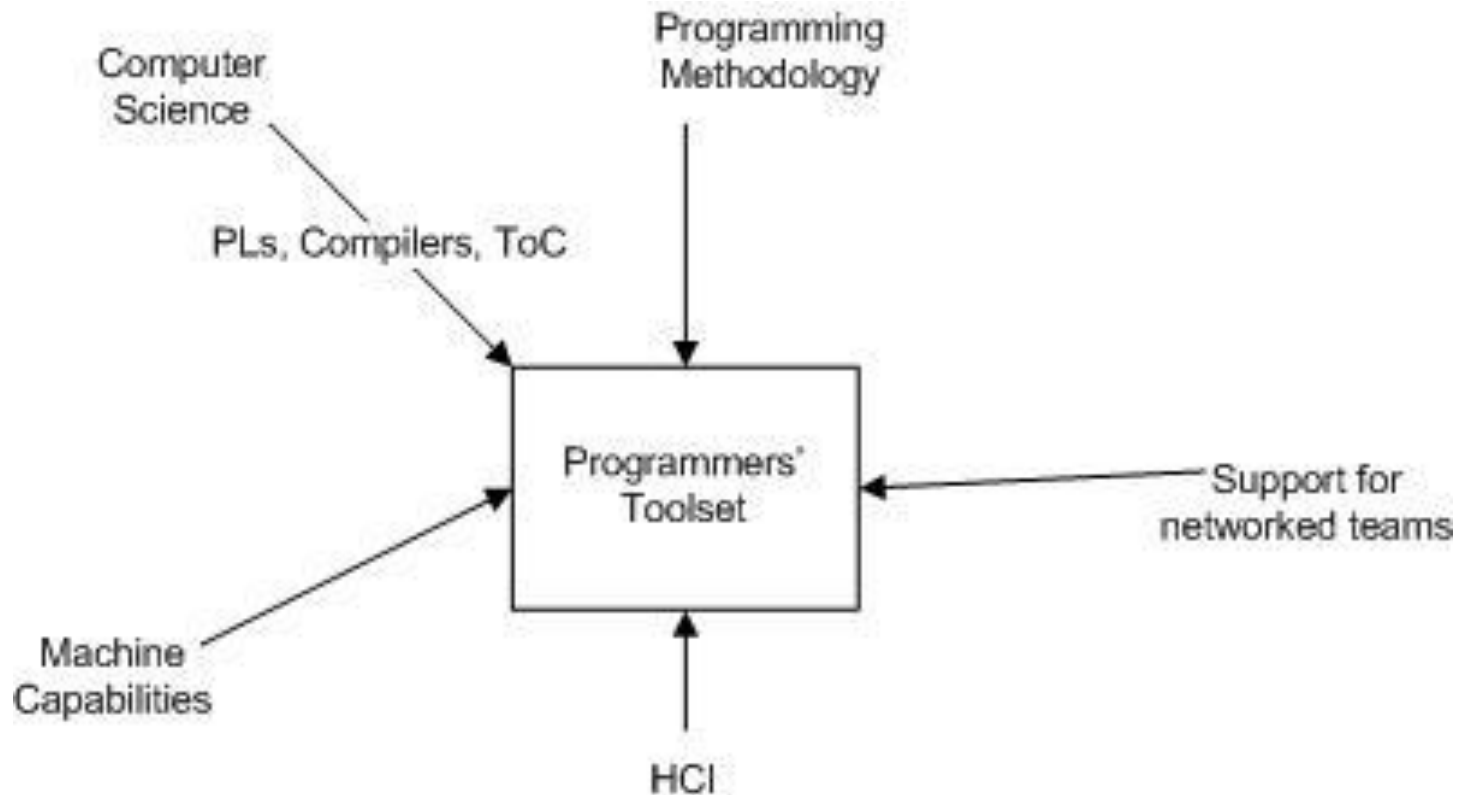


Book Structure

- ▶ Use a broad technical evolution with significant events and then include deep dives into:
 - ▶ Chapters by software technology domain
 - ▶ Important examples of source code
 - ▶ Failures and learnings
 - ▶ Other case studies

Programmers' Toolsets

Influences on Toolset Evolution

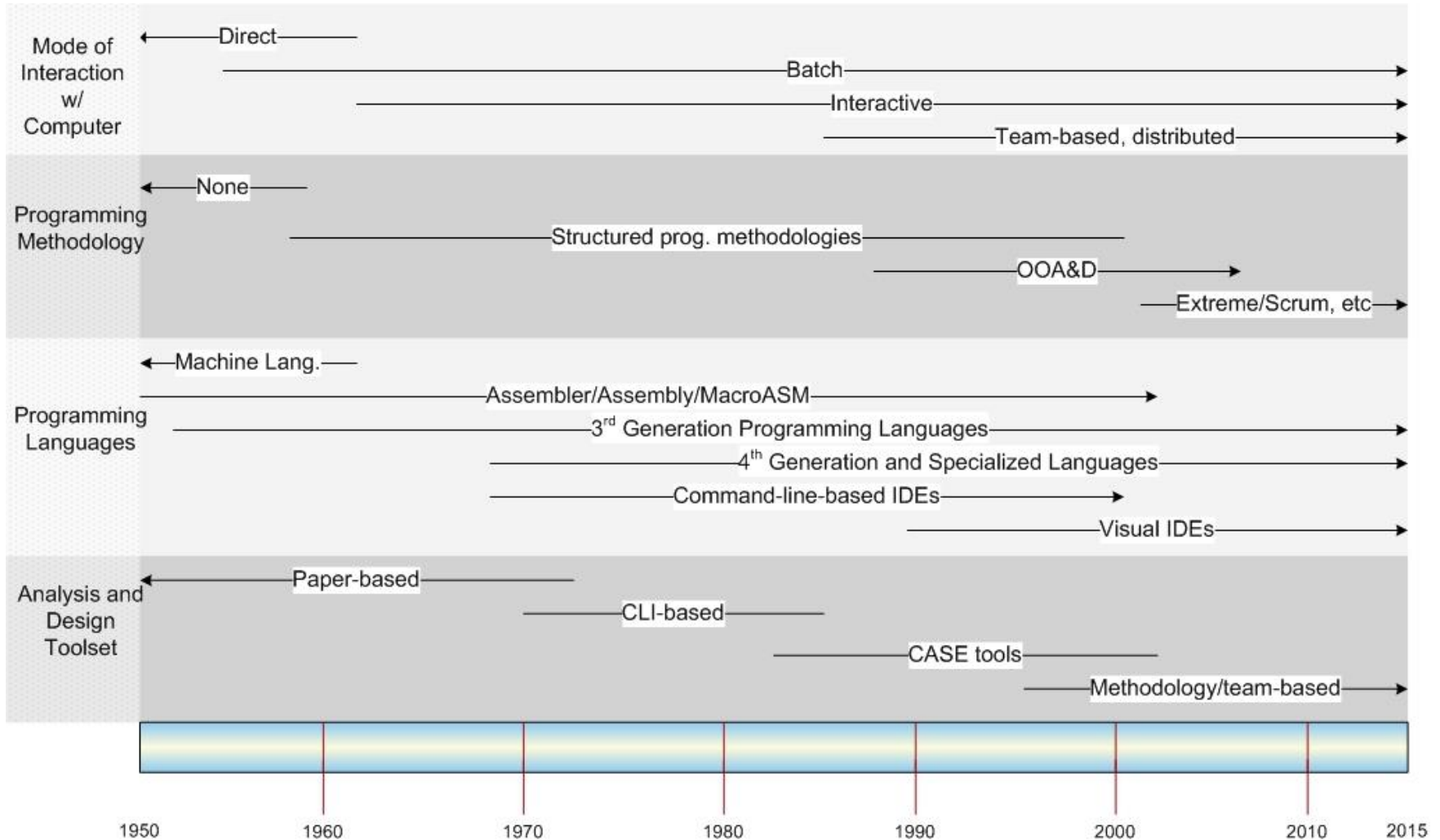


IBM 704



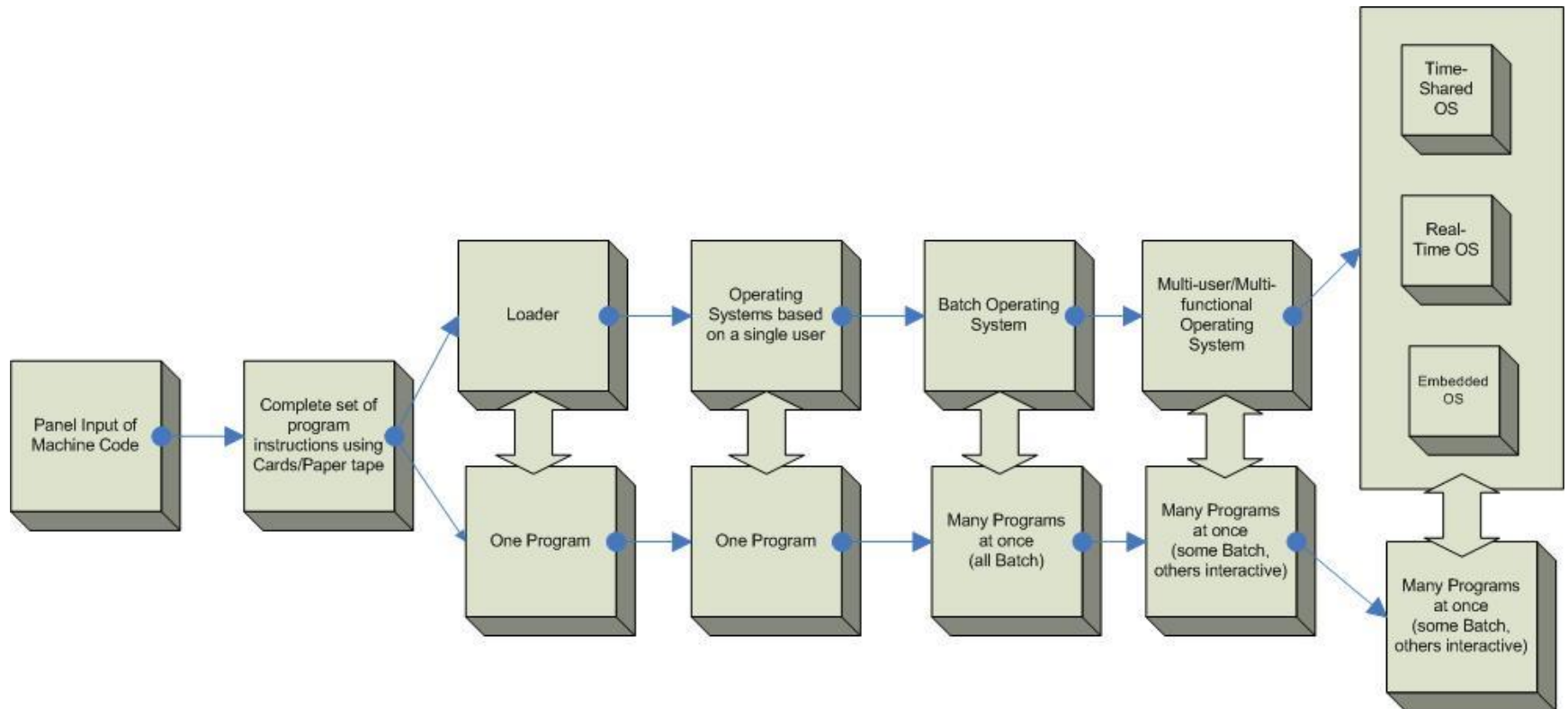
NASA, public domain

Programmers' Tools Over time

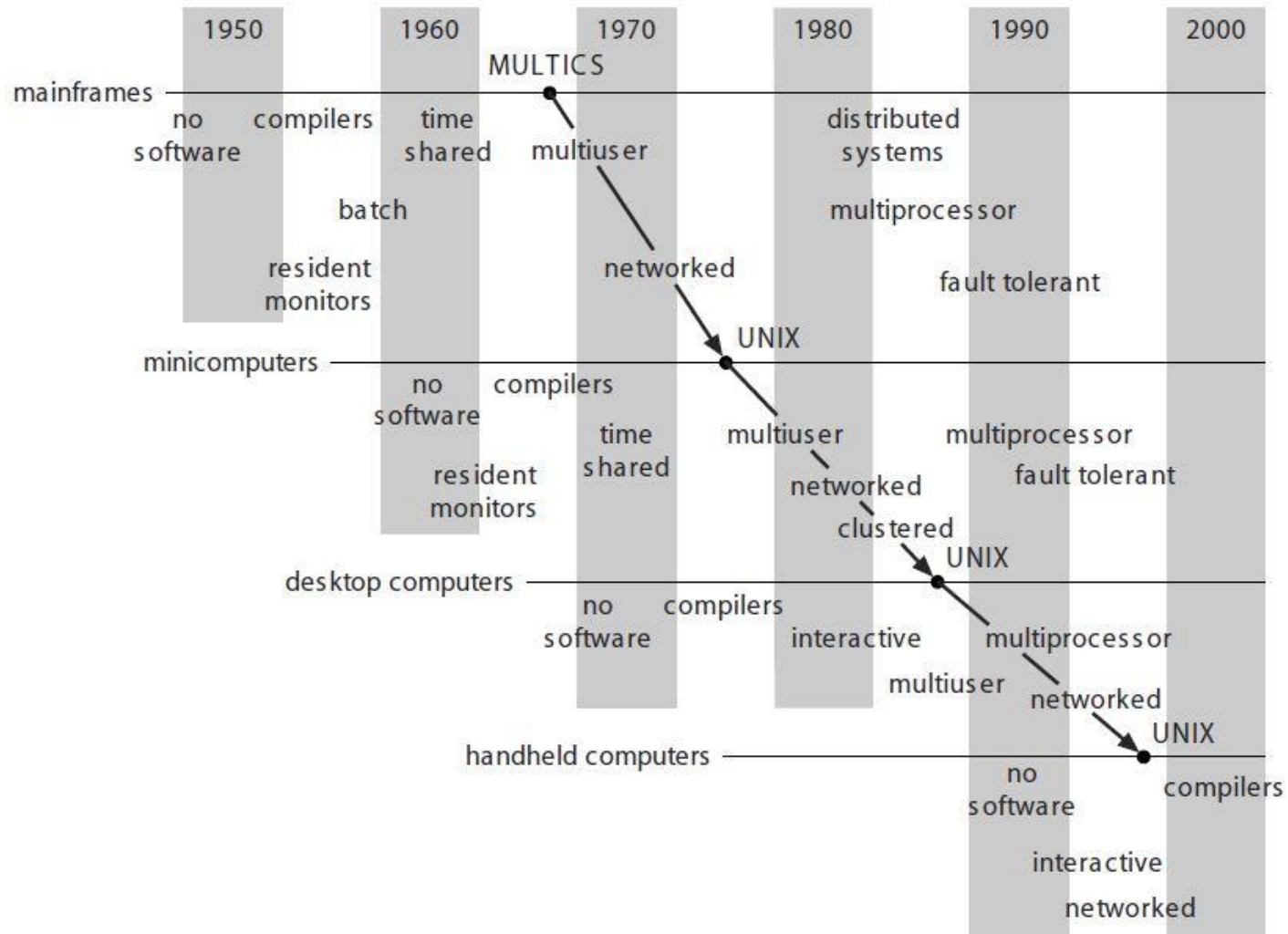


Operating Systems

High-level Evolution of Operating Systems



Evolution of OS Features to Smaller Devices*



* From Silberschatz, Galvin, and Gagne, *Operating Systems, Concepts*, 9th Edition, Wiley, 2012, Chapter 20, Figure 1.

Summary

- ▶ Software history's time has come
- ▶ Student's have a need to know
 - ▶ No cohesive, digestible view
- ▶ Losing software pioneers
- ▶ Gives students a picture of the overall evolution of SW
 - ▶ ability to reason about trends and future possibilities

Questions?

References

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- ▶ Basalla, George, The Evolution of Technology, Cambridge University Press, 1988.
- ▶ Constant II, Edward, The Origins of the Turbojet Revolution, The Johns Hopkins University Press, 1980.
- ▶ Mahoney, Michael, The Histories of Computing, Harvard University Press, 2011.
- ▶ Charles Babbage Institute (CBI), www.cbi.org.
- ▶ Computer History Museum, www.computerhistory.org
- ▶ Computer History Museum scanned manuals, <http://www.bitsavers.org/>
- ▶ Various Oral histories
 - ▶ CBI: <http://www.cbi.umn.edu/oh/>
 - ▶ CHM: <http://www.computerhistory.org/collections/oralhistories/>
 - ▶ Smithsonian Computer Oral History Collection, 1969-1973, 1977
 - ▶ <http://dl.acm.org/citation.cfm?id=1234040>
 - ▶ http://invention.smithsonian.org/downloads/fa_cohc_abstracts_a-d.pdf
 - ▶ http://invention.smithsonian.org/downloads/fa_cohc_abstracts_e-g.pdf
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 - ▶ http://invention.smithsonian.org/downloads/fa_cohc_abstracts_n-r.pdf
 - ▶ http://invention.smithsonian.org/downloads/fa_cohc_abstracts_s-z.pdf
 - ▶ SIAM: The History of Numerical Analysis and Scientific Computing
 - ▶ <http://history.siam.org/oralhistories.htm>
- ▶ History of Programming Languages I, II, and III conference proceedings, ACM.