C Programming
A Historical Perspective

Dr. Charles R. Severance

www.cc4e.com

code.cc4e.com (sample code)

online.dr-chuck.com

Learning Path: online.dr-chuck.com

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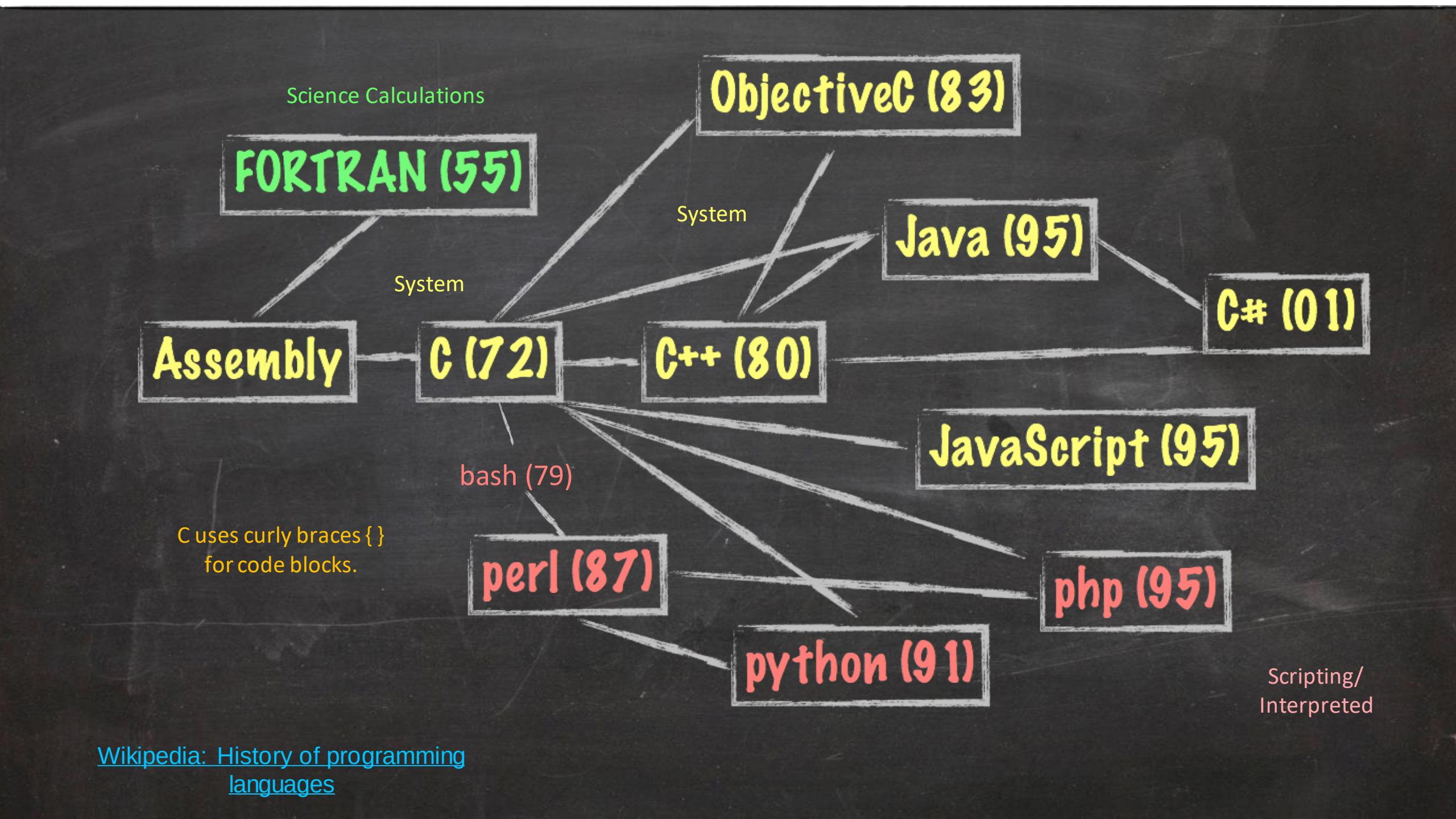
History of C

- 1969 – B Language – Word oriented (i.e. not byte oriented)
- 1972 – C Multiple types including (byte / character)
- 1972 – 1978 – C and UNIX co-evolved with a goal of increasingly less assembly language in UNIX
- **1978 – K&R C**
- 1989 – C89 / ANSI – void type, C++ declarations, character sets, locales
- 1990 - C90 / ISO C
- 1999 – C99 – complex type, // comments, Unicode
- 2011 – C11 – Library improvements
- 2018 – C17 - Cleanup of C11

Modern C / Future of C / post-C

- Challenges to use C as general purpose languages
  - No dynamic memory support in the core types / libraries
  - No “safe” string type
- C++ is best thought of as a more powerful and flexible C for professional programmers and systems applications
- Java / JavaScript / C# / Python – Types are usually objects – not ”close to the metal” – Not as well suited for an operating system Kernel
- The likely follow on to C in systems applications is Rust
  - Stays close to the metal while providing simple and safe core data types
  - Becoming the second official language in “Linux”



Wikipedia: History of programming languages

A Brief History of Computers

- 1940's – Top Secret / Military / WWII (ihts.dr-chuck.com)
- Early 1950's – Custom built
- Late 1950's – Companies like IBM, DEC, etc. begin selling computers
- 1960's – More companies, less expensive, wider range of options
- Late 1960's – Many kinds of computers old/new/fast/slow
- **1970's – Searching for "the one" solution for software**
- 1980's – Microprocessors and Personal Computers – performance++
- 1990's – The network is the computer – performance++
- 2000's – Amazon AWS founded in 2002 – computing as commodity

History of UNIX

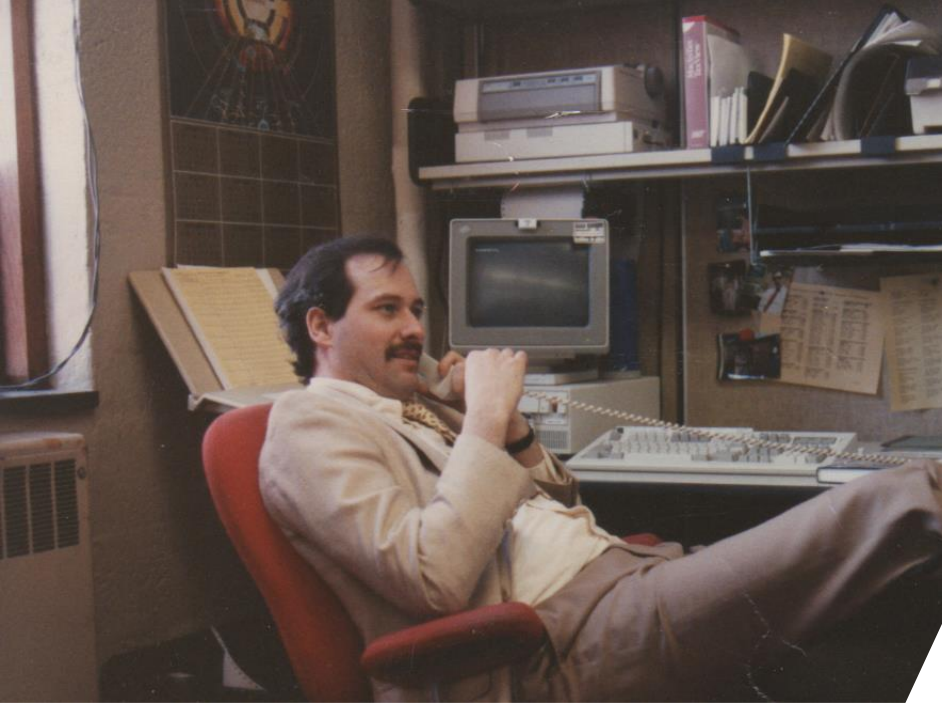
- 1960s – Multics
- 1970 – UNIX on a DEC PDP 11/20
- 1973 – UNIX Rewritten in C – Ran only on the PDP 11
- 1978 – UNIX ran on the Interdata 8/32 - C Evolved as well to support portability so UNIX could be ported
- **1978 – Unix version 7 ran on DEC VAX systems**
- **1978 – 1BSD Unix Released from Berkeley Software Distribution**
- 1982 - Sun Microsystems Founded – UNIX Workstation
- Late 1980's Intellectual Property became complex

The post-UNIX world

- Late 1980's UNIX was very popular – AT&T saw an opportunity to commercialize their work. Many variations of UNIX had bits and pieces taken from AT&T UNIX – it got complex quickly
- 1987 – Minux was developed as a fresh ground-up implementation by Andrew S. Tannenbaum to teach operating system concepts – it was free but modification and redistribution were restricted.
- 1991 – Linus Torvalds wanted to build a fresh ground up implementation of the "UNIX" kernel that was 100% free – some of the utility code came from the GPL-Licensed GNU project
- 1992 – Linux adopted the GPL license

A Brief History of Dr. Chuck

- **1970's – CDC 6500 / SCOPE/Hustler / FORTRAN / Pascal / Assembly**
- 1980's
  - HP21MX – Assembly
  - Burroughs B4900 / COBOL
  - Fortune 32:13 / UNIX / C
  - IBM PC / DOS / DBase / Turbo Pascal
  - IBM 360 / Assembly
  - DEC VAX / VMS / Fortran
  - AT&T 3B2 / UNIX / C / FORTRAN
- 1990's – UNIX / Sun / Ardent / Stellar / IBM RS-6000 / Convex C2400 / NeXT – C - Also TCP/IP, HTTP – Windows / MacOS
- 2000's – Linux / MacOS – Java / PHP / JavaScript
- 2010's – Linux / MacOS – Python / Java / PHP / JavaScript



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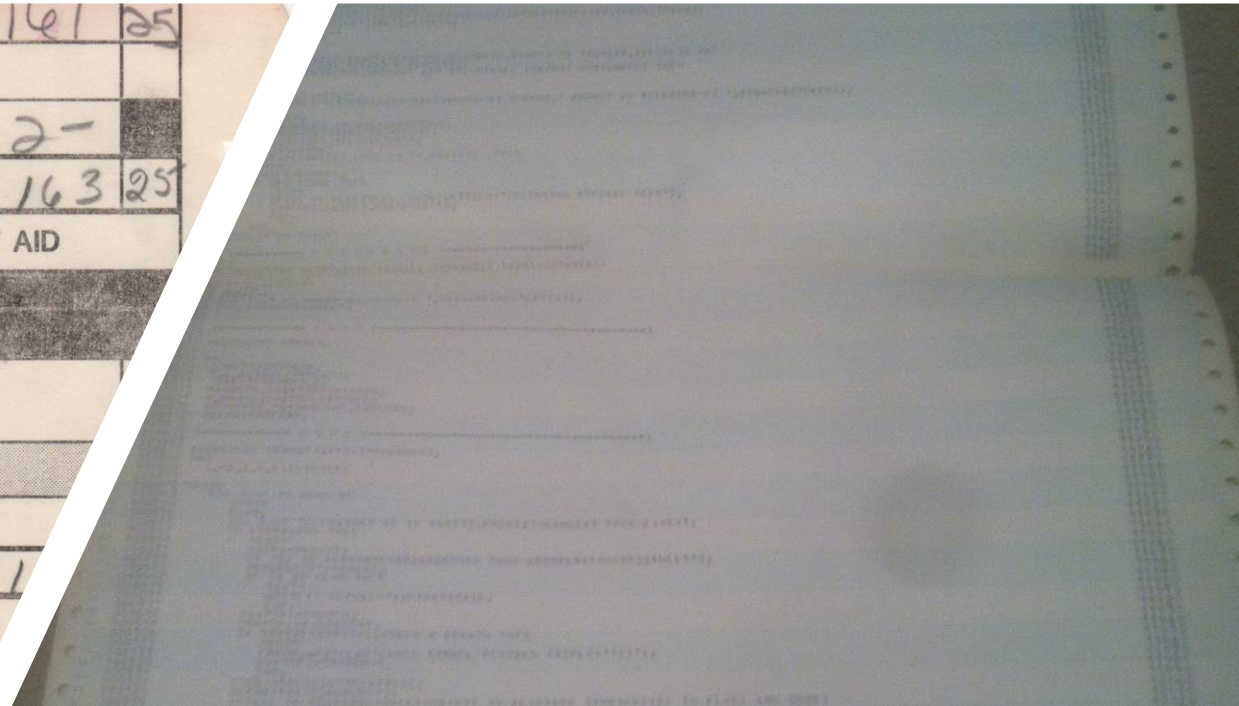
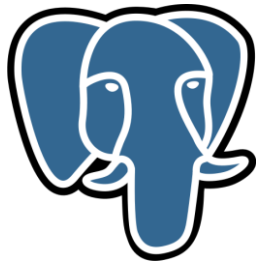
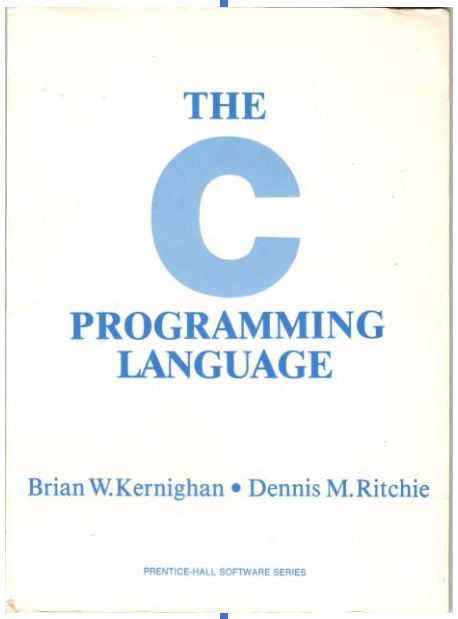


C Programming for Everybody

- C is the most important programming language you will ever learn
- C should not be the first programming language we teach to students
- You might never write a “professional” line of C during your career
- Learning C at the right time in your path, is necessary for you to become a master programmer
- Be patient – do not rush – **do not** search for solutions to programming
- Each exercise is teaching you something and preparing you to learn something much more challenging later in the course

Unlocking Advanced Topics





Data Structures

Computer Architecture

Object Oriented Design

Hardware

Service Oriented Architecture

Summary

- History of the C Language
- History of Computer Hardware
- History of the UNIX operating system
- History of “Dr. Chuck” and Computing
- Gender balance in computing

Acknowledgements / Contributions

Initial Development: Charles Severance, University of Michigan School of Information

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