Introducing the Unix System

An Advanced Introduction to Unix/C Programming

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Dennis Ritchie – Created the C programming language and Unix operating system at Bell Labs.

Ken Thompson – With Dennis, designed and implemented the first Unix operating system. Invented B language and co-developed the Google's Go language.

Linus Torvalds – Creator and lead developer of the Linux kernel and Git.

Richard Stallman –Launched free software GNU Project and wrote GNU General Public License.

Brian Kernigham – Developed the first Unix operating system with Ken, co-authored first C programming language, but he did not design the C language.

Unix

- Unix is a multi-user, multi-tasking operating system.
- Development started in 1969 at AT&T Bell Labs.
- Unix was announced outside of Bell Labs in 1973.
- Written by Ken Thompson, Dennis Ritchie, Brian Kernigham, Douglas McIlroy, Joe Ossanna, and others at Bell Labs.

Photo: Ken Thompson (sitting) and Dennis Ritchie working on a Digital PDP 11.

Digital Equipment Corporation PDP-11/20 thru PDP-11/94

- Released 1970
- Very Popular Minicomputer
- 16-bit architecture
- ~8 Megahertz CPU
- 600,000 units sold
- One of the first systems to run Unix.

Unix Derivatives

- As Unix became more popular, different versions of Unix were written over the years, such as:
  - System V Unix from AT&T
  - BSD from University of California, Berkeley
  - SunOS/Solaris from Sun Microsystems
  - HP-UX from Hewlett Packard
  - AIX from IBM
  - Xenix from Microsoft
  - SCO from Santa Cruz Operation
    (AT&T sold the Unix license to Novell, who sold license to SCO.)

Open Source Unix Derivatives

- In 1991, Linus Torvalds released an open-source Unix-like operating system which is freely available to anyone to use, copy, and modify.
- Linux is not proprietary software. Users do not need to pay for a license to use.
- “Free Software” is defined by:
  - Free access to all source code.
  - Free to run the program as you wish for any purpose.
  - Free to study how the program works and change it.
  - Free to distribute and redistribute copies of your modified versions.

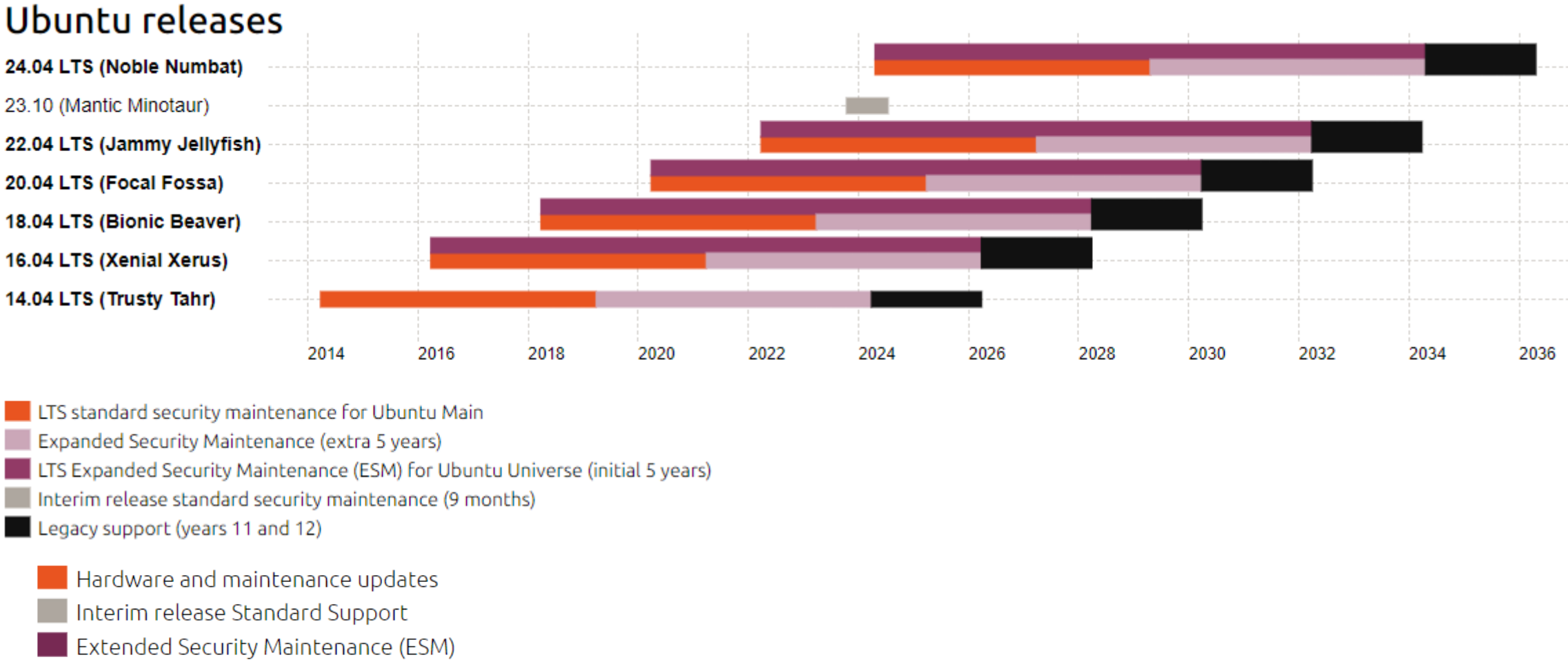
Linux Distributions

- Today, free Linux distributions include:
  - Ubuntu 24.04 (LTS) x64 (Ubuntu means “I am because we are.”)
  - FreeBSD 14.2
  - Fedora Linux 40
  - Debian Bookworm (Combination of Debra Lynn & Ian Murdock)
  - Rocky Linux 9.4
  - Actually there are hundreds of different Linux distributions available today.

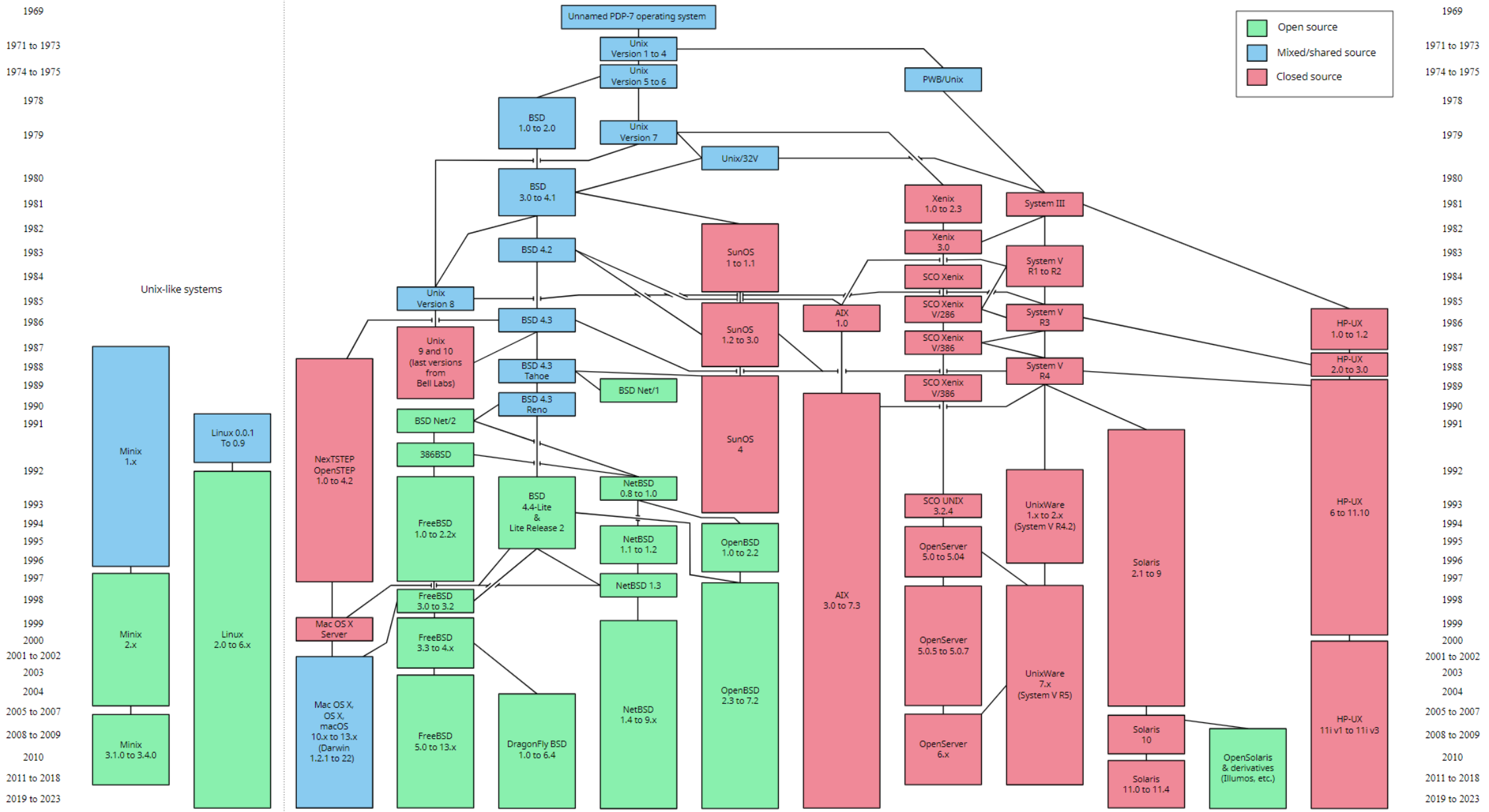
- Commercial Distributions
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server

Noble Numbat

Noble Numbat is Ubuntu's latest Long Term Support version (LTS).



Unix 1969-2023



Operating System Market Share 2023

Category	Source	Date	Linux	UNIX and Unix-like (not incl. Linux)	Windows	In-house	Other
Desktop, laptop	StatCounter Global Stats[265]	June 2023	Linux kernel family 7.23%: ChromeOS 4.15% (in the US up to 8.0%) plus traditional "Linux" 3.08%	21.38% (macOS)	68.15% (all versions)		3.24%
Embedded[e]	EE Times[266]	Mar 2019	38.42% (embedded Linux, Ubuntu, Android, other)	2.82% (QNX, LynxOS)	10.73% (Windows 10, Windows Embedded Compact)	10.73%	37.30%
Mainframe	Gartner[256]	Dec 2008	28% (SLES, RHEL)			72% (z/OS)[f]	
Server (web)	W3Techs[267]	Sep 2021	Likely 77.4% (39.8% confirmed)[g] (Ubuntu, CentOS, Debian, Gentoo, RHEL, ...)[268]	Less than 1% is confirmed to be UNIX or Unix-like and non-Linux. The top operating systems in order are: 0.3% BSD (97.8% of which is FreeBSD),[269] <0.1% Darwin,[270] <0.1% HP-UX,[271] <0.1% Solaris,[272] and <0.1% Minix.[273][g]	22.7% (Windows Server 2019, WS2016, WS2012) Microsoft's own webserver runs 6.6% of websites.[274]		
Smartphone, tablet	StatCounter Global Stats[275]	Apr 2020	70.80% (Android, KaiOS)	28.79% (iOS)	0.07%		0.34%
Supercomputer	TOP500[276]	Nov 2019	100% (Custom)				

Web Operating Systems (w3tech.com)

Operating Systems

Most popular operating systems

© W3Techs.com	usage	change since 1 June 2024
1. Unix	85.6%	+0.6%
2. Windows	14.7%	-0.6%

percentages of sites

Fastest growing operating systems since 1 June 2024

© W3Techs.com	sites
1. Unix	108.6
2. AlmaLinux	1.7
3. CloudLinux	0.2

daily increase of number of sites per million

Find more details in the operating system surveys

What does this mean?

85.6% of all websites use Unix as their operating system.

If you're interviewing with web-based companies, like FAANG,
there's a 86% chance knowing Unix will benefit you!

If you're interviewing to develop apps on an iPhone, Android, or any tablet,
there's a 99.66% chance knowing Unix will benefit you!

FAANG – Facebook, Amazon, Apple, Netflix, and Google … You can add Tesla to this list too.

Unix/Linux Are Written in C & Assembly

- Unix and Linux operating systems are written in the C programming language and assembly language.

Web Programming Languages (w3tech.com)

Server-side Programming Languages

Most popular server-side programming languages

© W3Techs.com	usage	change since 1 June 2024
1. PHP	76.1%	-0.1%
2. ASP.NET	5.9%	-0.2%
3. Ruby	5.9%	
4. Java	4.9%	+0.1%
5. JavaScript	3.5%	+0.1%

percentages of sites

Fastest growing server-side programming languages since 1 June 2024

© W3Techs.com	sites
1. Scala	22.7
2. JavaScript	20.0
3. Ruby	11.5

daily increase of number of sites per million

Client-side Programming Languages

Most popular client-side programming languages

© W3Techs.com	usage	change since 1 June 2024
1. JavaScript	98.9%	
2. Flash	1.1%	
3. Java	0.1%	

percentages of sites

Fastest growing client-side programming languages since 1 June 2024

© W3Techs.com	sites
1. JavaScript	13.4
2. Java	0.3

daily increase of number of sites per million

The C Programming Language – July 2025

In 2025, C is the third most popular programming language used on over 9.65% of all software projects.

9.65%

Add C++, C#, Objective-C, Swift, PHP, and other C and C++ related languages and C-based languages have more than 25.6% share worldwide.

25.6%

TIOBE (the software quality company)

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Jul 2025	Jul 2024	Change	Programming Language	Ratings	Change
1	1		Python	26.98%	+10.85%
2	2		C++	9.80%	-0.53%
3	3		C	9.65%	+0.16%
4	4		Java	8.76%	+0.17%
5	5		C#	4.87%	-1.85%
6	6		JavaScript	3.36%	-0.43%
7	7		Go	2.04%	-0.14%
8	8		Visual Basic	1.94%	-0.13%
9	24	⇈	Ada	1.77%	+0.99%
10	11	↑	Delphi/Object Pascal	1.77%	-0.12%
11	30	⇈	Perl	1.76%	+1.10%
12	9	↓	Fortran	1.67%	-0.38%
13	10	↓	SQL	1.39%	-0.65%
14	16	↑	PHP	1.28%	+0.14%
15	22	⇈	R	1.25%	+0.42%

Source: https://www.tiobe.com/tiobe-index/ January 2025

The C Programming Language – July 2024

In 2022, C is the third most popular programming language used on over 9.48% of all software projects.

9.5%

Add C++, C#, Objective-C, Swift, PHP, and other C and C++ related languages and C-based languages have more than 29% share worldwide.

29%

Jul 2024	Jul 2023	Change	Programming Language	Ratings	Change
1	1		Python	16.12%	+2.70%
2	3	↑	C++	10.34%	-0.46%
3	2	↓	C	9.48%	-2.08%
4	4		Java	8.59%	-1.91%
5	5		C#	6.72%	-0.15%
6	6		JavaScript	3.79%	+0.68%
7	13	⇈	Go	2.19%	+1.12%
8	7	↓	Visual Basic	2.08%	-0.82%
9	11	↑	Fortran	2.05%	+0.80%
10	8	↓	SQL	2.04%	+0.57%
11	15	⇈	Delphi/Object Pascal	1.89%	+0.91%
12	10	↓	MATLAB	1.34%	+0.08%
13	17	⇈	Rust	1.18%	+0.29%
14	16	↑	Ruby	1.16%	+0.25%
15	12	↓	Scratch	1.15%	+0.08%
16	9	⇊	PHP	1.15%	-0.27%
17	18	↑	Swift	1.13%	+0.25%
18	14	⇊	Assembly language	1.11%	+0.10%
19	20	↑	COBOL	1.08%	+0.21%
20	26	⇈	Kotlin	1.05%	+0.35%

Source: https://www.tiobe.com/tiobe-index/ July 2024

Historical Rankings

Very Long Term History

To see the bigger picture, please find below the positions of the top 10 programming languages of many years back. Please note that these are *average* positions for a period of 12 months.

Programming Language	2023	2018	2013	2008	2003	1998	1993	1988
Python	1	4	8	7	12	24	18	-
C	2	2	1	2	2	1	1	1
Java	3	1	2	1	1	16	-	-
C++	4	3	4	4	3	2	2	5
C#	5	5	5	8	9	-	-	-
Visual Basic	6	17	-	-	-	-	-	-
JavaScript	7	7	11	9	8	21	-	-
SQL	8	251	-	-	7	-	-	-
PHP	9	8	6	5	6	-	-	-
Assembly language	10	12	-	-	-	-	-	-
Fortran	19	30	27	21	13	8	3	16
Objective-C	22	16	3	41	55	-	-	-
Ada	26	28	21	19	16	14	5	3
Lisp	29	31	12	17	14	9	6	2
(Visual) Basic	-	-	7	3	5	3	8	6