INTRODUCTION TO PROGRAMMING
C AND JULIA

LECTURE 01: GENERAL INTRODUCTION

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20-Sept-2022

SAI
UNIVERSITY

Founder & Director

VisionCog
Research & Development Pvt. Ltd.

Assistant Professor
Computer Science Engineering

SHIV NADAR
UNIVERSITY
CHENNAI

Postdoc (Marie-Curie Fellow)

Dublin City University,
Ireland

Prof. Paul Whelan

PhD (Marie-Curie Fellow)

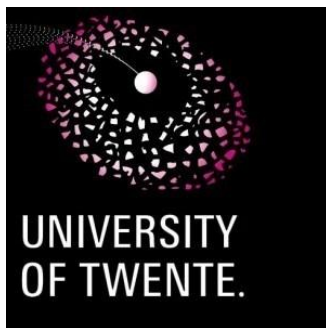Universidad Autónoma de Madrid
Spain

Prof. Julian Fierrez

Visiting Researcher
Halmstad University
Sweden

Prof. Josef Bigun

Visiting Researcher
University of Twente
Netherlands

Prof. Raymond Veldhuis

Chennai Mathematical Institute

India

Prof. Madhavan Mukund

Introduction to Programming
C and Julia

Tuesday, Friday
10:00 AM - 11:30 AM

Teaching Assistants Interactions
Will be announced

Evaluation

- Assignments: *50%*

- Quiz: *10%*

- Mid-sem: *20%*

- End-sem: *20%*

TIOBE index

From Wikipedia, the free encyclopedia

TIOBE programming community index is a measure of popularity of programming languages, created and maintained by the TIOBE Company based in Eindhoven, the Netherlands.[1] TIOBE stands for *The Importance of Being Earnest*, the title of a comedy play by Oscar Wilde that was first performed in 1895.[2] The index is calculated from the number of search engine results for queries containing the name of the language.[3] The index covers searches in Google, Google Blogs, MSN, Yahoo!, Baidu, Wikipedia and YouTube. The index is updated once a month. The current information is free, but the long-term statistical data is for sale. The index authors have stated that it may be valuable when accepting various strategic decisions. TIOBE focuses on Turing complete languages, so it does not provide information about the popularity of, for instance, HTML.

Maintainers specify that the TIOBE index is "not about the *best* programming language or the language in which *most lines of code* have been written",[4] but do

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TIOBE Index for January 2020

January Headline: Programming Language C awarded Programming Language of the Year 2019

Jan 2020	Jan 2019	Change	Programming Language	Ratings	Change
1	1		Java	16.896%	-0.01%
2	2		C	15.773%	+2.44%
3	3		Python	9.704%	+1.41%
4	4		C++	5.574%	-2.58%
5	7	⌃	C#	5.349%	+2.07%
6	5	⌄	Visual Basic .NET	5.287%	-1.17%
7	6	⌄	JavaScript	2.451%	-0.85%
8	8		PHP	2.405%	-0.28%
9	15	⌃⌃	Swift	1.795%	+0.61%
10	9	⌄	SQL	1.504%	-0.77%

TIOBE Index for January 2021

**January Headline: Python is TIOBE's Programming Language of 2020!**

Jan 2021	Jan 2020	Change	Programming Language	Ratings	Change
1	2	⌃	C	17.38%	+1.61%
2	1	⌄	Java	11.96%	-4.93%
3	3		Python	11.72%	+2.01%
4	4		C++	7.56%	+1.99%
5	5		C#	3.95%	-1.40%
6	6		Visual Basic	3.84%	-1.44%
7	7		JavaScript	2.20%	-0.25%
8	8		PHP	1.99%	-0.41%
9	18	⌃⌃	R	1.90%	+1.10%
10	23	⌃⌃	Groovy	1.84%	+1.23%

TIOBE Index for August 2021

August Headline: Data Mining and AI languages are booming in the TIOBE index

Aug 2021	Aug 2020	Change		Programming Language	Ratings	Change
1	1			C	12.57%	-4.41%
2	3	⌃		Python	11.86%	+2.17%
3	2	⌄		Java	10.43%	-4.00%
4	4			C++	7.36%	+0.52%
5	5			C#	5.14%	+0.46%
6	6			Visual Basic	4.67%	+0.01%
7	7			JavaScript	2.95%	+0.07%
8	9	⌃		PHP	2.19%	-0.05%
9	14	⌃⌃		Assembly language	2.03%	+0.99%
10	10			SQL	1.47%	+0.02%

TIOBE Index for September 2022

September Headline: Julia is getting close to the TIOBE index top 20

The Julia programming language is only 0.05% away from a top 20 position. Julia is designed for numerical analysis and computational science. There are many competing languages in that field. So what makes Julia stand out? Julia beats Matlab because it is much more modern and it can be used free of charge. Furthermore, Julia beats Python and R because it is much faster. Since there is a huge demand in the number crunching and modeling field, Julia has a serious chance to enter the top 20 in the near future. Note that the language Rust has also been knocking on the top 20 door for quite some time, but did not succeed so far. Time will tell whether Julia will endure the same fate. -- *Paul Jansen CEO TIOBE Software*
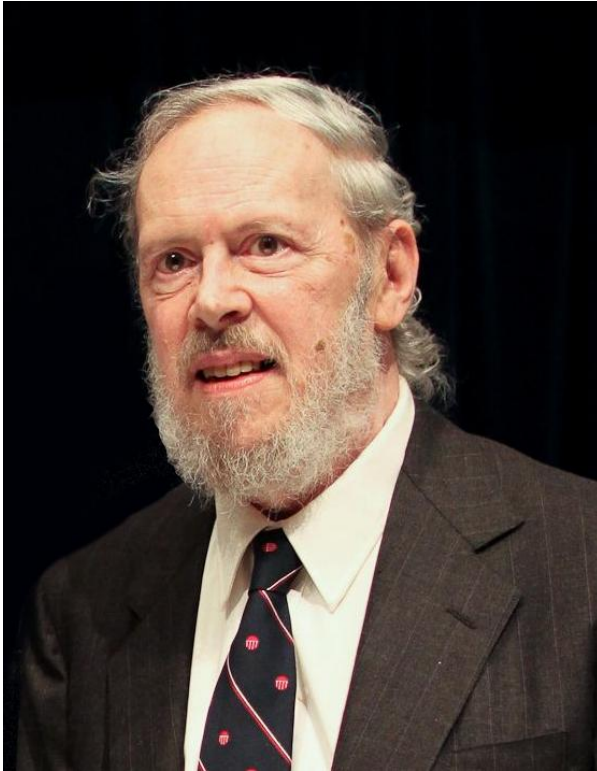
TIOBE

TIOBE Index for September 2022

Sep 2022	Sep 2021	Change		Programming Language	Ratings	Change
1	2	⌃		Python	15.74%	+4.07%
2	1	⌄		C	13.96%	+2.13%
3	3			Java	11.72%	+0.60%
4	4			C++	9.76%	+2.63%
5	5			C#	4.88%	-0.89%
6	6			Visual Basic	4.39%	-0.22%
7	7			JavaScript	2.82%	+0.27%
8	8			Assembly language	2.49%	+0.07%
9	10	⌃		SQL	2.01%	+0.21%
10	9	⌄		PHP	1.68%	-0.17%

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	2022	2017	2012	2007	2002	1997	1992	1987
Python	1	5	8	7	12	28	-	-
C	2	2	1	2	2	1	1	1
Java	3	1	2	1	1	16	-	-
C++	4	3	3	3	3	2	2	6
C#	5	4	4	8	14	-	-	-
Visual Basic	6	14	-	-	-	-	-	-
JavaScript	7	8	10	9	8	24	-	-
Assembly language	8	10	-	-	-	-	-	-
SQL	9	-	-	-	7	-	-	-

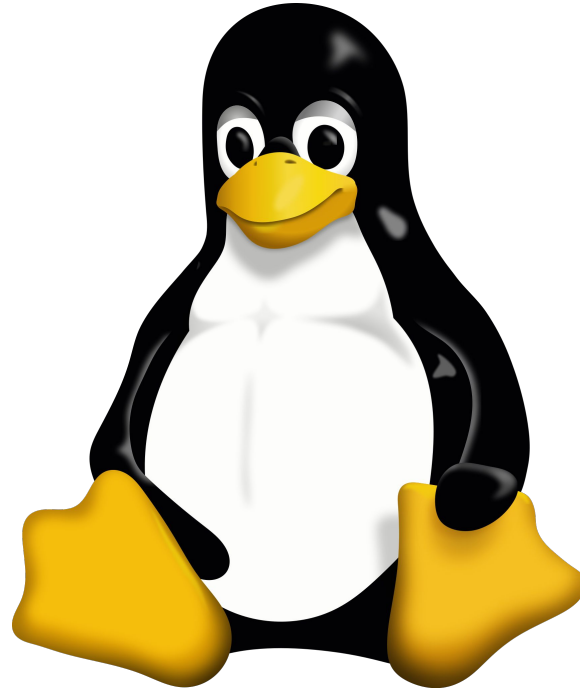**Dennis M Ritchie**
(1941 - 2011)

- C Programming - 1972

- Modular, portable, reusable

- Widely used today
  - Top 2 - TIOBE

- Performance efficient

- Low-level access

- Latest C standard version
  - C17 - June 2018; ISO/IEC
  - ANSI vs ISO

- Unix OS

- A high-level / mid-level programming language.
- Developed to overcome limitations of previous programming languages such as:
  - B, BCPL
- C was developed for UNIX operating system.
- Increasingly used by system programmers, customized softwares, building OS, and other resource efficient tasks.
- Work in progress on new C standards - C2x
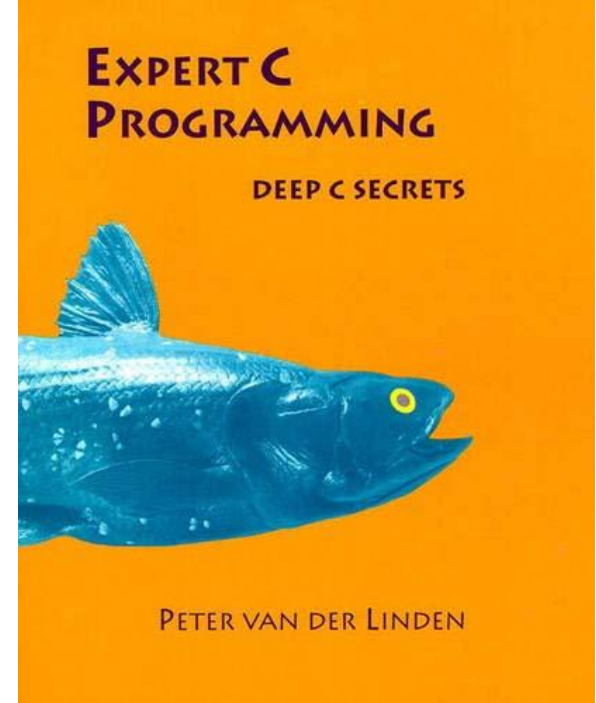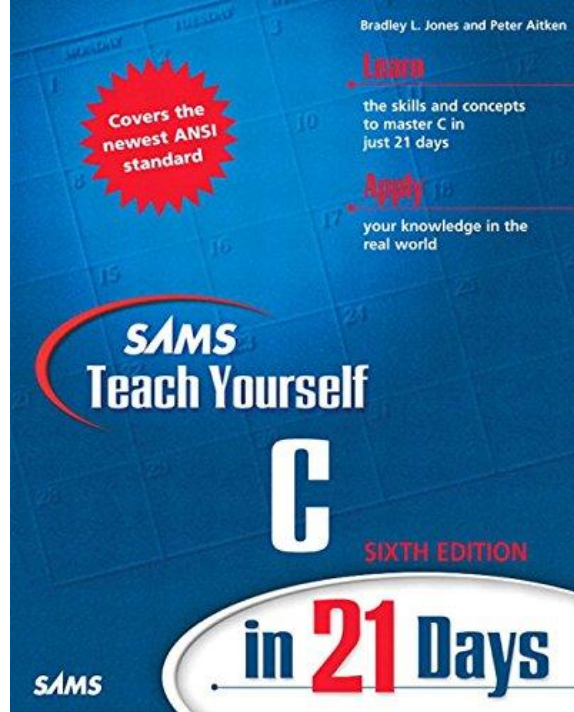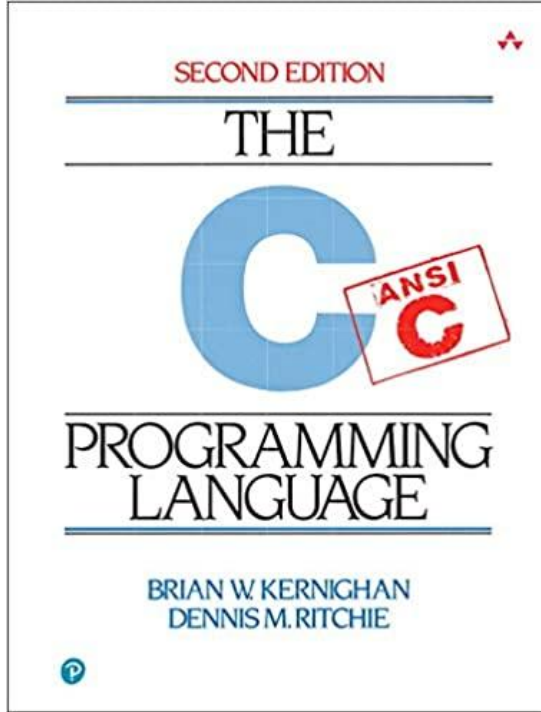 - Expected in 2023, will be called C23.

Linus Torvalds

- Linux OS - 1991

- GNU General Public License

- Ubuntu Linux

- Fedora Linux

- openSUSE

- Unix like OS

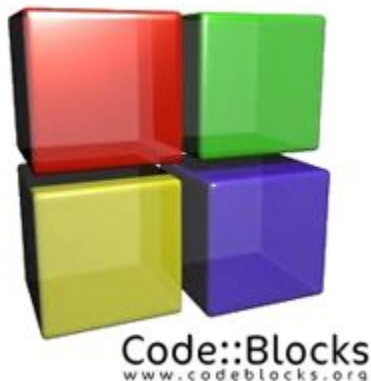- Android uses Linux kernel

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Recommended Reading

Tool for C Programming

Recommended IDE (*Integrated Development Environment*)

https://www.codeblocks.org/

https://www.codeblocks.org/downloads/

Code::Blocks / Downloads

Downloads

There are different ways to download and install Code::Blocks on your computer:

- **Download the binary release**

  This is the easy way for installing Code::Blocks. Download the setup file, run it on your computer and Code::Blocks will be installed, ready for you to work with it. Can't get any easier than that!

  ○ **Download a nightly build**

    There are also more recent so-called nightly builds available in the **forums**. Please note that we consider nightly builds to be stable, usually, unless stated otherwise.

  ○ Other distributions usually follow provided by the community (big "Thank you!" for that!). If you want to provide some, make sure to announce in the forums such that we can put it on the official C::B homepage.

Tool for C Programming

Recommended IDE
(*Integrated Development Environment*)

http://www.codeblocks.org/downloads/binaries/

Binary releases

Please select a setup package depending on your platform:

- Windows XP / Vista / 7 / 8.x / 10
- Linux 32 and 64-bit
- Mac OS X

Microsoft Windows

File	Download from
codeblocks-20.03-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03-setup-nonadmin.exe	FossHUB or Sourceforge.net
codeblocks-20.03-nosetup.zip	FossHUB or Sourceforge.net
codeblocks-20.03mingw-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03mingw-nosetup.zip	FossHUB or Sourceforge.net
codeblocks-20.03-32bit-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03-32bit-setup-nonadmin.exe	FossHUB or Sourceforge.net
codeblocks-20.03-32bit-nosetup.zip	FossHUB or Sourceforge.net
codeblocks-20.03mingw-32bit-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03mingw-32bit-nosetup.zip	FossHUB or Sourceforge.net

Mac OS X

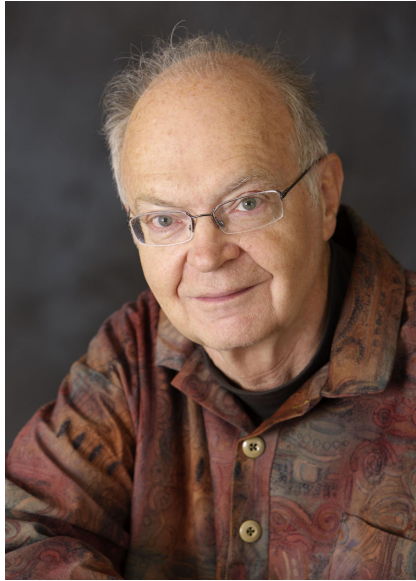| File	Download from
CodeBlocks-13.12-mac.zip	FossHUB or Sourceforge.net

NOTES:

- Code::Blocks 20.03 for Mac is currently not available due to issues caused by Apple hardening their install packages and lack of Mac developers. We could use an extra Mac developer to work on these issues.
- The provided download contains an Application Bundle (for the i386 architecture) built for Mac OS X 10.6 (and later), bundling most Code::Blocks plugins.

Linux 32 and 64-bit

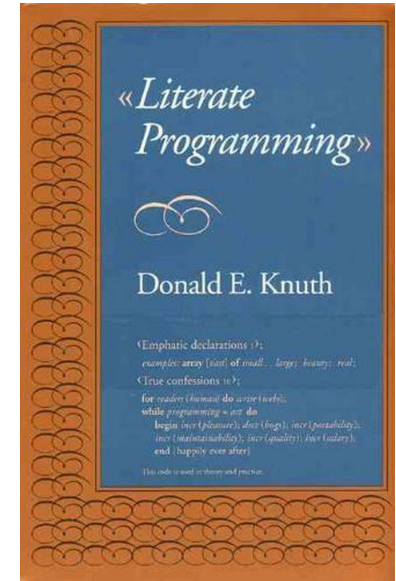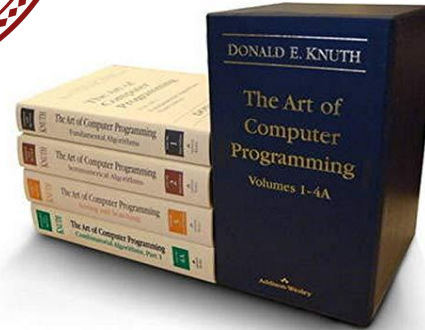| Distro	File	Download from
	codeblocks_20.03_amd64_oldstable.tar.xz	FossHUB or Sourceforge.net
	codeblocks_20.03_i386_oldstable.tar.xz	FossHUB or Sourceforge.net
	codeblocks_20.03_amd64_stable.tar.xz	FossHUB or Sourceforge.net
	codeblocks_20.03_i386_stable.tar.xz	FossHUB or Sourceforge.net
	codeblocks-20.03-1.el6.rmps.tar	FossHUB or Sourceforge.net
	codeblocks-20.03-1.el7.rmps.tar	FossHUB or Sourceforge.net
	For Ubuntu, use this PPA	

PROGRAMMING PRACTICES

Turing award winner, 1974
- Algorithm Analysis
- Design of programming languages
- The Art of Computer Programming

Donald E Knuth

Emeritus Professor, Stanford University

https://www-cs-faculty.stanford.edu/~knuth/

THANK YOU