

# Paradigmas de Linguagens de Programação

## Informações



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### 3.4 INF01113 Paradigmas de Linguagens de Programação

- **Ementa:**

Conceitos fundamentais sobre linguagens de programação; Histórico; Características de Projeto; Paradigmas de linguagens de programação: procedimentais ou estruturado (declarativo e imperativo), funcionais, lógicas, transformacionais e orientadas a objetos.

- **Bibliografia Básica:**

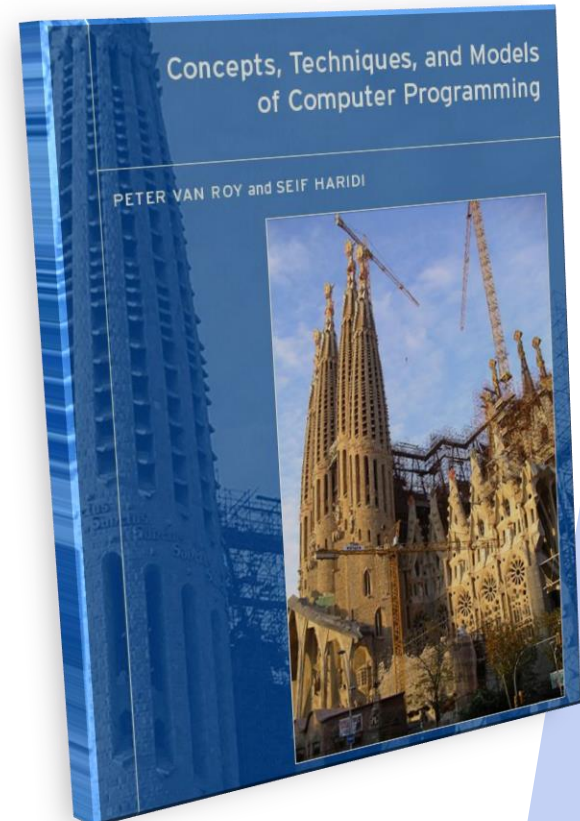
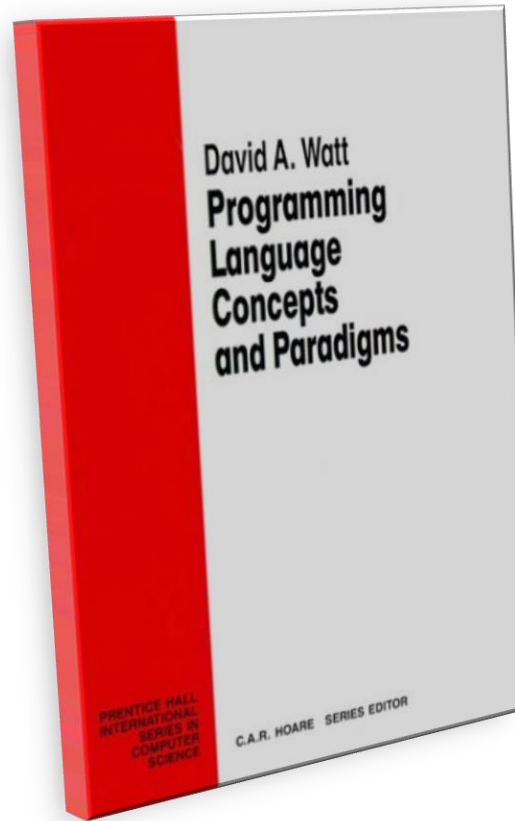
1. SEBESTA, R. **Conceitos de Linguagens de Programação** - 9a Edição, Ed. Bookman, 2011.
2. MELO, Ana Cristina Vieira de; SILVA, Flávio Soares Corrêa. **Princípios de Linguagens de Programação** - Editora Edgard Blücher Ltda. 1ª Edição - 2003.
3. TUCKER, Allen; NOONAN, R., **Linguagens de Programação: Princípios e Paradigmas**, 2a.Ed., Porto Alegre: McGraw-Hill, 2009.

- **Bibliografia Complementar:**

1. WATT, David A., **Programming Language Design Concepts**, New York: John Wiley & Sons, 2006.
2. GABRIELLI, Maurizio; MARTINI, Simone, **Programming Languages: Principles and Paradigms**, London: Springer-Verlag, 2010.
3. SCOTT, Michael L., **Programming Language Pragmatics**, 3a. Ed, New York: Elsevier, 2009.
4. HARPER, Robert, **Practical Foundations for Programming Languages**, Cambridge University Press, 2012.
5. LOUDEN, Kenneth C.; LAMBERT, Kenneth A., **Programming Languages: Principles and Practices**, 3a.Ed., Boston: Cengage Learning, 2011.
6. VAN ROY, Peter; HARIDI, Seif Concepts. **Techniques and Models of Computer Programming**, Massachusetts: The MIT Press, 2004.

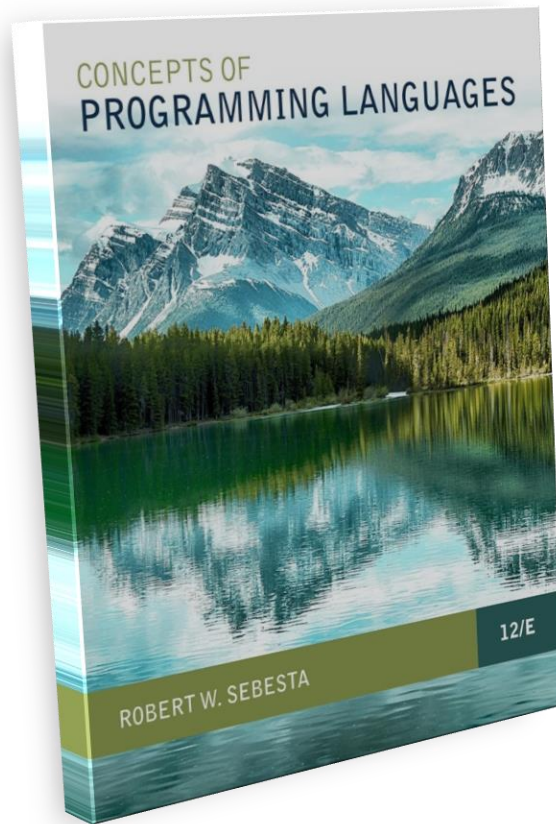
**Ementa da disciplina  
como aparece no  
Projeto Pedagógico do Curso**

# Bibliografia Básica

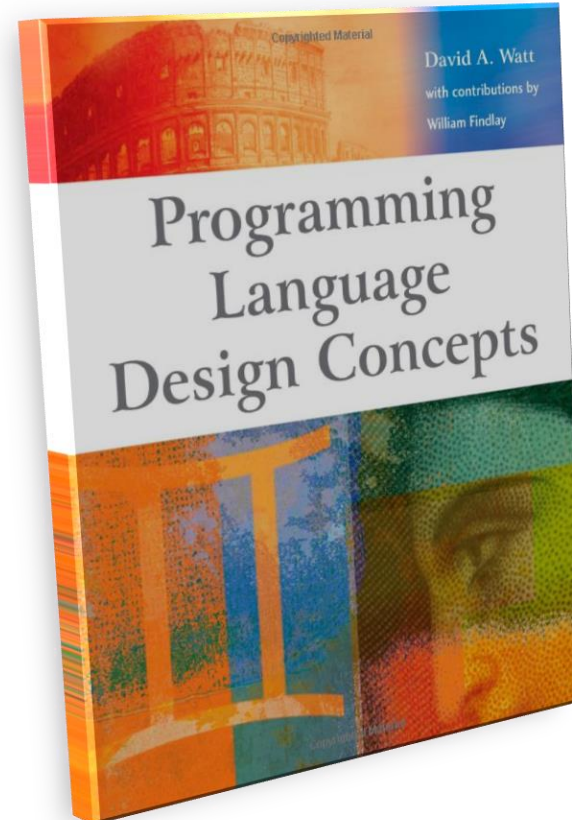


# Bibliografia Complementar

Pearson Education; 12 edition  
2019



Wiley; 1 edition (May 21, 2004)



<http://www.levenez.com/lang/>

# Avaliação

## Média:

1. Laboratório (L) (4) **Peso 1**
  - Completo Nota 2.5
  - Incompleto\* Nota 1,0
2. Provas Escritas (P) **Peso 2**
  - Pelo menos duas
3. Trabalho Individual (T) **Peso 3**
  - Relatório (LaTeX)

\* Incompleto = pelo menos 2/3 do total



# Trabalho Individual

- ❖ Relatório de uma linguagem de Programação escrito em LaTeX



## Introdução à Linguagem Python

Paradigmas de Linguagens de Programação

Aluno Fulano de tal  
Ausberto S. Castro Vera

9 de março de 2020

- Python
- R



## Introdução à Linguagem R

Paradigmas de Linguagens de Programação

Aluno Fulano de tal  
Ausberto S. Castro Vera

9 de março de 2020



# Trabalho Individual

- ❖ Relatório de uma linguagem de Programação escrito em LaTeX

- Fortran
- JavaScript



# Trabalho Individual

- ❖ **Origem da linguagem**
  - Autor, datas, motivações
  - Entrega: até 09 Abril de 2020
- ❖ **Aspectos importantes da linguagem**
  - Estruturas, comandos, funções, etc.
  - Entrega: até 08 Maio de 2020
- ❖ **Implementação: 5 programas completos**
  - Fatorial
  - Quicksort
  - Cadastro
  - Entrega: até 04 Junho de 2020
- ❖ **Ferramentas**
  - Compiladores, interpretadores
- ❖ **Referências bibliográficas**
  - Apenas livros e artigos de revistas científica
- ❖ **Entrega FINAL: até 18 Junho 2020**

- Python
- R
- Fortran
- JavaScript



# Trabalho Individual - Links



<https://www.python.org/>



<https://www.r-project.org/>



<https://www.fortran.com/>

<https://www.fortrantutorial.com/basics/>



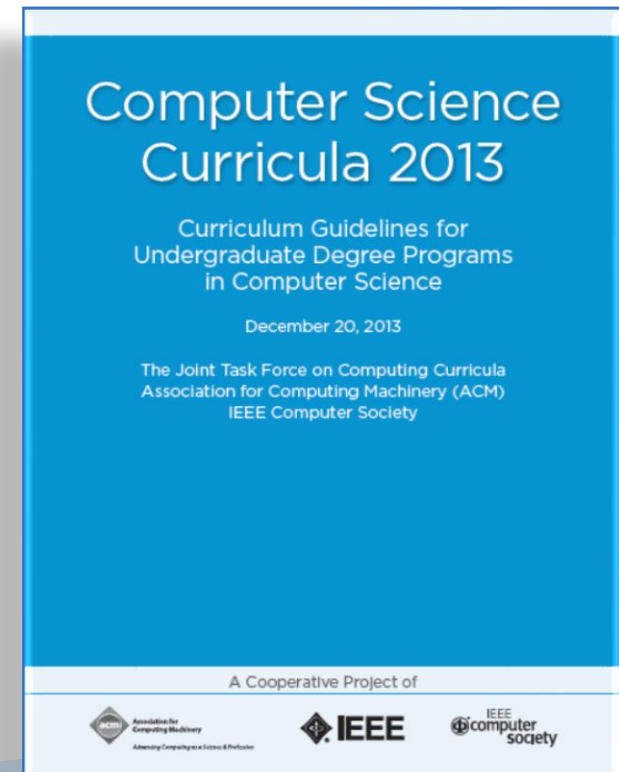
<https://www.javascript.com/>

<https://en.wikipedia.org/wiki/JavaScript>

# Ciência da Computação

## 18 ÁREAS

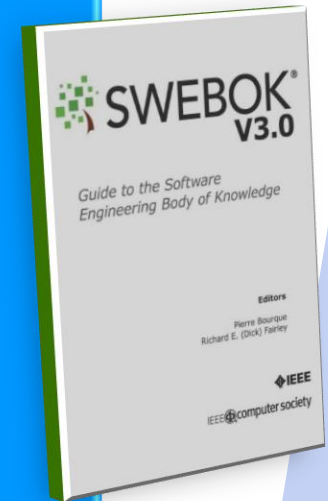
- AL - Algorithms and Complexity
- AR - Architecture and Organization
- CN - Computational Science
- DS - Discrete Structures
- GV - Graphics and Visualization
- HCI - Human-Computer Interaction
- IAS - Information Assurance and Security
- IM - Information Management
- IS - Intelligent Systems
- NC - Networking and Communications
- OS - Operating Systems
- PBD - Platform-based Development
- PD - Parallel and Distributed Computing
- PL - Programming Languages
- SDF - Software Development Fundamentals
- SE - Software Engineering
- SF - Systems Fundamentals
- SP - Social Issues and Professional Practice



# Engenharia de Software



1. Software Requirements
2. Software Design
3. Software Construction
4. Software Testing
5. Software Maintenance
6. Software Configuration Management
7. Software Engineering Management
8. Software Engineering Process
9. Software Engineering Models and Methods
10. Software Quality
11. Software Engineering Professional Practice
12. Software Engineering Economics
- 13. Computing Foundations
14. Mathematical Foundations
15. Engineering Foundations



# Chapter 13: Computing Foundations

- ❖ **1. Problem Solving Techniques**
  - 1.1. Definition of Problem Solving
  - 1.2. Formulating the Real Problem
  - 1.3. Analyze the Problem
  - 1.4. Design a Solution Search Strategy
  - 1.5. Problem Solving Using Programs
- ❖ **2. Abstraction**
  - 2.1. Levels of Abstraction
  - 2.2. Encapsulation
  - 2.3. Hierarchy
  - 2.4. Alternate Abstractions
- ❖ **3. Programming Fundamentals**
  - 3.1. The Programming Process
  - 3.2. Programming Paradigms
- ❖ **4. Programming Language Basics**
  - 4.1. Programming Language Overview
  - 4.2. Syntax and Semantics of Programming Languages
  - 4.3. Low-Level Programming Languages
  - 4.4. High-Level Programming Languages
  - 4.5. Declarative vs. Imperative Programming Languages
- ❖ **5. Debugging Tools and Techniques**
  - 5.1. Types of Errors
  - 5.2. Debugging Techniques
  - 5.3. Debugging Tools
- ❖ **6. Data Structure and Representation**
  - 6.1. Data Structure Overview
  - 6.2. Types of Data Structure
  - 6.3. Operations on Data Structures

# Chapter 13: Computing Foundations

## ❖ 7. Algorithms and Complexity

- 7.1. Overview of Algorithms
- 7.2. Attributes of Algorithms
- 7.3. Algorithmic Analysis
- 7.4. Algorithmic Design Strategies
- 7.5. Algorithmic Analysis Strategies

## ❖ 8. Basic Concept of a System

- 8.1. Emergent System Properties
- 8.2. Systems Engineering
- 8.3. Overview of a Computer System

## ❖ 9. Computer Organization

- 9.1. Computer Organization Overview
- 9.2. Digital Systems
- 9.3. Digital Logic
- 9.4. Computer Expression of Data
- 9.5. The Central Processing Unit (CPU)
- 9.6. Memory System Organization
- 9.7. Input and Output (I/O)

## ❖ 11. Operating Systems Basics

- 11.1. Operating Systems Overview

- 11.2. Tasks of an Operating System
- 11.3. Operating System Abstractions
- 11.4. Operating Systems Classification

## ❖ 12. Database Basics and Data Management

- 12.1. Entity and Schema
- 12.2. Database Management Systems (DBMS)
- 12.3. Database Query Language
- 12.4. Tasks of DBMS Packages
- 12.5. Data Management
- 12.6. Data Mining

## ❖ 13. Network Communication Basics

- 13.1. Types of Network
- 13.2. Basic Network Components
- 13.3. Networking Protocols and Standards
- 13.4. The Internet
- 13.5. Internet of Things
- 13.6. Virtual Private Network (VPN)



# Chapter 13: Computing Foundations

## ❖ 14. Parallel and Distributed Computing

- 14.1. Parallel and Distributed Computing Overview
- 14.2. Difference between Parallel and Distributed Computing
- 14.3. Parallel and Distributed Computing Models
- 14.4. Main Issues in Distributed Computing

## ❖ 15. Basic User Human Factors

- 15.1. Input and Output
- 15.2. Error Messages
- 15.3. Software Robustness

## ❖ 16. Basic Developer Human Factors

- 16.1. Structure
- 16.2. Comments

## ❖ 17. Secure Software Development and Maintenance

- 17.1. Software Requirements Security
- 17.2. Software Design Security
- 17.3. Software Construction Security
- 17.4. Software Testing Security
- 17.5. Build Security into Software Engineering Process
- 17.6. Software Security Guidelines

# Five Best Programming Languages for First-Time Learners





# TIOBE Index for March 2020

Mar 2020	Mar 2019	Change	Programming Language	Ratings	Change
1	1		Java	17.78%	+2.90%
2	2		C	16.33%	+3.03%
3	3		Python	10.11%	+1.85%
4	4		C++	6.79%	-1.34%
5	6	⬆	C#	5.32%	+2.05%
6	5	⬇	Visual Basic .NET	5.26%	-1.17%
7	7		JavaScript	2.05%	-0.38%
8	8		PHP	2.02%	-0.40%
9	9		SQL	1.83%	-0.09%
10	18	⬆⬆	Go	1.28%	+0.26%
11	14	⬆	R	1.26%	-0.02%
12	12		Assembly language	1.25%	-0.16%
13	17	⬆⬆	Swift	1.24%	+0.08%
14	15	⬆	Ruby	1.05%	-0.15%
15	11	⬇⬇	MATLAB	0.99%	-0.48%
16	22	⬆⬆	PL/SQL	0.98%	+0.25%
17	13	⬇⬇	Perl	0.91%	-0.40%
18	20	⬆	Visual Basic	0.77%	-0.19%
19	10	⬇⬇	Objective-C	0.73%	-0.95%
20	19	⬇	Delphi/Object Pascal	0.71%	-0.30%

# What is the Best Programming Language to Learn in 2020?

Before start talking about Programming Languages let me clarify:

- I'm not arguing that any language is objectively better than any other.
- I agree that developers should eventually learn more than one language.

**1.Java**

**2.Python**

**3.C/C++**

**4.C#**

**5.JavaScript**

**6.PHP**

**7.Swift**

**8.SQL &NoSQL**

## What Programming Languages Engineers and Employers Love—and Hate



Skills	San Francisco Bay Area	New York	Toronto	Paris	London	Developers
1. Go	3	2	8	1	3	7%
2. Scala	4	7	13	14	2	3%
3. Ruby	2	1	2	15	4	10%
4. TypeScript	1	5	1	2	1	12%
5. Kotlin	5	10	12	8	9	2%
6. JavaScript	6	4	3	4	5	62%
7. Objective-C	10	3	10	11	13	3%
8. PHP	7	6	6	3	8	12%
9. Java	9	12	9	7	7	42%
10. HTML	8	9	5	6	6	36%
11. Swift	11	8	14	12	15	6%
12. Python	12	11	7	13	10	42%
13. C++	13	14	15	10	14	14%
14. C	14	15	11	5	12	9%
15. C#	15	13	4	9	11	17%
16. R	16	16	16	16	16	2%



## Top 10 IT Skills and Tech Skills for 2020



1. Mobile Development
2. Artificial Intelligence
3. Python
4. Data Science
5. Cybersecurity
6. Cloud/Amazon Web Services
7. Blockchain
8. Virtual Reality
9. IT Support
10. Internet of Things (IoT)



# Top 10 In-Demand Programming languages to learn in 2020

Popularidade, salario, demanda de trabalho, Usos

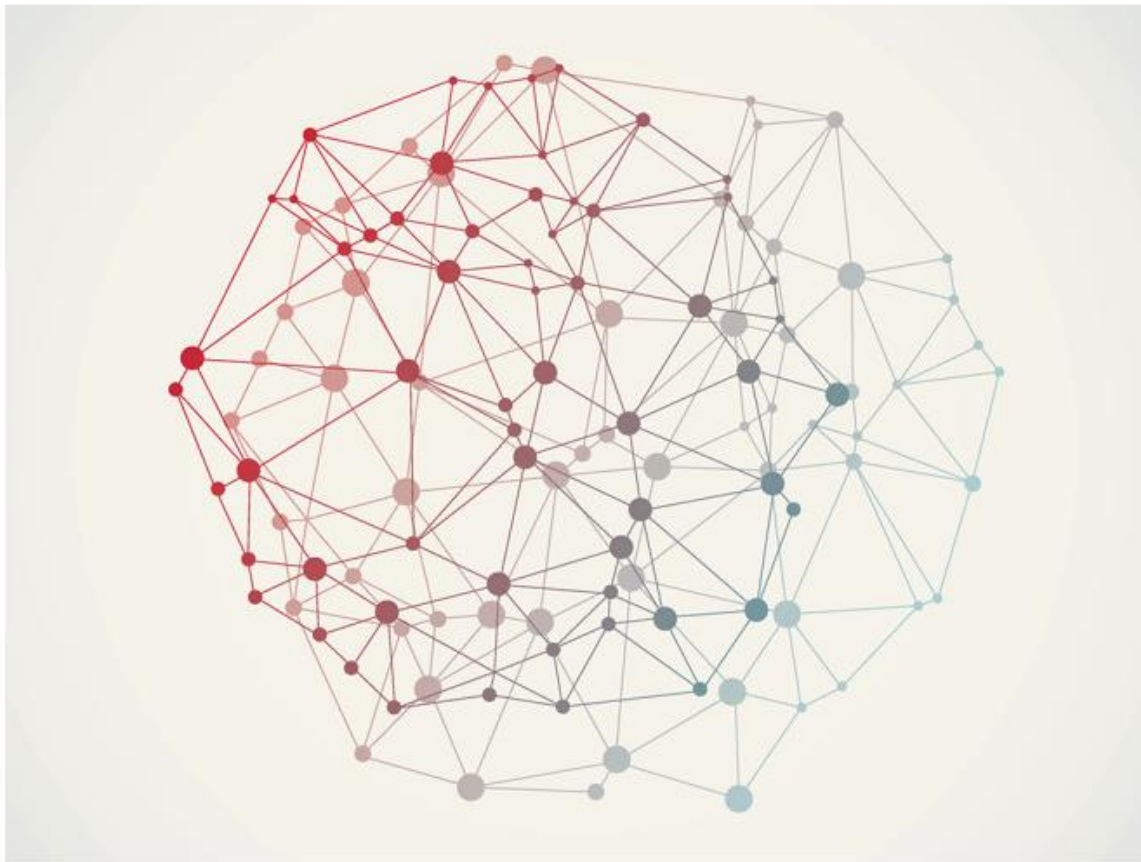
1. Python
2. JavaScript
3. Java
4. C#
5. C
6. C++
7. PHP
8. Swift
9. Go
10. Ruby



# The Next Big Programming Language You've Never Heard Of

BY CADE METZ 07.07.14 | 6:30 AM | PERMALINK

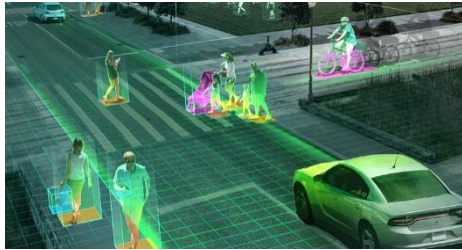
[f Share](#) 5.7k [t Tweet](#) 612 [g+1](#) 190 [in Share](#) 215 [Pin it](#) 13



<http://dlang.org/>



Computer vision engineering



Cybersecurity



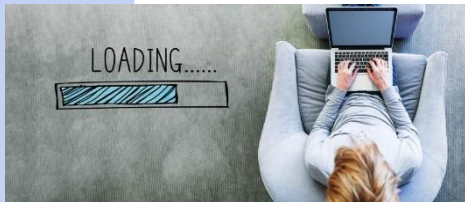
Data science



AI and Machine Learning



Cloud engineering



# Top 10 In-Demand Tech Skills You Need to Have in 2019



Development (web, mobile, software)



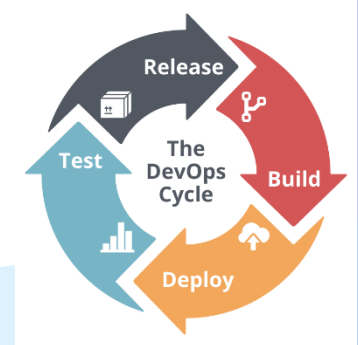
Business Intelligence analyst



Database development



Amazon Web Services



DevOps

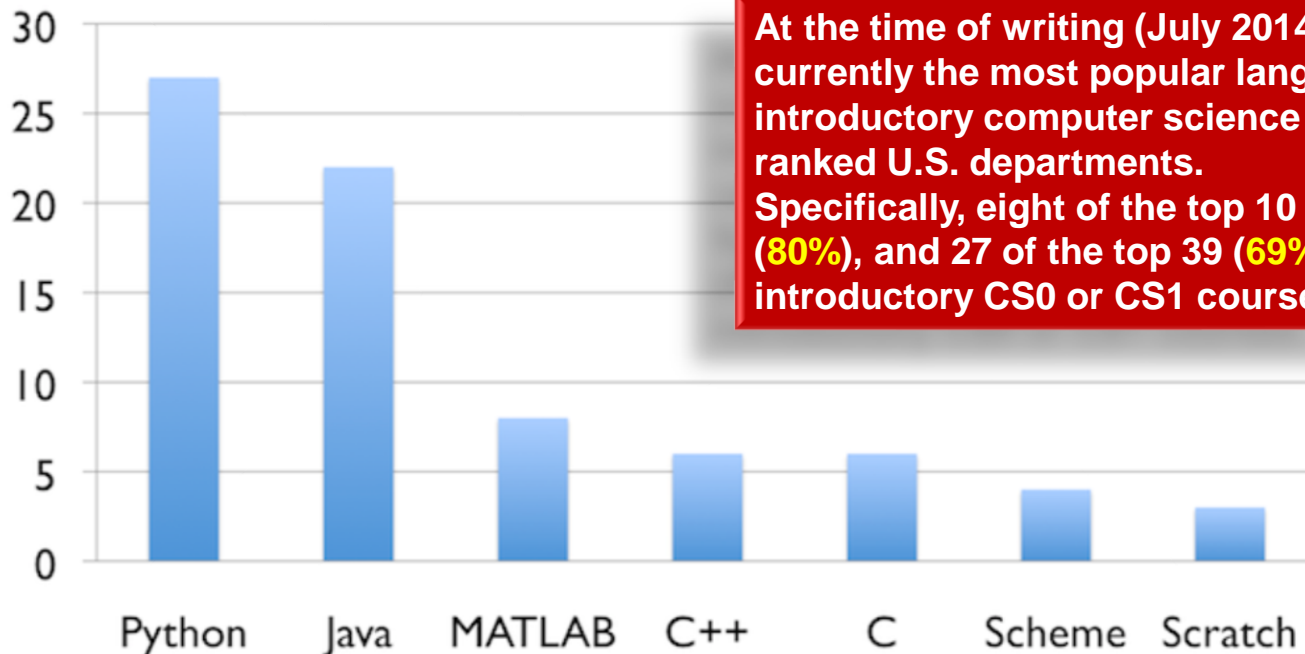
BLOG@CACM

## Python is now the most popular introductory teaching language at top U.S. universities

By Philip Guo  
July 7, 2014  
[Comments](#)

[MORE NEWS & OPINIONS](#)

Number of top 39 U.S. computer science departments that use each language to teach introductory courses



Analysis done by Philip Guo ([www.pgbovine.net](http://www.pgbovine.net)) in July 2014

At the time of writing (July 2014), **Python** is currently the most popular language for teaching introductory computer science courses at top-ranked U.S. departments. Specifically, eight of the top 10 CS departments (**80%**), and 27 of the top 39 (**69%**), teach Python in introductory CS0 or CS1 courses.





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