

# CSE-103: Structured Programming

Lecture 1

Introductory Lecture

# WHO AM I?

## Ashikur Rahman

Professor, CSE, BUET.

**B.Sc.:** BUET, 1998 (Merit pos: 3<sup>rd</sup>)  
(Started job as a Lecturer) (1998)

**M.Sc.:** BUET, 2001

**Ph.D.:** University of Alberta,  
Canada, 2006  
(rejoined BUET as an  
Assistant Professor)

**Postdoc:** University of Calgary, Canada, 2011

State University of New York, USA, 2012

(rejoined BUET as an Associate Professor)

Became professor in 2014!



# Syllabus

- constant, variable and data types,
- operator and expression, type conversion,
- decision making,
- branching and looping,
- arrays,
- user defined functions,
- strings,
- structures,
- bit-wise operations,
- pointer,
- file management in C

# Mark Distribution

- Attendance: 10%
  - Class Tests ( 3 out of 4): 15%
  - Assignment: 5%
  - Mid term: 20%
  - Final Exam: 50%
- 
- Grading Policy: UAP
  - Pass Requirement in the course:
    - More than 40% and Appear in the Final Exam


**NO MAKE-UP of anything !!!**



**NO MAKE-UP  
for Attendance,  
Class test, Mid,  
Final exam, or  
Assignments**

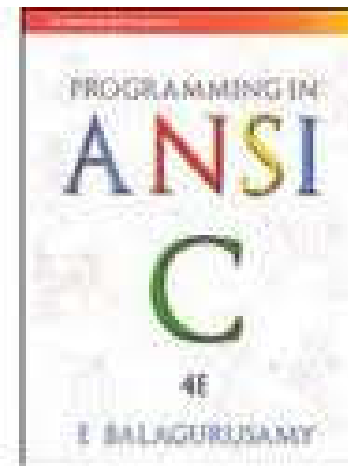
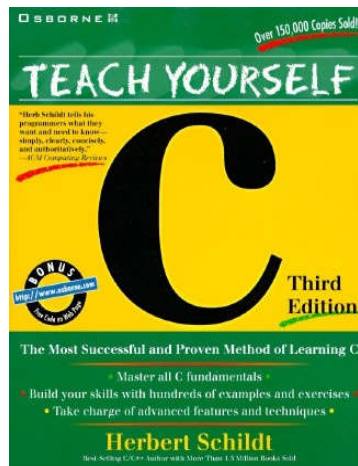
# Course Website (type it as is)

<https://ashikur.buet.ac.bd/CSE103/>

<b>LECTURE</b> <b>SEC A: WED</b> 3:30 - 4:50 PM <b>THU</b> 5:00 - 6:20 PM <b>SEC B: WED</b> 5:00 - 6:20 PM <b>THU</b> 3:30 - 4:50 PM	<b>CSE 103: STRUCTURED PROGRAMMING</b> <b>FALL 2019</b> <b>Office hour</b> <b>TBA</b> 
<b>COURSE TEACHER</b> <b>DR. ASHIKUR RAHMAN</b> E-MAIL: ASHIKUR@CSE.BUET.AC.BD	
<b>NOTICES</b> TOP NEWS: 20/10/2019: CLASS BEGINS FROM OCTOBER 23RD, WEDNESDAY.	

# Books

- Text:
  - Teach Yourself C (3<sup>rd</sup> Edition) – Herbert Schildt
  - Programming in ANSI C – Balagurusamy



# Learning Style

- This course is practical oriented (and not a theoretical course).
- Memorization will not help you to get a good result.
- Three key techniques to perform better in this course:

**(1) PRACTICE**  
**(2) PRACTICE**  
**AND (3) PRACTICE**

- Copying Code:
  - Strictly prohibited.
  - Will be severely punished if you are caught.



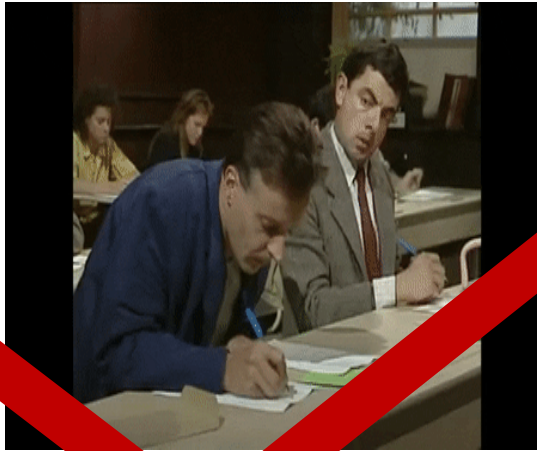
# Learning Style

**Study regularly otherwise.....**

One Night Before Exam. 😂



# Exam Style (what student's think)



# Exam Style (what actually happens)



# Exam Style (what actually happens)



# Exam Style (what actually happens)



**Andhra Pradesh: Boy writes exam under strict vigil by seven officials**



# Teaching style

What we teach  
in the class....



What we ask  
you to do in the  
exam...

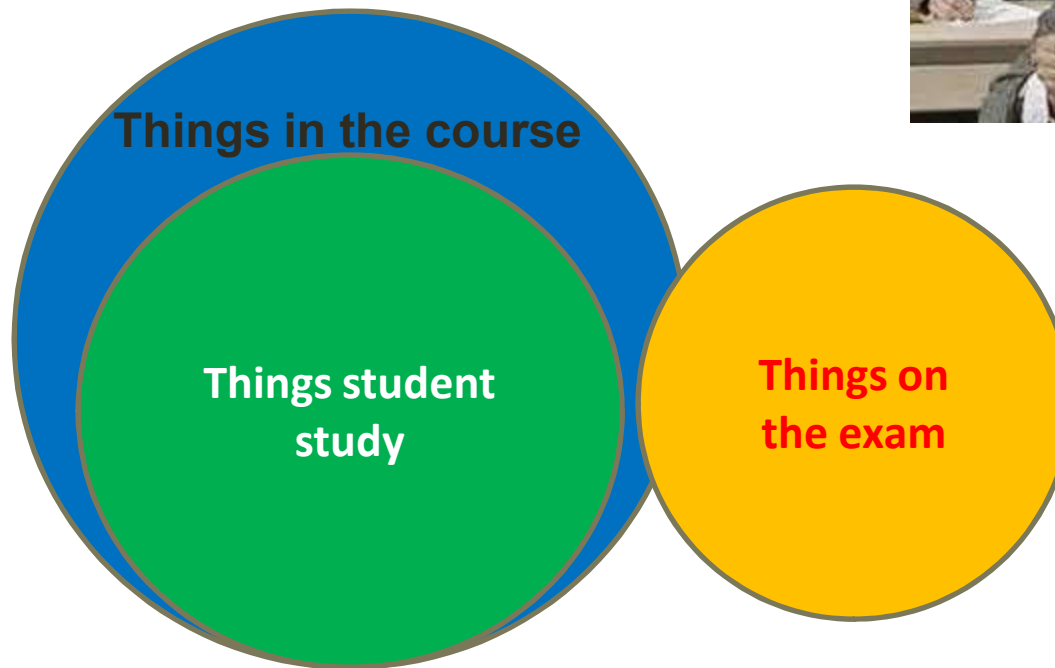


Sometimes  
what you write  
in the exam...



# Teaching style

## Venn diagram



Who is the inventor of C  
Programming Language?





Harvard drop-out  
but the second  
richest person of  
the world!

# Richest persons: Current standing (2019)

**SIX out of TEN are Engineers!!**

**Electrical Engineers be like...**



No. ↕	Name ↕	Net worth (USD) ↕	Age ↕	Nationality ↕	Source(s) of wealth ↕
1 —	Jeff Bezos	\$131 billion ▲	55	🇺🇸 United States	Amazon
2 —	Bill Gates	\$96.5 billion ▲	63	🇺🇸 United States	Microsoft
3 —	Warren Buffett	\$82.5 billion ▼	88	🇺🇸 United States	Berkshire Hathaway
4 —	Bernard Arnault	\$76 billion ▲	70	🇫🇷 France	LVMH
5 ▲	Carlos Slim	\$64 billion ▼	79	🇲🇽 Mexico	América Móvil, Grupo Carso
6 —	Amancio Ortega	\$62.7 billion ▼	82	🇪🇸 Spain	Inditex, Zara
7 ▲	Larry Ellison	\$62.5 billion ▲	74	🇺🇸 United States	Oracle Corporation
8 ▼	Mark Zuckerberg	\$62.3 billion ▼	34	🇺🇸 United States	Facebook
9 ▲	Michael Bloomberg	\$55.5 billion ▲	77	🇺🇸 United States	Bloomberg L.P.
10 ▲	Larry Page	\$50.8 billion ▲	45	🇺🇸 United States	Alphabet Inc.

Electrical

Computer

Civil

Computer

Electrical

Computer

18

10/20/2019

Lecture-1

Ashikur rahman

# GOOD NEWS for CSE: Jeff is no more **Number 1!!**

**Jeff Bezos: World's richest man agrees  
\$35bn divorce**

🕒 5 April 2019



The pair said that they had had a great life together

# Richest persons: Current standing (2019)

Total Budget of  
Bangladesh  
(2017-18) :  
\$49 billion (only)



Padma  
bridge \$3  
billion  
(only)



Metro  
Rail  
\$2.5  
billion  
(only)

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10 ▲	Larry Page	\$50.8 billion ▲	45	🇺🇸 United States	Alphabet Inc.



# 2000 to 2007: Bill Gates (Wiki)

## 2000 Top 10 [\[edit\]](#)

No. ↕	Name ↕	Net worth (USD) ↕	Age ↕	Citizenship ↕	Source(s) of wealth ↕
1	<a href="#">Bill Gates</a>	\$60.0 billion	44	United States	<a href="#">Microsoft</a>
2	<a href="#">Larry Ellison</a>	\$47.0 billion	55	United States	<a href="#">Oracle Corporation</a>
3	<a href="#">Paul Allen</a>	\$28.0 billion	47	United States	<a href="#">Microsoft</a>
4	<a href="#">Warren Buffett</a>	\$25.6 billion	69	United States	<a href="#">Berkshire Hathaway</a>
5	<a href="#">Karl and Theo Albrecht</a>	\$20.0 billion	80	Germany	<a href="#">Aldi Süd</a>

## 2001 Top 10 [\[edit\]](#)

No. ↕	Name ↕	Net worth (USD) ↕	Age ↕	Citizenship ↕	Source(s) of wealth ↕
1 <a href="#">←</a>	<a href="#">Bill Gates</a>	\$58.7 billion <a href="#">▼</a>	45	United States	<a href="#">Microsoft</a>
2 <a href="#">▲</a>	<a href="#">Warren Buffett</a>	\$32.3 billion <a href="#">▲</a>	70	United States	<a href="#">Berkshire Hathaway</a>
3 <a href="#">←</a>	<a href="#">Paul Allen</a>	\$30.4 billion <a href="#">▲</a>	48	United States	<a href="#">Microsoft</a>
4 <a href="#">▼</a>	<a href="#">Larry Ellison</a>	\$26.0 billion <a href="#">▼</a>	56	United States	<a href="#">Oracle Corporation</a>
5 <a href="#">←</a>	<a href="#">Karl and Theo Albrecht</a>	\$25.0 billion <a href="#">▲</a>	81	Germany	<a href="#">Aldi</a>

## 2002 Top 10 [\[edit\]](#)

No. ↕	Name ↕	Net worth (USD) ↕	Age ↕	Citizenship ↕	Source(s) of wealth ↕
1 <a href="#">←</a>	<a href="#">Bill Gates</a>	\$52.8 billion <a href="#">▼</a>	46	United States	<a href="#">Microsoft</a>
2 <a href="#">←</a>	<a href="#">Warren Buffett</a>	\$35.0 billion <a href="#">▲</a>	71	United States	<a href="#">Berkshire Hathaway</a>
3 <a href="#">▲</a>	<a href="#">Karl and Theo Albrecht</a>	\$26.8 billion <a href="#">▲</a>	82	Germany	<a href="#">Aldi Süd</a>

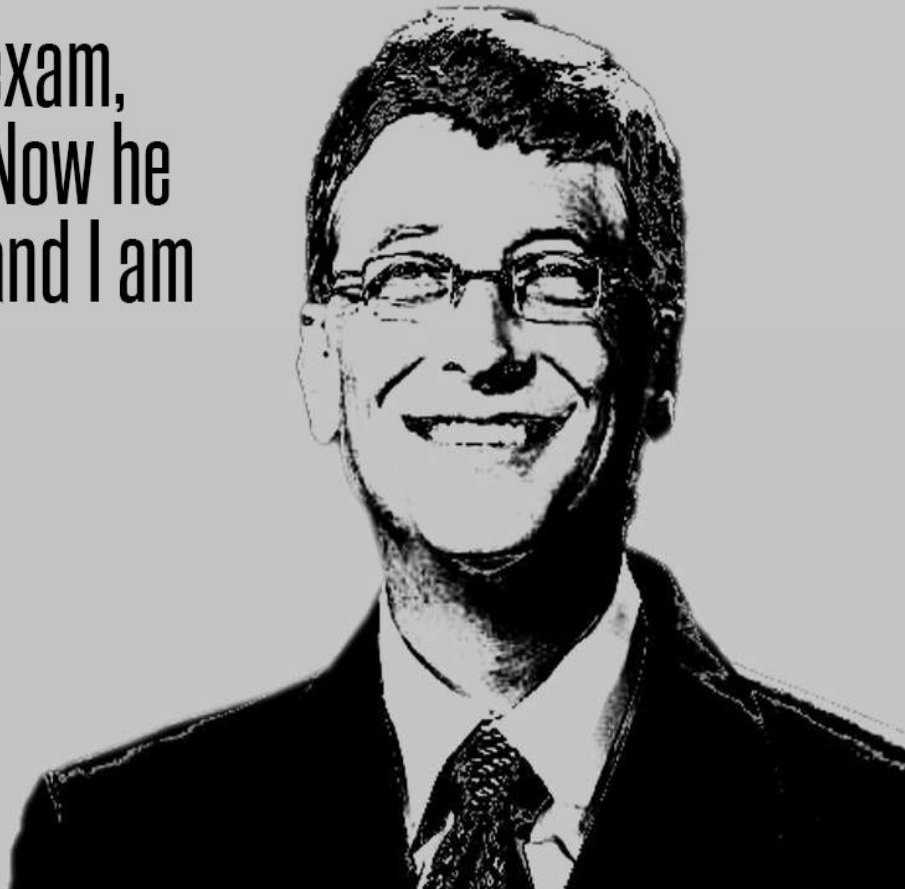
# Windows: Idea stolen from Mac OS



Original Image: Hardware Secrets / Ruben de Rijke

# Harvard dropout, BUT.....

I failed in some subjects in exam,  
but my friend passed in all. Now he  
is an engineer in Microsoft and I am  
the owner of Microsoft.




More Fun Only On [www.ApnaTalks.com](http://www.ApnaTalks.com)

[QuotesBlog.net](http://QuotesBlog.net)

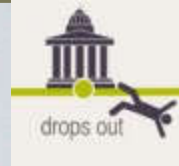
# Windows: Idea stolen from Mac OS





A photograph of Steve Jobs, co-founder of Apple, holding an iPhone. He is wearing his signature black turtleneck and round glasses. The background is a blurred stage setting.

Reed College  
drop-out but  
another very rich  
person of the  
world!





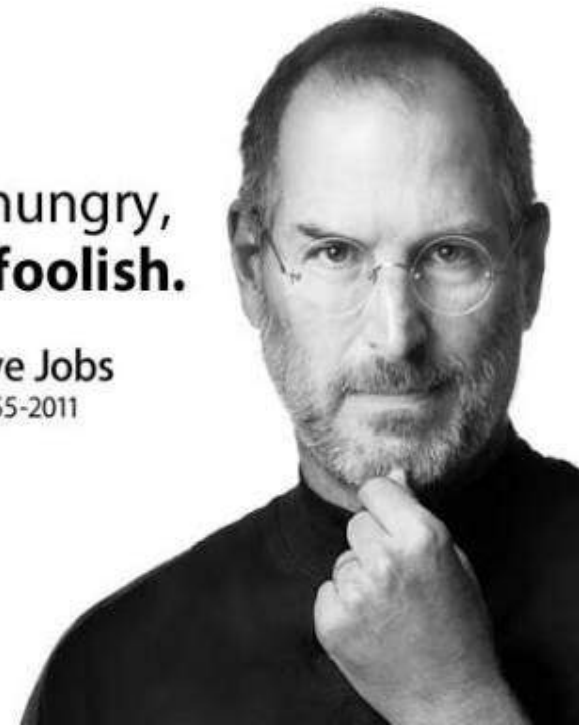
**Where Apple started**



**Apple headquarters now**

**Stay hungry,  
Stay foolish.**

Steve Jobs  
1955-2011



# iPhone prices: about 1 lakh Tk.

iPhone 7  
4.7-inch display

Select

From \$899



iPhone 7 Plus  
5.5-inch display

Select

From \$1049



Please select your method of  
payment for iPhone 7





## Laurence Powell Jobs (\$18.2 billion)



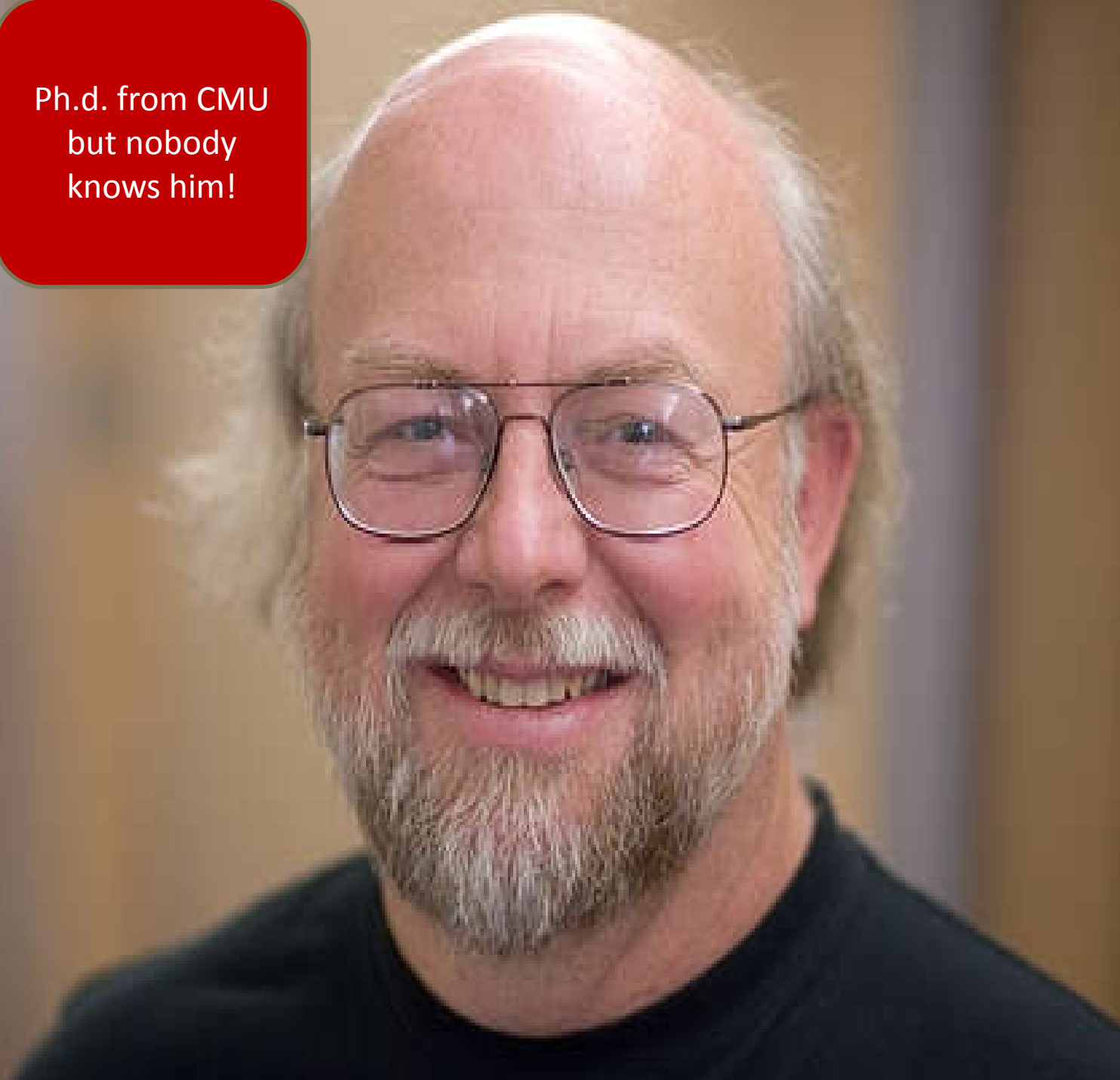


Harvard drop-out  
but another very  
rich person of  
the world!  
\$63 billion (Rank  
8: 2019)

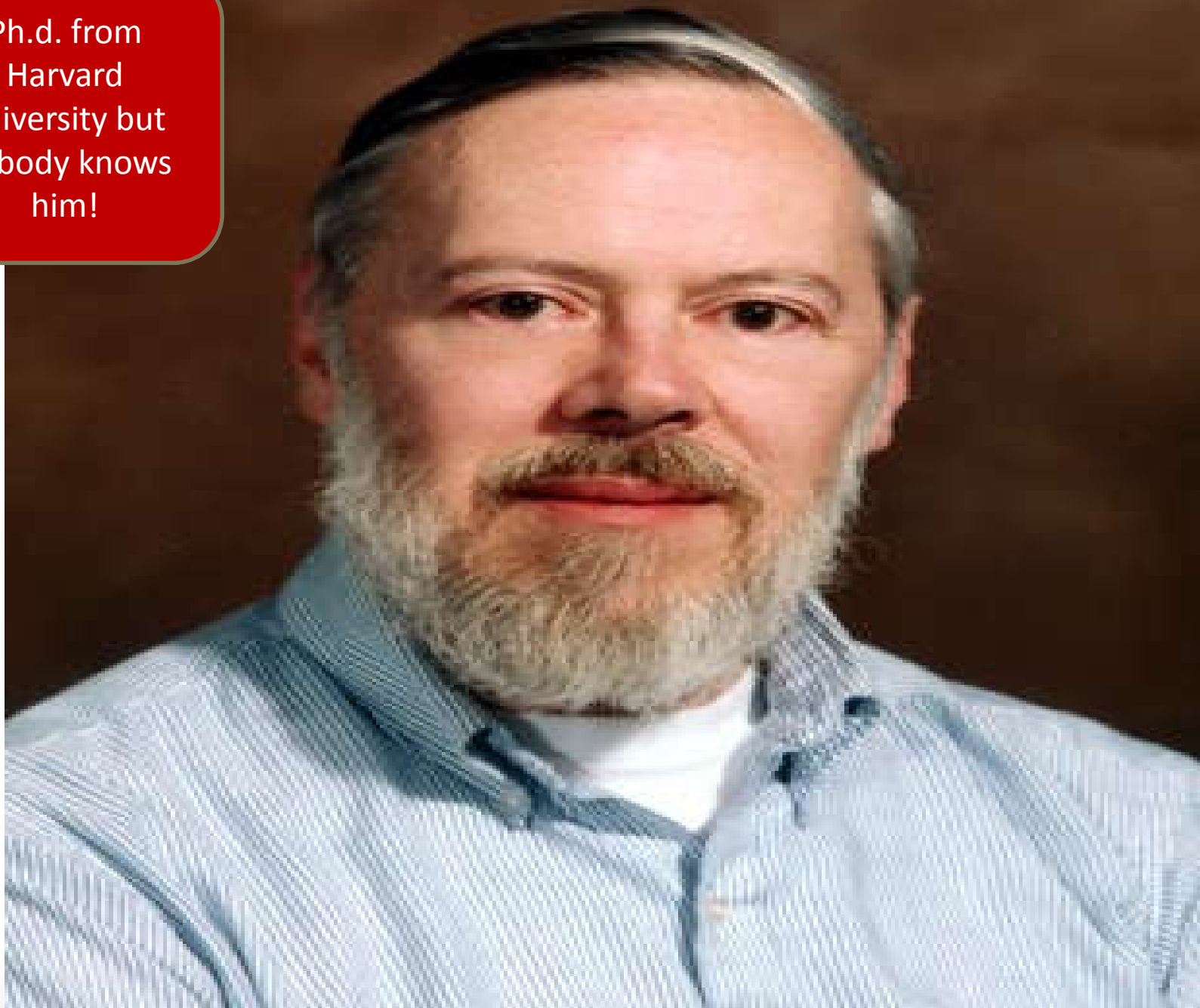
# Let's see the other side of the coin



Ph.d. from CMU  
but nobody  
knows him!



Ph.d. from  
Harvard  
university but  
nobody knows  
him!







Money  
talks!

Billionaire from stolen ideas  
and clever sales tactics



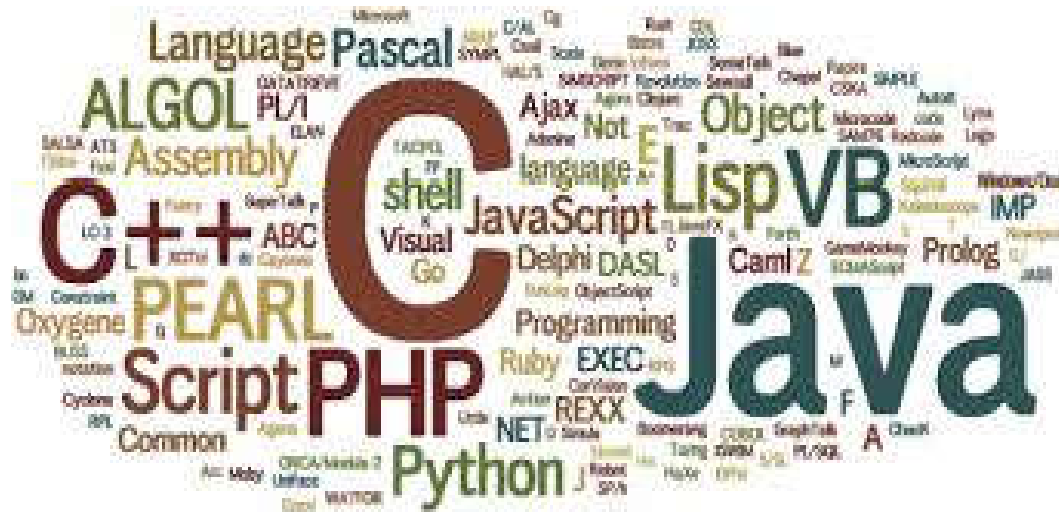
Invents C language & Unix,  
both released for free

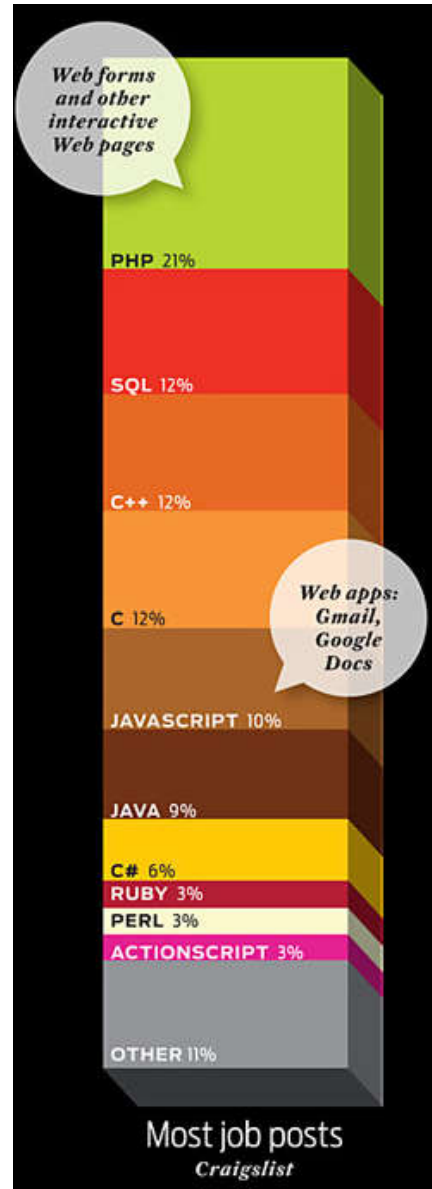
# C Brief History

- Developed by Dennis Ritchie at AT&T, early 70s
- Unix written in, closely associated with, C
- Family of languages:
  - Fortran, IBM, 1957, **Scientific** language
  - LISP, John McCarthy, Stanford, 1958
  - Algo, 1958
  - COBOL, **Business** language, 1959
  - Pascal, Niklaus Wirth 1968, **Academic** language
  - BCPL, Martin Richards , 1970
  - B (typeless), Ken Thompson, 1970
  - C, Dennis Ritchie, Bell Labs, early 1972, **Everlasting** language
  - C++, Bjarne Stroustrup, Bell Labs, 1983, **Object-oriented** language
  - Java, James Gosling Sun, 1995, **Object-oriented** language
  - C#, Microsoft, recently, **Object-oriented** language
- C++, Java, C# conserve (much) C syntax



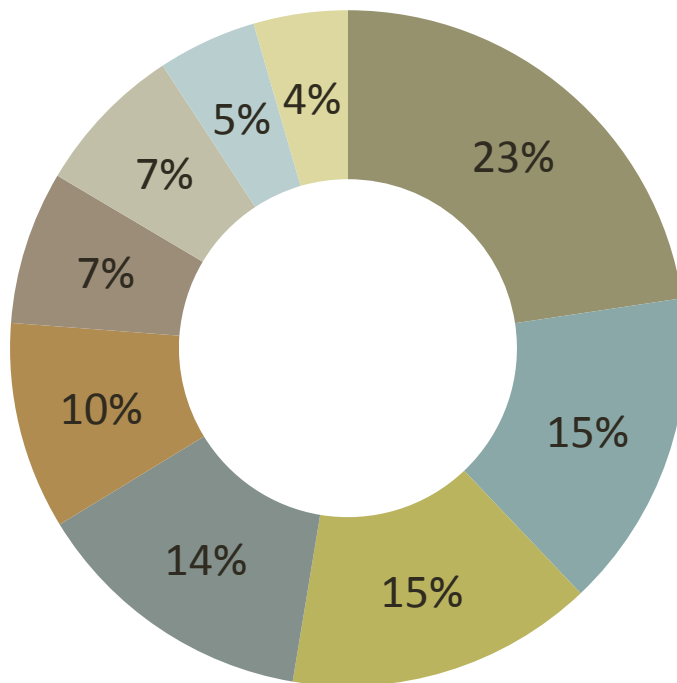
# Which programming language?





# 2011 Job Posting USA

## Programming Languages in Demand



# 2013 Job Posting USA

# 2014 IEEE Spectrum Ranking

Choose a Ranking (choose a weighting or make your own)



























IEEE Spectrum Trending Jobs Open Custom

Edit Ranking

Add a Comparison

Language Types (click to hide)

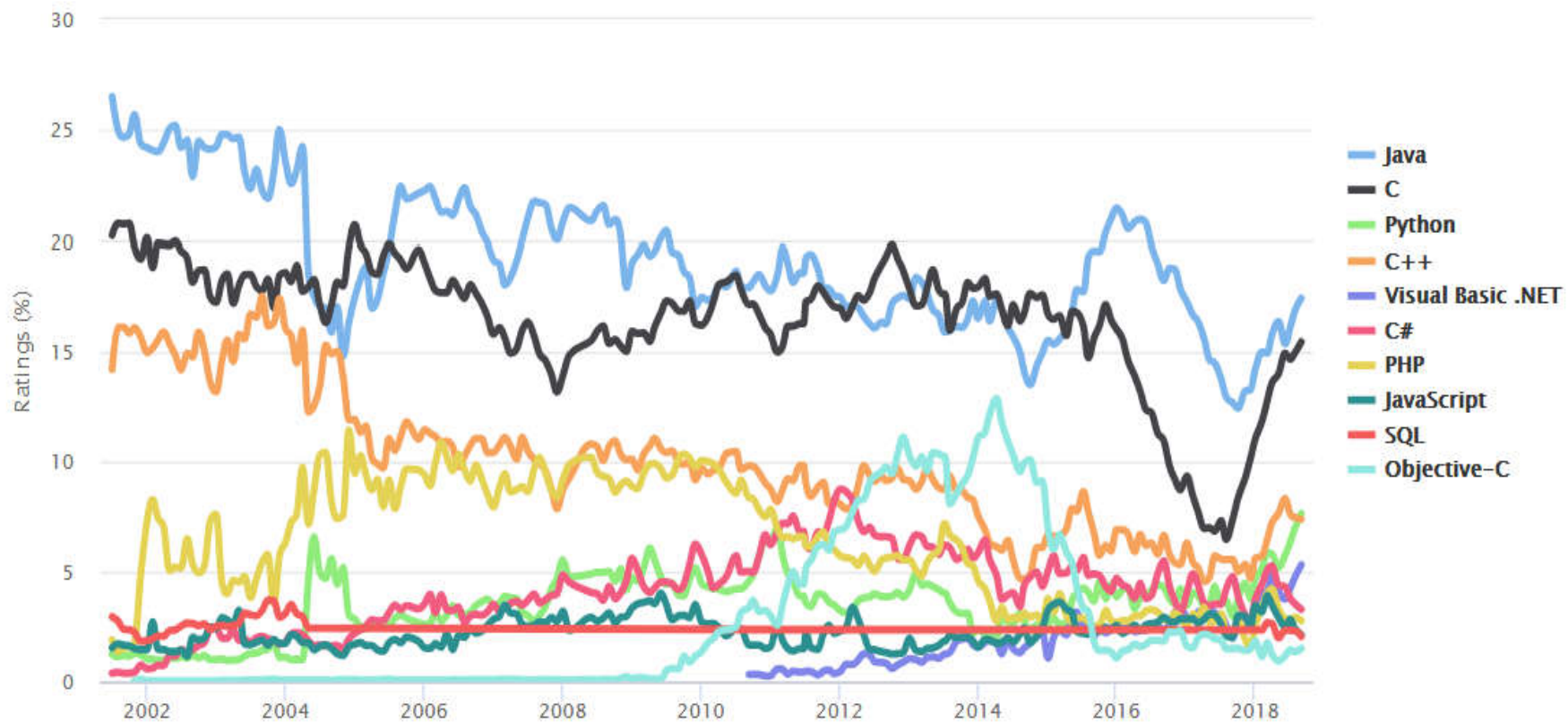
Web Mobile Enterprise Embedded

Language Rank	Types	Spectrum Ranking
1. Java	  	100.0
2. C	  	99.2
3. C++	  	95.5
4. Python	 	93.4
5. C#	  	92.2
6. PHP		84.6
7. Javascript	 	84.3
8. Ruby		78.6
9. R		74.0
10. MATLAB		72.6
11. SQL		70.5
12. PERL	 	70.1
13. Assembly		69.7
14. HTML		66.1
15. Visual Basic		64.9

# Programming Language Rating

TIOBE Programming Community Index

Source: [www.tiobe.com](http://www.tiobe.com)





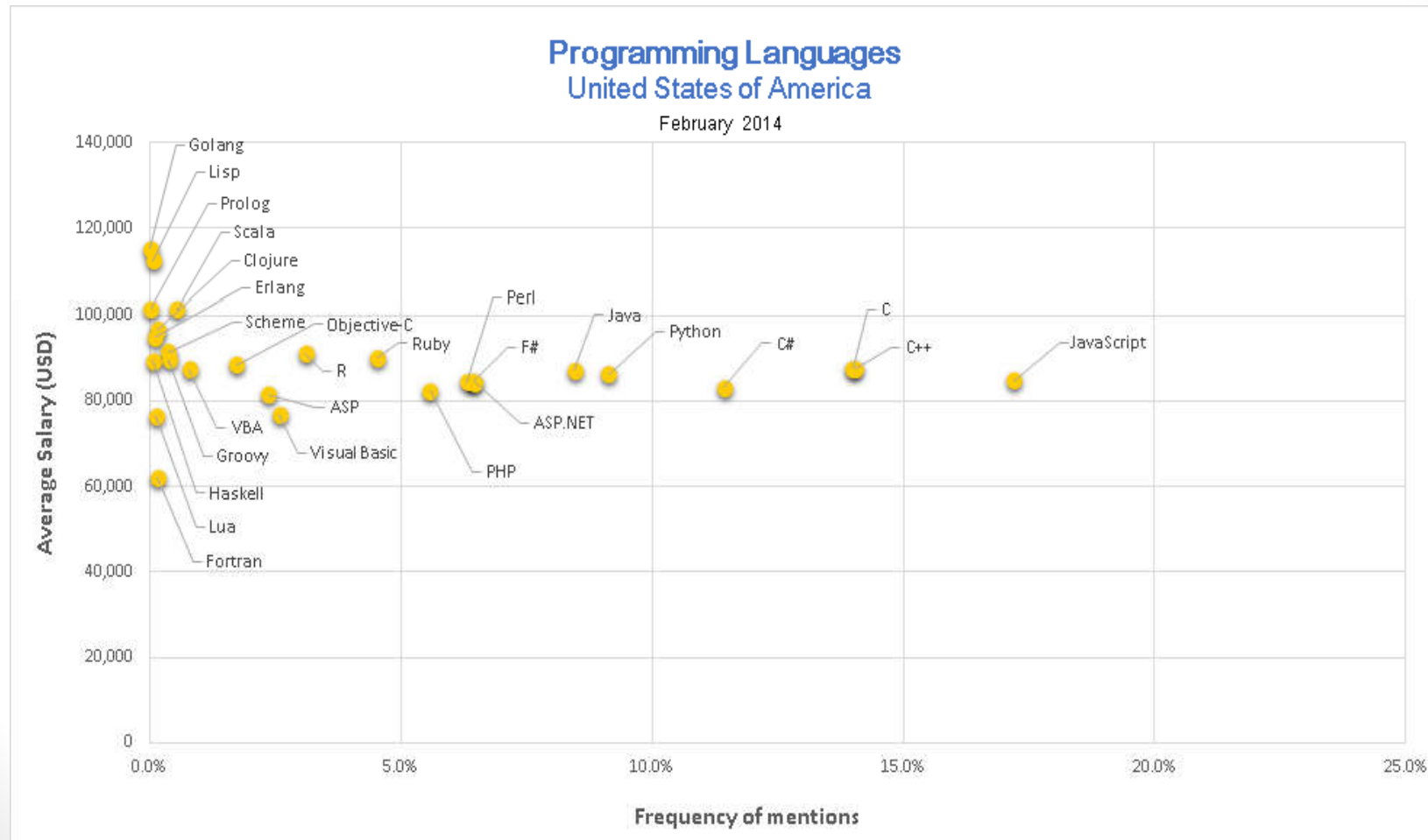
# Programming Languages used in most popular websites

Programming languages used in most popular websites\*

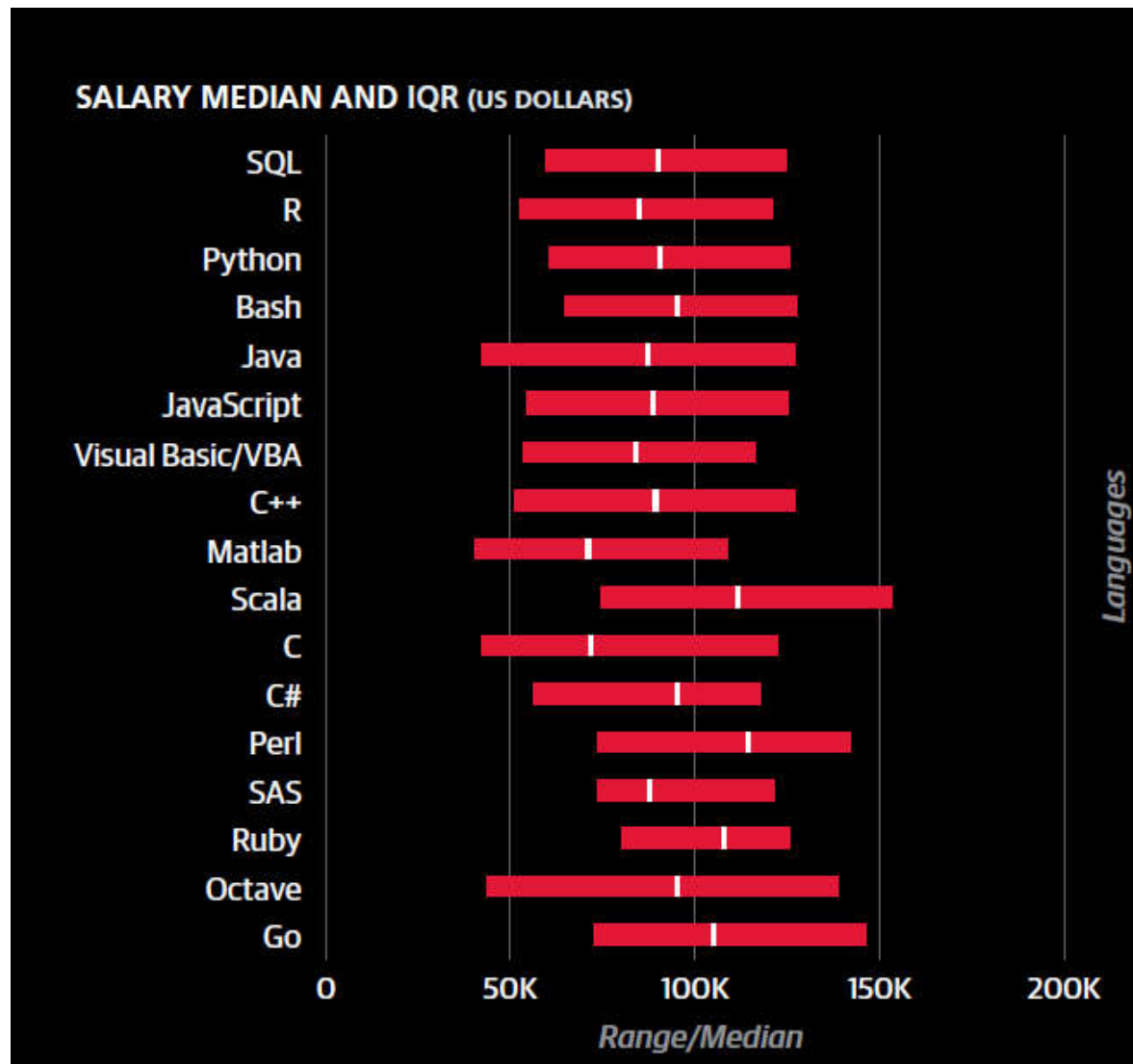
Website	Popularity (unique visitors)	Frontend (Client-side)	Backend (Server-side)	Database
Google.com <sup>[2]</sup>	1,000,000,000	JavaScript, Ajax	C, C++, Java, Python, PHP	BigTable <sup>[3]</sup>
Facebook.com	880,000,000	JavaScript, Ajax	PHP, C++, Java, Python, Erlang	MySQL
YouTube.com	800,000,000	Flash, JavaScript	C, Python, Java	MySQL
Yahoo	590,000,000	JavaScript, Ajax	PHP	MySQL
Live.com	490,000,000	JavaScript, Ajax	ASP.NET	Microsoft SQL Server
MSN.com	440,000,000		ASP.NET	Microsoft SQL Server
Wikipedia.org	410,000,000		PHP	MySQL
Blogger	340,000,000		Python	BigTable
Bing	230,000,000	JavaScript	ASP.NET	Microsoft SQL Server
Twitter.com	160,000,000		C++, Java, RoR, Scala	
Wordpress.com	130,000,000	JavaScript	PHP	MySQL
Amazon.com	110,000,000		Java, J2EE, C++, Perl	
eBay.com	88,000,000		Java, WebSphere, Servlets	Oracle Database
Linkedin.com	80,000,000		Java, Scala	



# Average Job Salary of Programmers



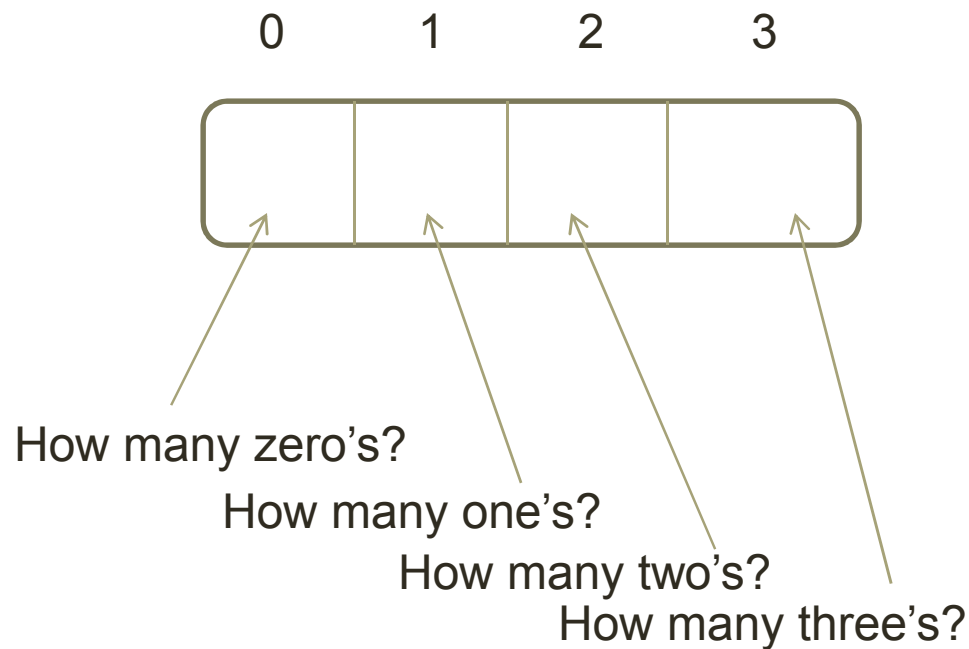
# Average Data Scientists Salary (USA, 2016)



# Why should we learn programming?

Helps us to solve  
many, many, many, many, ....  
interesting, useful and/or complex  
problems

# 4-digit number problem:



# Birthday Problem:

1	3	5	7
9	11	13	15
17	19	21	23
25	27	29	31

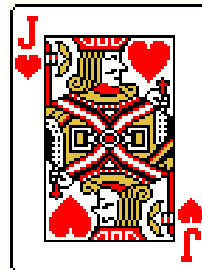
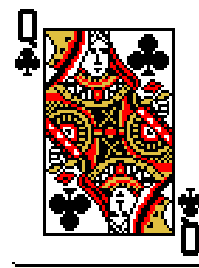
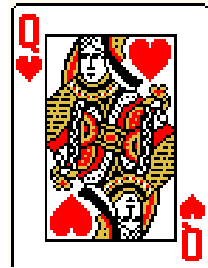
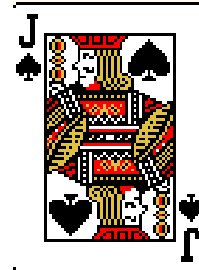
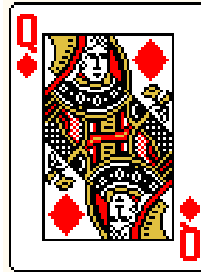
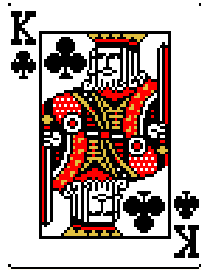
2	3	6	7
10	11	14	15
18	19	22	23
26	27	30	31

4	5	6	7
12	13	14	15
20	21	22	23
28	29	30	31

8	9	10	11
12	13	14	15
24	25	26	27
28	29	30	31

16	17	18	19
20	21	22	23
24	25	26	27
28	29	30	31

# Card game

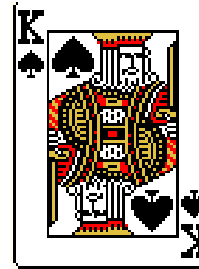
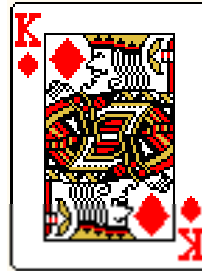




I am thinking.....



# Your card is gone!!



# 3 and 8 are good enough!

14 =

$3+3+8$

15 =

$3+3+3+3+3$

16 =

$8+8$

# How to solve all these interesting problems?



# But computer can only understand 0's and 1's!

- Computer's language
  - 0's and 1's
  - Machine language
  - Hard to code for human beings
- What's the solution then?
  - Develop English like-languages
    - High-level languages like C
  - Let compiler translate at the background

# A Simple C Code

```
#include <stdio.h>
```

```
int main()
```

```
{
```

```
    printf("Welcome to CSE 115");
```

```
    return 0;
```

```
}
```



# How to Run

- Save a source code with extension “c” or “cpp”. (Ex: **first.c**)
- Compile it and link it
  - Output: first.exe
- Run the program.
- Output of the program:
  - Welcome to CSE 115