DM2111
C++ Programming

Module Instructors

- Delivery
  - 60 hours – 1 hr lecture, 3 hrs lab per week
- Instructors
  - Mr Jan Sim
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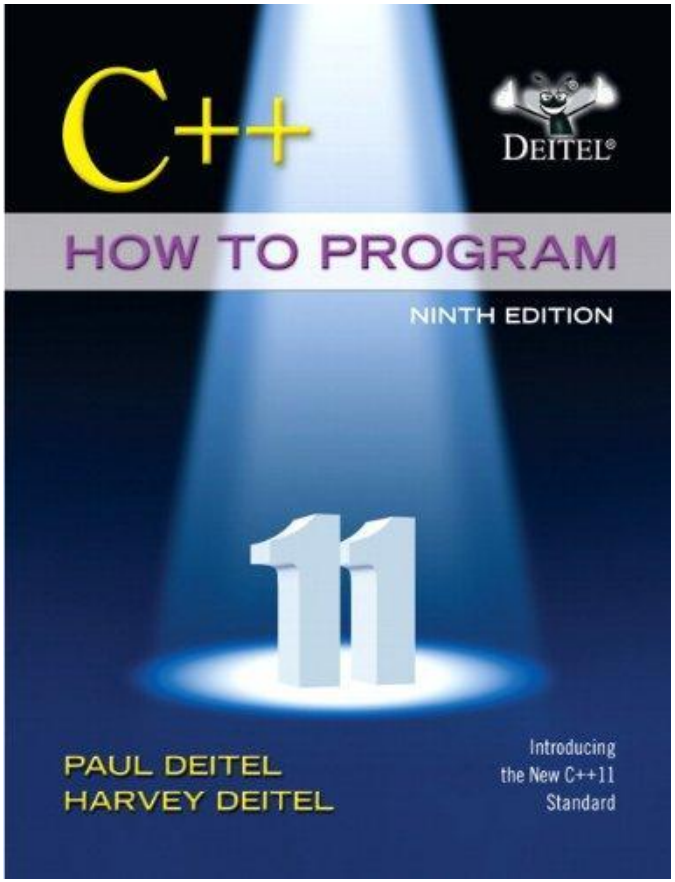
  - Mr Tang Wen Sheng
    - M507, ☎6550 1770, tang_wen_sheng@nyp.edu.sg

Assessment Breakdown

- Assignment 1 – 30%
- Assignment 2 – 30%
- Test 1 – 10%
- Test 2 – 20%
- Participation – 10%

Recommended Text

Deitel & Deitel, C++ How to Program, Pearson (9th edition)



Other Resources

- Malik, D.S., *C++ Programming, Program Design Including Data Structures*, Cengage Learning (5th edition)
- Dawson, M. *Beginning C++: C++ Through Game Programming* Cengage Learning
- http://www.cplusplus.com
- http://www.cprogramming.com/tutorial.html

Ground Rules

1. No one to sit at last 2 rows.
2. You can use mobile phone, laptop, BUT if you disrupt the class, it will be confiscated until end of lecture.
3. No plagiarism.
4. Latecomers sit in the front row.
5. Students who disrupt the class will sit in the front row.

BlackBoard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2013S1-DM2398-INDUSTRIAL ATTACHMENT PROGRAMME
Courses where you are: Student
Blackboard 101
Workshop: Social Media in Education 2012


2013S1-DM2111-C++ PROGRAMMING
Home Page
Lecture
Lab
Discussions
Groups
Tools
Help

Schedule

Introduction	Array and Strings
Problem solving	Array and Strings
Basic elements of C++	Pointers
Basic elements of C++	Pointers
Logic and branching	I/O operations
Repetition	Structs
Functions	Others
Functions	

Agenda

- Hardware
- Bits & Bytes
- Evolution of programming languages

Hardware

- What is a computer?

Hardware

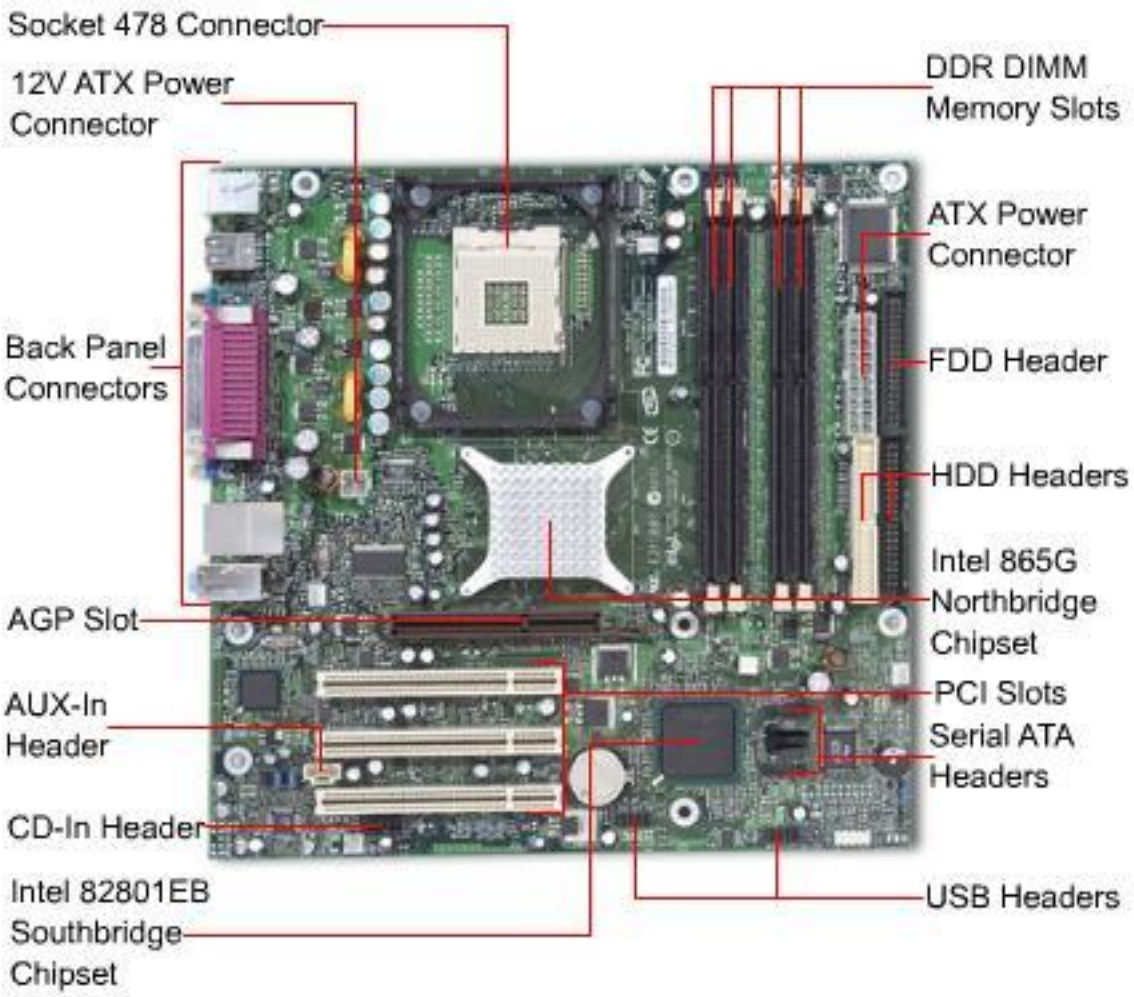
"According to Moore's Law, every Christmas your computer games are almost twice as powerful (in terms of memory and processing speed) as they were the previous year. Furthermore, as the years pass, this incremental gain becomes truly monumental. For example, **when you receive a birthday card in the mail, it often has a chip which sings "Happy Birthday" to you. Remarkably, that chip has more computer power than all the Allied Forces of 1945. Hitler, Churchill, or Roosevelt might have killed to get that chip.** But what do we do with it? After the birthday, we throw the card and chip away. **Today, your cell phone has more computer power than all of NASA back in 1969 when it sent two astronauts to the moon.** Video games, which consume enormous amounts of computer power to simulate 3D situations, use more computer power than main frame computers of the previous decade. The Sony Playstation of today, which costs $300, has the power of a military supercomputer of 1997, which cost millions of dollars."

Excerpts from Michio Kaku's amazing new book, PHYSICS OF THE FUTURE.

Hardware

- Motherboard – bridging CPU with all other hardware
- RAM – volatile; contains instructions & data
- Graphics card – GPU, execute graphics related instr
- Secondary Storage – non-volatile; harddisk, DVD, etc
- I/O devices – mouse, keyboard, monitor, etc

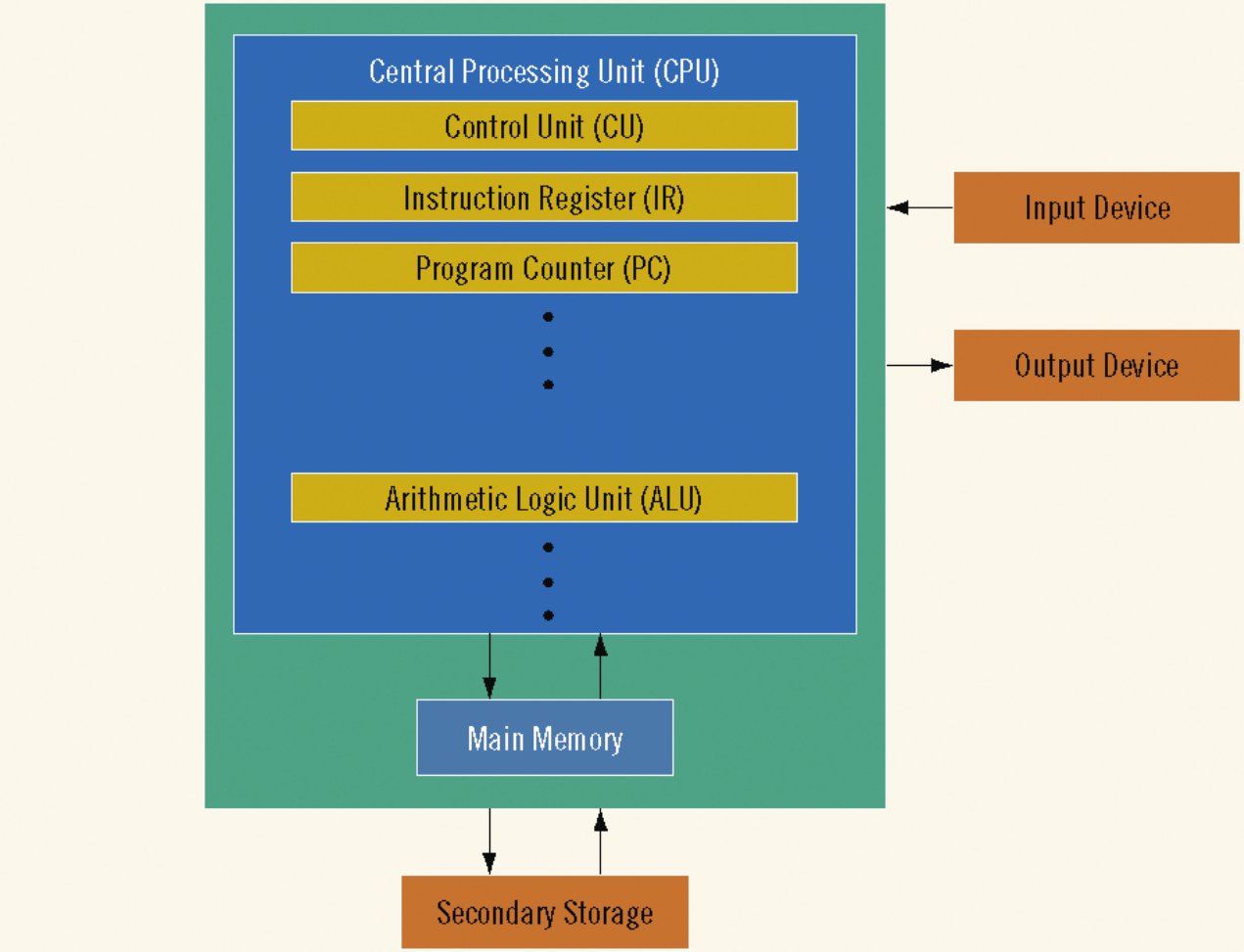
Hardware


Socket 478 Connector
12V ATX Power Connector
DDR DIMM Memory Slots
ATX Power Connector
Back Panel Connectors
FDD Header
HDD Headers
Intel 865G Northbridge Chipset
AGP Slot
PCI Slots
AUX-In Header
Serial ATA Headers
CD-In Header
Intel 82801EB Southbridge Chipset
USB Headers

Hardware

- Central Processing Unit (CPU)
  - “brain” of the computer
  - Processes and delegate work
- Components of CPU
  - Control Unit (CU)
  - Arithmetic & Logic Unit (ALU)
  - Registers

Hardware


Central Processing Unit (CPU)
Control Unit (CU)
Instruction Register (IR)
Program Counter (PC)
Arithmetic Logic Unit (ALU)
Main Memory
Input Device
Output Device
Secondary Storage

Bits and Bytes

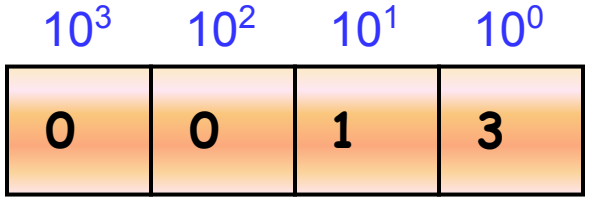
There are only 10 types of people in the world:
Those who understand binary,
and those who don't.

Bits & Bytes

Decimal (10)	Octal (8)	Binary (2)	Hexadecimal (16)
0	0	0	0
1	1	1	1
2	2	10	2
3	3	11	3
4	4	100	4
5	5	101	5
6	6	110	6
7	7	111	7
8	10	1000	8
9	11	1001	9
10	12	1010	A
11	13	1011	B
12	14	1100	C
13	15	1101	D
14	16	1110	E
15	17	1111	F
16	20	10000	10

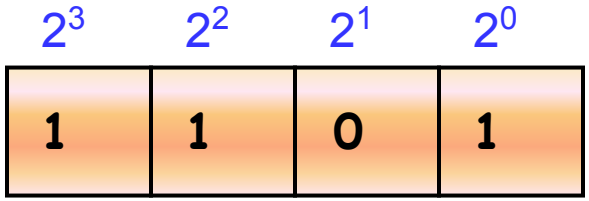
- Converting from other bases to decimal

Decimal



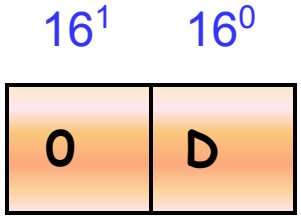
$(0 \times 10^3) + (0 \times 10^2) + (1 \times 10^1) + (3 \times 10^0) = 13$

Binary



$(1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) = 13$

Hexadecimal

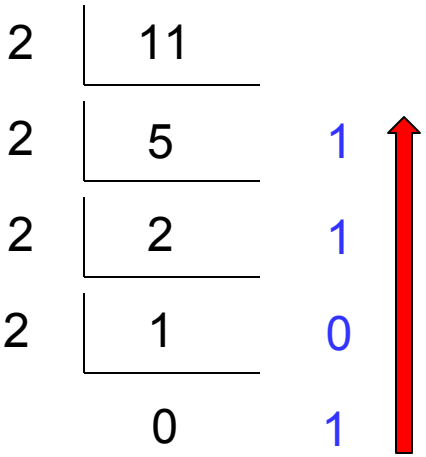


$(0 \times 16^1) + (13 \times 16^0) = 13$

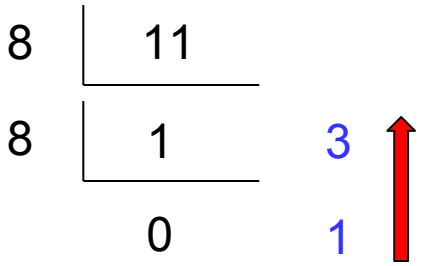
"D" in hex is 13 in decimal

Bits & Bytes

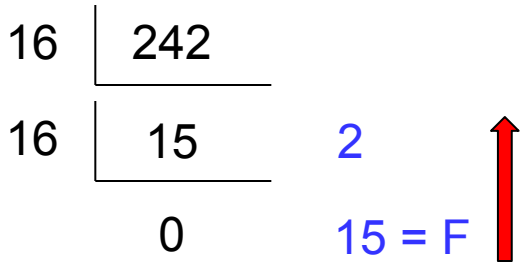
- Converting from decimal to other bases



$11_{10} = 1011_{2}$



$11_{10} = 13_{8}$



$242_{10} = F2_{16}$

Bits & Bytes

- 1 byte = 8 bits
- 1 word = 2 bytes = 16 bits
- 1 kilobyte (KB) = 2^{10} bytes = 1024 bytes
- 1 megabyte (MB) = 1024 KB (1024^2)
- 1 gigabyte (GB) = 1024 MB (1024^3)
- 1 terabyte (TB) = 1024 GB (1024^4)
- 1 petabyte (PB) = 1024 TB (1024^5)
- 1 exabyte (EB) = 1024 PB (1024^6)
- 1 zettabyte (ZB) = 1024 EB (1024^7)
- 1 yottabyte (YB) = 1024 ZB (1024^8) > number of stars in the universe

Bits & Bytes

- Signed Binary
  - Leftmost bit taken as sign; 0 = +ve, 1 = -ve
    - $0010_2 = 2_{10}$
    - $1010_2 = -2_{10}$ (1 at the most significant bit)
  - 1's complement
    - $1101_2 = -2_{10}$ (flip all the bits)
  - 2's complement
    - $1110_2 = -2_{10}$ (add 1 to 1's complement)

Bits & Bytes

- Encoding Schemes
  - ASCII (American Standard Code for Information Interchange) uses 7 bits (0-127)
  - EBCDIC (Extended Binary Coded Decimal Interchange Code) (0-255)
  - Unicode uses 2 bytes

Bits and Bytes

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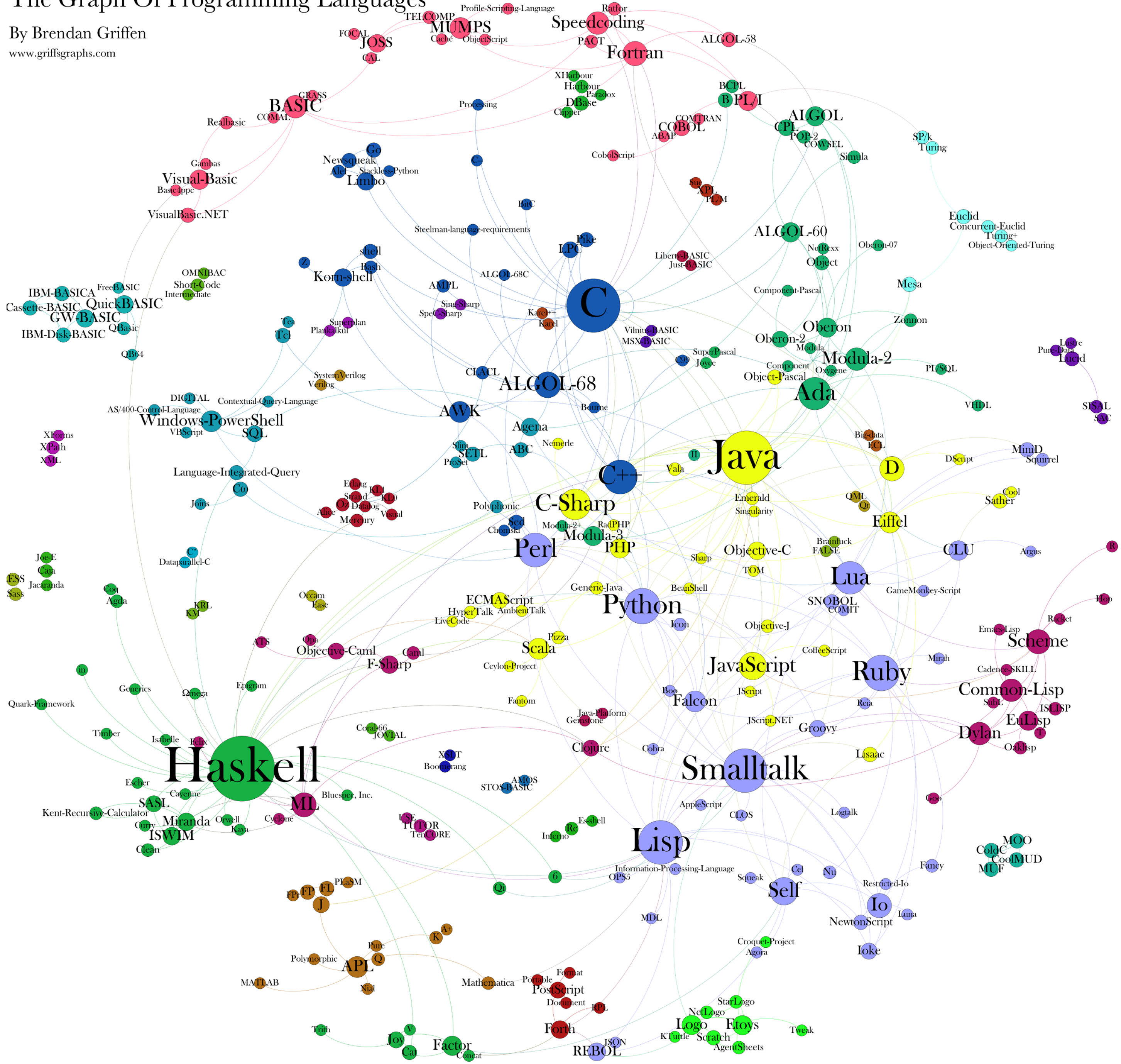
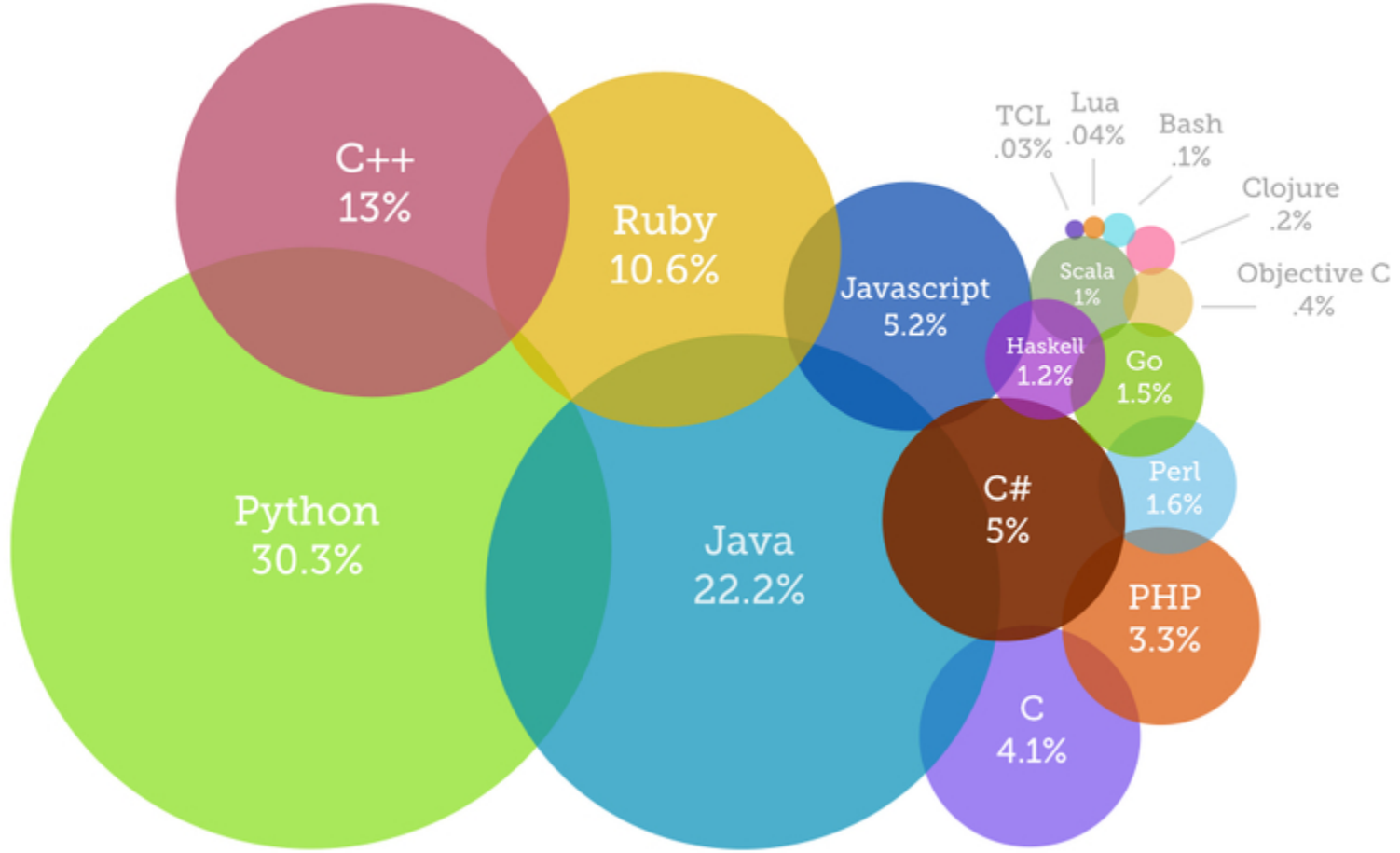
and those who don't

The Graph Of Programming Languages

By Brendan Griffen
www.griffsgraphs.com



Most Popular Coding Languages of 2014



Evolution of Programming Language

- Machine Language
  - 0010 0100 0010 0010 0010 0110 0010 0101
- Assembly Language

Assembly Language	Machine Language
LOAD	100100
STOR	100010
MULT	100110
ADD	100101
SUB	100011

Evolution of Programming Language

- High Level Languages
  - Closer to natural language
  - Fortran, BASIC, C, C++, Pascal, Java
- To calculate wages = rate × hour
  - Assembly Language
    - LOAD rate
    - MULT hour
    - STOR wages
  - C / C++
    - wages = rate * hour;


IF YOU THINK YOU CAN PASS
C++ WITHOUT PUTTING IN EFFORT
THEN YOU'RE GONNA HAVE A BAD TIME
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