C++: Syllabus & Introduction

Outline

- Course Introduction
- C++ Introduction

Who I am

- Instructor: Keith Perkins
- Office & Office Hours: See syllabus, course shell and course website

- Email: keith.perkins@cnu.edu

Notes, Lectures, Assignments, Videos …

- Scholar
  - Not much except for Grades and announcements
- Course Webpage  Most content here
- Webpage: Note in particular;
  - The Lectures/Readings section
    - You are responsible for everything here
  - The Examples section
    - Please understand these

Assignments

- Read All week 1 readings
- Please go to projects section of website
  - Complete Project 0 by due date

Syllabus: Prerequisites

- CPSC 255 or equivalent
- Textbook – Any C++ text
- Suggestions:
  - Absolute C++, Walter Savitch
  - C++ Programming Language, Stroustrup
- References to make you a better programmer
  - Effective C++, Scott Meyers
  - More Effective C++ , Scott Meyers
  - Effective STL, Scott Meyers
  - Effective Modern C++, Scott Meyers

Syllabus: Major Topics
(Subject to change)

- Week 1 C++ Intro, Market share, Compilation, GIT, Linux introduction
- Week 2 compilation, headers intro, makefiles, Eclipse
- Week 3,4 Headers, functions, Streams, Structs, Enums
- Week 5,6 Standard Library, strings
- Week 7 Standard Library iterators and Lists, Preprocessor directives
- Week 8,9 Pointers, References, Memory
- Week 10 Classes, operators, memory management using RAII
- Week 11 Exceptions
- Week 12, 13 Inheritance, operator overloading, virtual heiarchys
- Week 14 Registers, Memory, profiling

Syllabus : Evaluation

- 2 Midterm Tests
- 1 Final
- Numerous projects
- See Syllabus for details

- This will be a rigorous course. Please start projects early.

Syllabus: Assignments

- Project 0 – 0 points – IDE
- Project 1 - 100 points – makefile
- Project 2 - 100 points – File I/O
- Project 3 - 100 points – Modeling a simple system
- Project 4 - 100 points – Static libraries and parsing strings
- Project 5 - 100 points – Polymorphism

- This may change as the semester progresses

Development Environment

- Could use vim, g++, gdb, valgrind, tmux for a command line only dev environment
- Or an IDE, Lots to choose from, Codeblocks, Netbeans,Ms Visual Studio, Eclipse CDT…Clion
- We will use Eclipse CDT

Operating System

- Linux – Ubuntu
- Can install yourself or (see course website for tutorial)
- Also running on the Hunter Creech lab computers.

- Compiler – GNU toolchain

What you will learn

- Standard C++ - to a level of proficiency so you can function professionally, you will not be an expert.
- Some of the C++ syntax
- Coding suggestions and Guidelines to make you a better programmer.
- how to use an IDE, how to use libraries, how to approach and solve programming problems

What you will NOT learn

- User Interface (UI), networking– UI is platform dependent, networking is too advanced for intro class (and is MUCH harder in C++ than Java)

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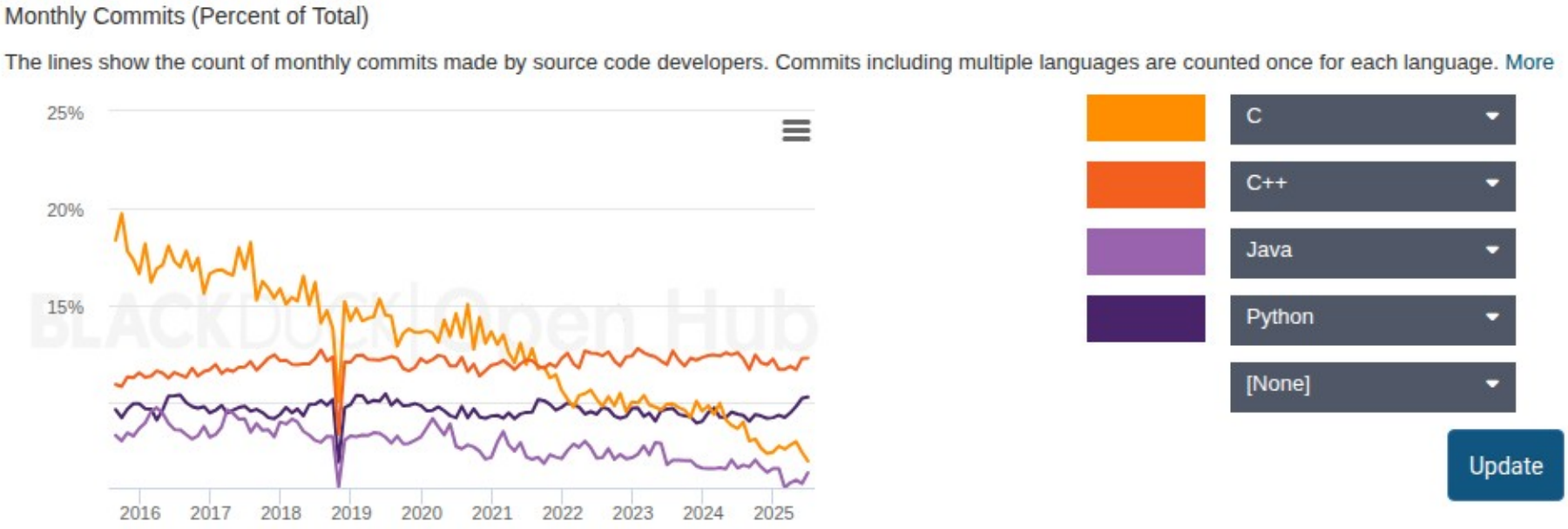
C++ Usage

Aug 2025	Aug 2024	Change	Programming Language	Ratings	Change
1	1		Python	26.14%	+8.10%
2	2		C++	9.18%	-0.86%
3	3		C	9.03%	-0.15%
4	4		Java	8.59%	-0.58%

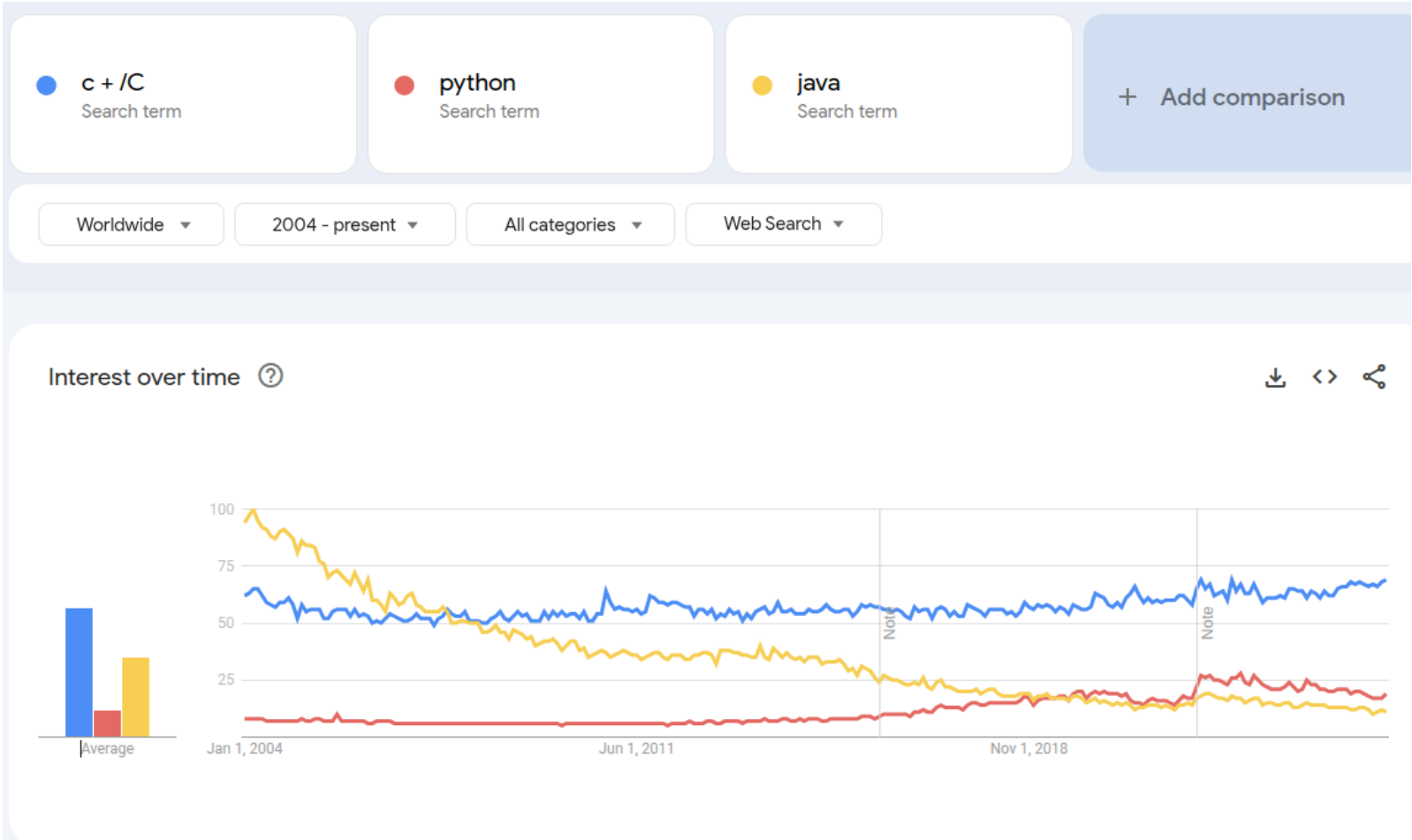
See https://www.tiobe.com/tiobe-index/

C++ Usage



See https://www.openhub.net/languages/compare

C++ Usage



See https://www.google.com/trends/explore?date=all&q=c%2B%2B%2FC,python,javascript

C++ … Why?

- Fast
- You have absolute control over everything
- No need for virtual machine or interpreter
- Elegant when done well
- Only choice for some situations
  - High speed trading
  - Google search
  - Embedded systems
  - Real Time Processing
- Low level control

C++ … Why not?

- Harder to code than languages that run on a VM (Java, C#)
- No garbage collection, pointers can be (and usually are) a problem
- Must be compiled to target platform, no portable bytecode
- My experience – My Python and Java applications are up and running faster than my C++ apps.

C++ … Where is it used?

- Device driver development
- Video Games
- Advanced engines (audio, image processing, etc)
- Telecom
- Embedded software
- Financial - low latency market data feeds
- Google
- Real time video processing

I know Python, why bother?

- Speed
- Software now targets distributed applications
  - Rich user interfaces
  - Cloud storage
  - Mobile Applications
  - Big Data
  - games
- Today, applications require expertise in multiple languages

But… I don’t know most of that stuff

- Don’t worry, you aren’t expected to.
- You learn on the job (while getting paid)