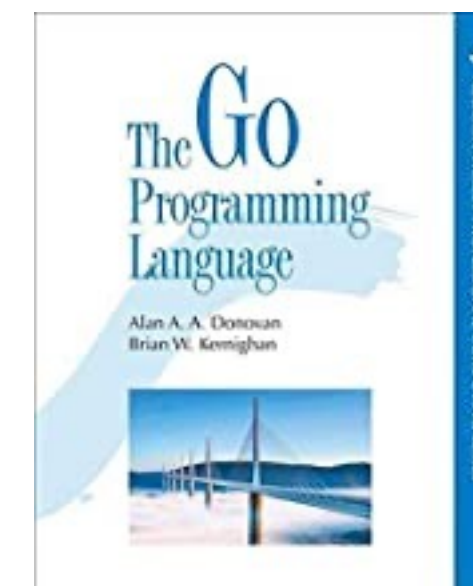
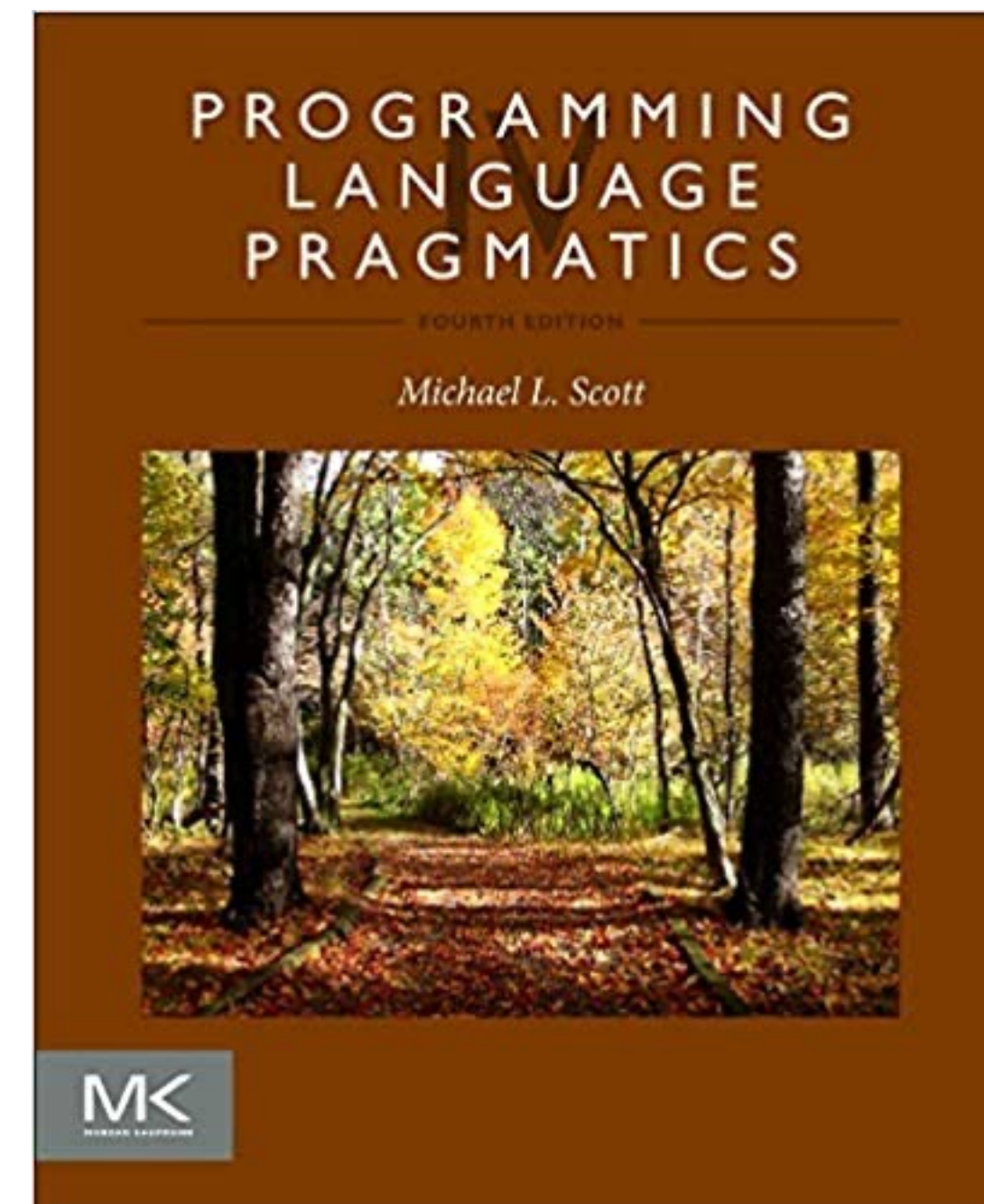


Programming Languages

CS245

Things to Know

- Textbook
 - Programming Language Pragmatics, v4
 - by M Scott
 - 17 chapters, 8 covered and not all of those
- Also
 - The Go Programming Language
 - Donovan & Kernighan
 - Atomic Kotlin
 - Eckel & Isakova



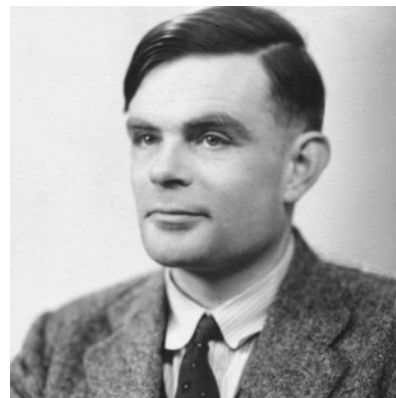
Class WebSite

<https://cs.brynmawr.edu/cs245>

- Will have all homework, important dates, etc
- Lecture notes — I will post PDF “notes”. Literally my notes to myself.
 - This will likely be the only powerpoint for the class
- Tests — 2 midterms and a final. All will be open book, open notes, open computer, closed mouth.
 - midterms will be “take where you want, but during class time”
 - final — similar idea.
- Homeworks — approximately 6 through the semester
- Lab — The first few will be formally in lab room. Rest will be in the form of small programming or written assignments assigned at the end of class. These will be graded on a “did you hand in something that is at least semi-correct”.

Programming Languages

- Why?
 - because it is required for the major
- Why is it required?
 - All PL are “Turing Complete” so at one level it does not matter what language you use
 - Grace Hopper — if you program in a better language you can be more efficient



YOU'LL NEVER FIND A
PROGRAMMING LANGUAGE
THAT FREES YOU FROM
THE BURDEN OF
CLARIFYING
YOUR IDEAS.

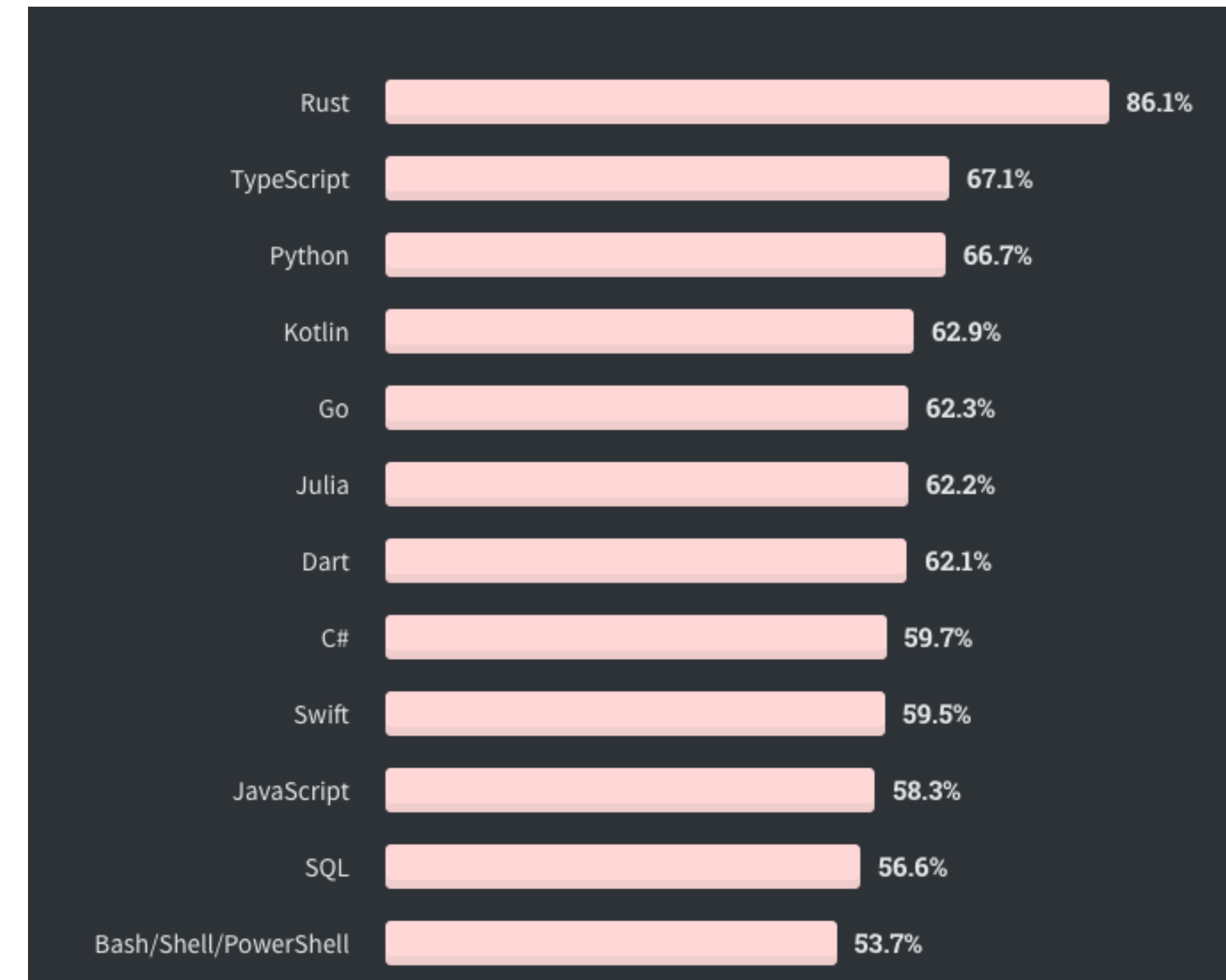


Goals

- learn questions to ask, and how to evaluate answers, for choosing language appropriate to problem
- Improve ability to learn new programming languages
 - In my career: Basic, PL/1, Pascal, (rascal, spss, sas), C, Lisp, Prolog, Visual-C, Perl, Python, Visual-Basic, Java, SQL, Objective-C, PHP, Javascript, Kotlin, Go. (and probably a dozen others)
- Increase ways in which you can express and implement programs
- Understand why and wherefore of “obscure” language features

PL in this course

Rank	Language	Type	Score
1	Python	🌐 🖥️ ⚙️	100.0
2	Java	🌐 📱 🖥️	95.4
3	C	📱 🖥️ ⚙️	94.7
4	C++	📱 🖥️ ⚙️	92.4
5	JavaScript	🌐	88.1
6	C#	🌐 📱 🖥️ ⚙️	82.4
7	R	🖥️	81.7
8	Go	🌐 🖥️	77.7
9	HTML	🌐	75.4
10	Swift	📱 🖥️	70.4



<https://insights.stackoverflow.com/survey/2020#overview>

<https://spectrum.ieee.org/top-programming-languages-2021#toggle-gdpr>

Java

Why is it the first language taught at BM

- Plusses
 - large, well-organized libraries
 - clean, consistent syntax
- Minuses
 - OO is big hurdle — have to “talk around it”
 - Comically wordy

Kotlin and Go

- All programming will be in Kotlin or Go
 - Go
 - imperative, successor to C(?), language of Google, well loved
 - Kotlin (named for an island near St Petersburg)
 - “Kotlin is an open-source statically typed programming language”
 - successor to Java(?), well-loved
 - excellent support for functional programming
 - Will only be writing in functional programming style

Functional and Imperative programming

- Imperative
 - programming by side effect
 - procedures that return nothing (in Java void)
 - lots of variables whose values are set and change frequently
- Functional
 - No variables
 - Named constants Yes; variables no. (So no loops!)
 - Procedures always return values, it is why they are executed
 - Procedures are only dependent on their arguments
 - Programs can be provably correct

Hello World

//KOTLIN

```
@SuppressWarnings("UNUSED_PARAMETER")
fun main(args: Array<String>) {
    println("hello world kotlin");
}
```

Somewhat briefer

```
fun main() {
    println("hello world");
}
```

//GO

```
package main
import "fmt"
func main() {
    fmt.Println("hello geoff!")
}
```

Somewhat briefer

```
package main
func main() {
    println("hello geoff!")
}
```

For next class

- If you could be a programming language, which one would you be
 - Why
 - Why is that language so named?
 - Do not use: Java, C, Python, Fortran, Cobol, Javascript
- Read
 - The semi-colon wars
 - The end of history and the last programming language
 - Scott 1.1-1.4