Introductory Java 1

J1

Programming Language Paradigms
Java Standard Library
Hello World

Photo by Fabian Muehlboeck

Why Java?

- Learn multiple paradigms
- Important example of:
  - Object-Oriented Programming
  - Large-Scale Programming
  - Programming with a rich standard library
- Widely used
  - Industry
    - Servers, Enterprise Software
    - Android apps
  - Teaching
    - Including here at ANU

Different Paradigms

	Java	Haskell	Python	JavaScript	C
Imperative	✔	✘	✔	✔	✔
Object-Oriented	✔	✘	✔	✔	✘
Statically-Typed	✔	✔	✘	✘	✔
Class-Based	✔	✘	~	~	✘
Memory-Safe	✔	✔	✔	✔	✘

Imperative Languages

describe computation in terms of a series of statements that transform state.

e.g. Java, Python, JavaScript, C

Object-Oriented Languages

tightly couple data with the code that transforms it.

e.g. Java, Python, JavaScript

Statically-Typed Languages

ensure a certain level of compatibility between different parts of a program before running it.

e.g. Java, Haskell, C

Class-Based Languages

organize their code, and particularly objects, into classes.

e.g. Java, (parts of) Python, (newer) JavaScript

Memory-Safe Languages

restrict the use of every bit of program data according to how it was created.

e.g. Java, Haskell, Python, JavaScript

Structured Programming

A particular kind of imperative programming

"Any program can be computed by combining sub-programs with only three control structures:

- Sequence,

- Selection, and

- Iteration"

- The "Structured Programming Theorem"

Structuring your program in a way that is beneficial to large-scale program

- *Development*

- *Maintenance*

- *Extension*

Object-Orientation (coupling code/behavior tightly with data/state) and Class-based mechanisms make Java good at this.
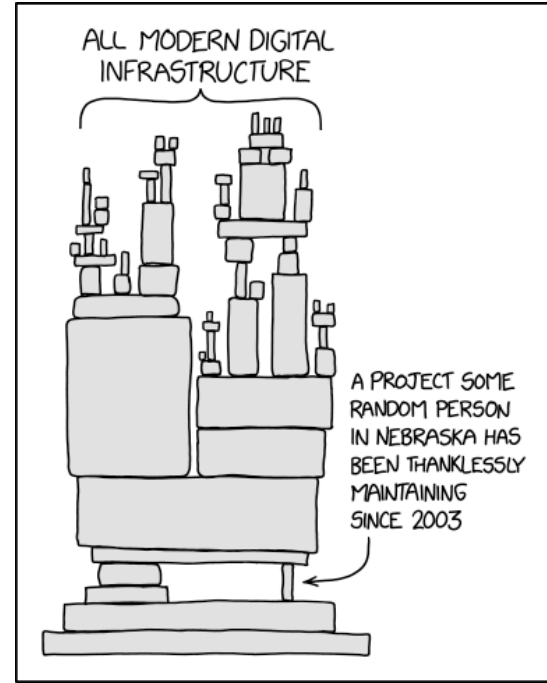
The Java Standard Library

The Java language is augmented with a large standard library (.NET does the same for C#)

- IO (accessing files, network, etc.)
- Graphics
- Standard data structures
- Much more

Using and understanding the standard library is part of learning a major language like Java or C#.

Rich standard libraries are a key software engineering tool.

The Oracle Java Tutorials

This course follows the structure of the Oracle Java Tutorials for the basic introduction to Java.

The tutorials are subject to Oracle's 'Java Tutorial Copyright and License' (Berkeley license).

We will move very fast for the first few weeks. You should use the tutorials to **ensure that you rapidly become proficient in the basics of Java.**