Programming Merit Badge
Troop 613

outline

I only have ~15 minutes!

- Introduction: Why study programming?

  - What counts as "computer literacy"

- What types of computer programming languages & technologies are there?

- Where does Python fit?

- What makes Python cool?

Introduction

"A human being should be able to change a diaper, plan an invasion, butcher a hog, conn a ship, design a building, write a sonnet, balance accounts, build a wall, set a bone, comfort the dying, take orders, give orders, cooperate, act alone, solve equations, analyze a new problem, pitch manure, **program a computer**, cook a tasty meal, fight efficiently, die gallantly. Specialization is for insects."

— Robert Heinlein, <u>Time Enough for Love</u>, (1973)

Why Study Programming

- I don't really care if all or none or some of you learn to truly program a computer. It is simultaneously fun and hard, frustrating and rewarding. It is not for everybody.

- I do care that all of you learn to be "computer literate"

What counts as computer literacy

- computer literacy *is not* knowing how to use MS Word

- computer literacy *is not* blindly accepting Facebook, Google, Windows, etc.

- computer literacy *is* understanding what is going on underneath the hood

- computer literacy *is* recognizing patterns of activity/functionality

- computer literacy means not panicking when things go wrong
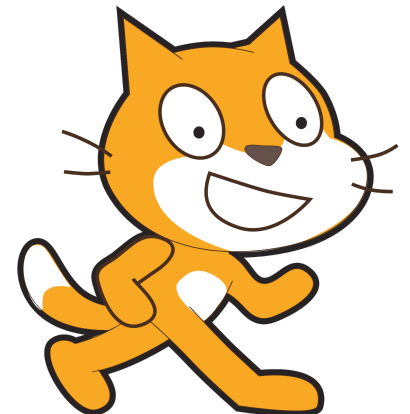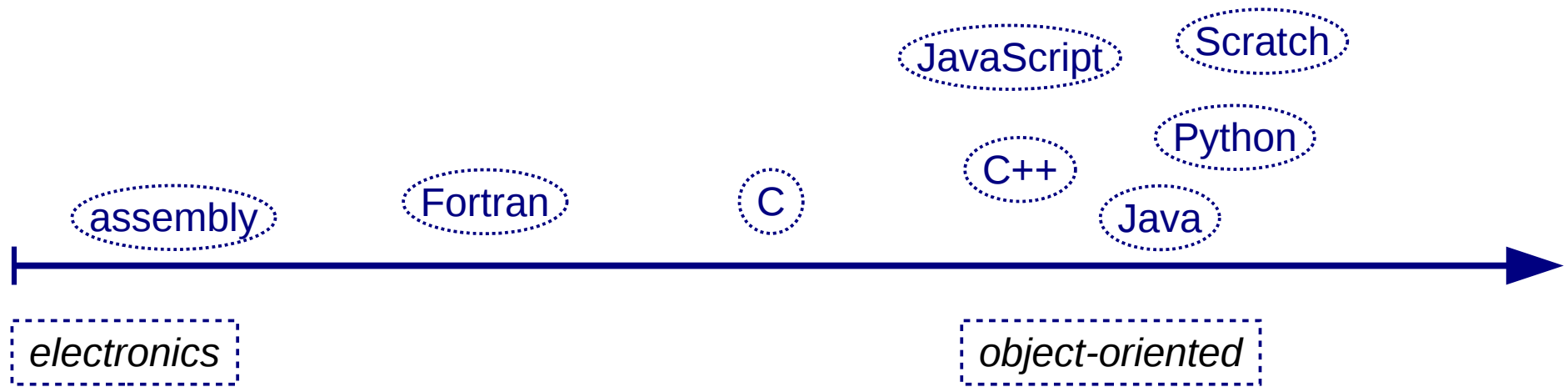
Types of Programming Technologies

- there are **a lot** of different programming languages and technologies
  - list of "Hello World" programs

- each has similarities & differences
- each has pros & cons

Types of Programming Technologies
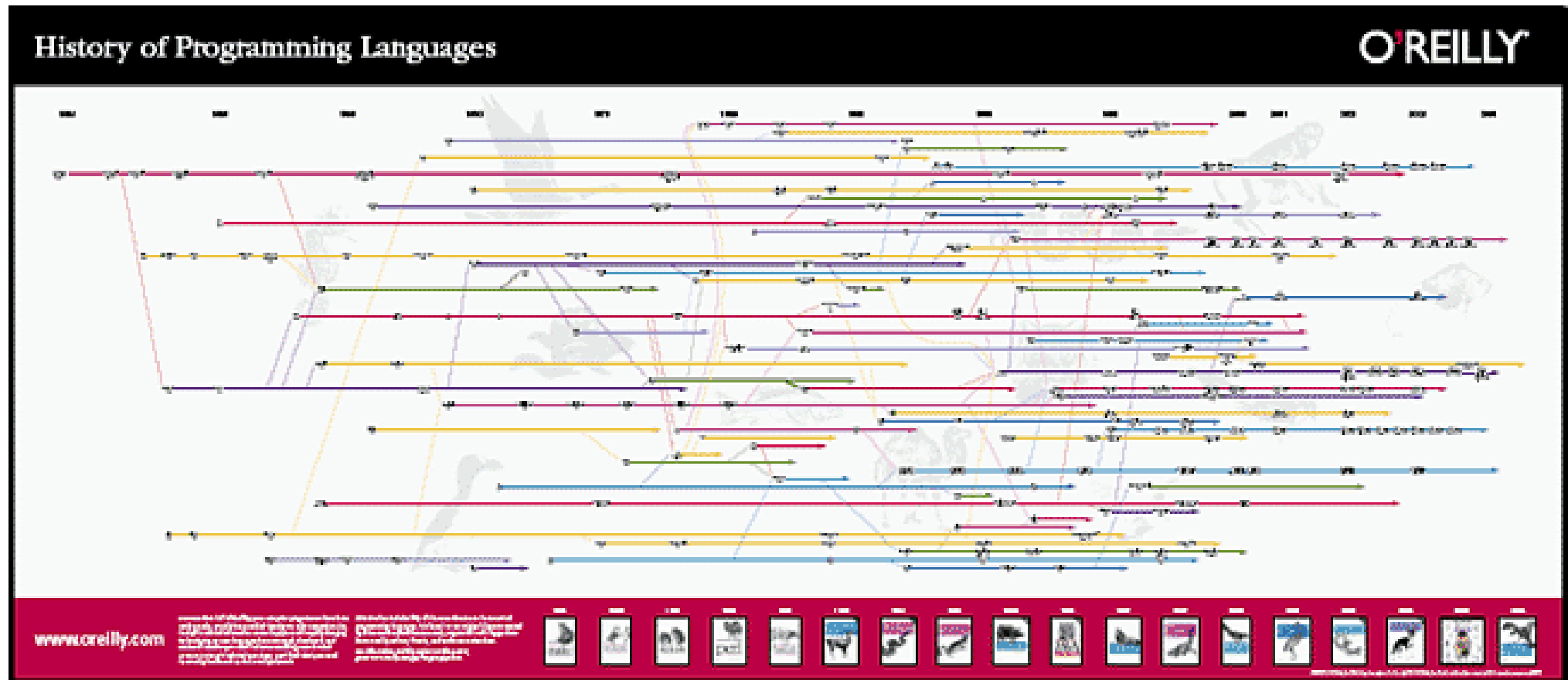
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types of programming technologies

Types of Programming Technologies

- interpreted vs. compiled languages

- strongly vs. weakly typed

- memory management

- object oriented

    - advantages:

        - dealing w/ set of related variables rather than individually

        - makes more sense to human programmers

        - "polymorphism"

Where does Python fit?

- Python is a high-level object-oriented weakly-typed language

- Python is very pretty

  - `>> import this`

What makes it cool?

- code blocks are identified by indentation rather than explicit brackets (*this makes it pretty*)

- automatic memory management (*this makes it simple*)

- packages / libraries / namespaces (*this makes it extensible*)

- "duck typing" (*sometimes this makes things easy, sometimes not*)

What makes it cool?

- I will go over some basic python code and maybe try to demonstrate...
    - variables
    - lists & dictionaries
    - loops
    - control flow
    - modules & packages
    - functions
    - classes