

CSE 130 : Fall 2011

Programming Languages

Lecture 11: Hello, Python.

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News

- Midterm Grades Will Be Up Soon
 - Stay tuned for viewing hours
- PA4 Due Tomorrow (Fri 5p)
 - Ocaml
- PA5 Is Up, Due 5/13
 - Python

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Say hello to Python

Recap of the course so far

- 4+ weeks of functional with OCaml
- Next: 3 weeks of OO with Python

OO at the highest level

- What is OO programming?

OO at the highest level

- What is OO programming?
- Answer:
 - Objects
 - message sends
 - dynamic dispatch

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Just to whet your appetite

- Say we have objects, like `cars`, `ducks`, `pig`, `cell_phones`
- Say we have a message name: `make_some_noise`

Just to whet your appetite

- Each object has its own implementation for `make_some_noise`: these are traditionally called methods.
 - `car`: vroom vroom,
 - `pig`: oink oink,
 - `duck`: quack quack
- Can send `make_some_noise` to any object. Depending on the actually run-time object, we'll get a different noise!

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OO programming

- Message:
 - the name of an operation
- Method:
 - the implementation of an operation
- Dynamic dispatch:
 - dynamic type of object determines
 - which method is run for given message send
- These are the core ideas of OO

This brings us to Python...

- We'll use Python as our vehicle for OO programming
- Fun and useful language

Python

- Python has a very relaxed philosophy
 - if something "can be done" then it is allowed.
- Dynamic types + Everything is an object
 - very flexible
 - very intuitive code

No static types

- **No static type system** to "prohibit" operations.
- No more of that OCaml compiler giving you hard-to-decipher error messages!

No static types: but what instead?

- **Dynamic typing**
- At runtime, every "operation" is translated to a method call on the appropriate object. If the object supports the method, then the computation proceeds.
- Duck-typing: if it looks like a duck, quacks like a duck, then it is a duck!

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Similarities to ML

- Uniform model
 - everything is an object, including functions
- Pass functions around
 - functions are objects!
- Supports functional programming
 - map and fold

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Other cool things about Python

- A lot of stuff that you may first think is a "language feature" is actually just translated under the hood to a method call...
- Very widely used, supported.
- Has libraries for all sorts of things.

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Ok, let's start playing with Python!

- Like Perl, python is a "managed" or "interpreted" language that runs under the python environment, i.e. not compiled to machine code.
- Makes it convenient to rapidly write, check-in and test code!

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Ways to run Python code

- At an interactive Python prompt
 - like "read-eval-print" loop of ML
- As shell scripts
- As stand-alone programs
 - run from the shell.

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Let's fire it up!

- Ok, let's give it a try...
- See lec11.py file for the rest...

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