Domain-Specific Languages

[T]he fundamental principles of designing for people: (1) provide a good conceptual model and (2) make things visible. — The Design of Everyday Things, Donald A. Norman

[E]very large scale programming project involves the design, use, and implementation of a special-purpose programming language, with its own data concepts and primitive operations, specifically oriented to that particular project.

— Hints on Programming Language Design, C. A. R. “Tony” Hoare
Inventing on Principle

Brett Victor
A studio is:

1. People
2. Process
3. Place

All work in progress is public.
Exercise: Set up our studio

(3 groups of 4 people) + Prof. Ben = 13 people

Discussion space
  everyone can see each other’s face

Discussion + presentation space
  everyone can see each other’s face
  everyone (except presenter) can see the side screen and front board

Work space
  space for each person to write or work on a computer
  no need to see boards easily, but it might be nice to use the boards

Easy set-up and recovery
  should take no more than two minutes for all of us to set-up / reset
  (perhaps after some practice :) )
The plan
This course is two half-courses

A tour of DSL design & implementation techniques

Project
$111 = \frac{1}{3} \cdot (81 + 121 + 131)$
Skills

- Scala
- GitHub
- Testing
- Build system (sbt)
Concepts

- Language design
- Parsing
- Semantic models
- Software engineering
- Extensibility
- ...

Skills

- Scala
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## Philosophies

- People first
- Programming as language design
- How does language influence thought?
- The end of PLs

## Concepts

- Language design
- Parsing
- Semantic models
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- Extensibility
- ...

## Skills

- Scala
- GitHub
- Testing
- Build system (sbt)
Scala as a lens

lots of experience
Soundbite syllabus
or is it “soundbyte”?

- One-stop shop: [www.cs.hmc.edu/cs111](http://www.cs.hmc.edu/cs111) schedule, assignments, repository, syllabus, etc.
- All course communication happens on [Piazza](https://piazza.com)
- Come to class and participate fully.
- Concentrate more on problems than solutions
A typical week

Class on Monday and Wednesday
we’ll need a scribe each day — sign up on the Wiki

Assignment due Wednesday at 11:59pm

Critique due Friday at 11:59pm
treat your critique partner as your collaborator

New assignment available no later than Wednesday evening

Office hours in the LAC
Mondays 10:30–noon & Tuesdays 2:45–4:30pm
Important places

**Physical access:** F&M

**Electronic access:** CIS
Grading
More details next week

Participation: 20%
critiques • in-class discussion • class writeup(s)

Assignments: 40%

Project: 40%
there will be milestones, but it’s mostly on you
Key point

The primary responsibility is yours.
# Music Maker

Emily Blatter — DSLs Fall 2014

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
| 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8 | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na |
| 9 | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na |
| 10| na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na |
| 11|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 12|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 13|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 14|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

*baaaat maaaaaaaaaan*
Alex Ozdemir — DSLs Fall 2015

```
ben:construct ben$ `runMain construct ConstructREPL`
[info] Loading global plugins from /Users/ben/.sbt/0.13/plugins
[info] Set current project to Construct (in build file:/Users/ben/Documents/work/teaching/courses/DSLs/Fall15/projects/construct)
[info] Running construct.ConstructREPL
Construct $ ```
Before Monday

- Activate your Piazza account
  use Piazza (or GitHub)—not email—for course communication

- Join our GitHub organization

- Assignment 1
  submission due Sunday
  critique due next Tuesday
  all the details are in the assignment
  ask questions on Piazza!

- Sign up to scribe a class

- Restore the room