Racecar

*Racecar*

A *Programming Language for Kids*

Sam Kohn: Project Manager Guru
Alex Fields: Language Guru Guru
Mason Silber: System Integrator Guru
Jeremy Spencer: System Architect Guru
Colfax Selby: Verifier and Validator and Text Box Guru
Big Problems Facing America

- Global Warming
- Poverty
- OS
- Learning to drive before learning to code
Guiding Principle: Make Everything Easy
Buzzwords
Language design
Lesson Plan
Syntax

● Minimize punctuation
  ○ Function calling like in OCaml and Haskell
  ○ Newline-terminated statements unlike C and Java

● Keywords are real words!
  ○ drive
  ○ turn
  ○ number
  ○ word
  ○ define
  ○ set
  ○ etc.
Semantics

Guiding principle: It should sound like English

Examples:

● drive forward 5 steps
● turn left
● define myFun using myVar (number)
● set myVar to getCarPosition
● repeat 10 times
Development and Runtime Environments
Development Software

- Git & GitHub
- Google Drive
- All kinds of text editors
Runtime Environment

● Custom-built GUI to run Racecar programs
  ○ Python Lex/Yacc (PLY)
  ○ Python TkInter framework
  ○ Python image library (PIL)

● Remember, it's supposed to be easy!
  ○ Immediate visual output of code
  ○ Fully integrated development environment
  ○ Error checking and code verification
System Architecture
Semantic Analyzer
Semantic Analyzer

- **Traverses AST twice**
  - First
    - checks for functions and adds them to the symbol table
  - Second
    - everything else
    - type checking
    - scoping
- **Allows for function calls to appear before declarations**
Testing
Frameworks

- Test suite:
  - Iterative testing
  - Specific tests for each step of the compiler
  - End to end system testing

- Code validation:
  - PEP8 standard
    - Style guide
    - Similar to checkpatch.pl
Lessons Learned

Or: How I learned to stop worrying and love Python
What went right

● Using Python for everything

Python: the Racecar of real-people programming languages

● Iterative + end-to-end testing

● Team Roles
  ○ but not binding
What went wrong

TkInter

Not enough time to implement entire specification

- logical operators? who needs 'em!
- Line numbers in IDE
- Explode on collision
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Learning to drive before learning to code

Good luck!
Thank You!
Any Questions?