

# Grace

## *Manifesto for a New Educational Object-Oriented Programming Language*

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ECOOP 2010, Maribor, Slovenia

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## Supporters

- ◉ Peter Andrae, Victoria University of Wellington
- ◉ Gilad Bracha, Ministry of Truth
- ◉ John Boyland, University of Wisconsin, Milwaukee
- ◉ Pascal Constanza, Vrije Universiteit Brussel
- ◉ Sophia Drossopoulou, Imperial College, London
- ◉ Susan Eisenbach, Imperial College, London
- ◉ Michael Hicks, University of Maryland
- ◉ Michael Kölling, University of Kent at Canterbury
- ◉ Gary Leavens, University of Central Florida
- ◉ Shane Markstrum, Bucknell University
- ◉ Doug Lea, SUNY Oswego
- ◉ Dirk Riehle, Friedrich-Alexander-University of Erlangen-Nürnberg
- ◉ Ewan Tempero, The University of Auckland
- ◉ Dave Thomas, Bedarra Research Labs
- ◉ Laurence Tratt, Middlesex University
- ◉ Jan Vitek, Purdue University

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## Educational Languages

Kim

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# What is an educational programming language?

- Designed specifically for novices
- Can have limited or broad domain of application
  - We are interested in broad domain
- Main focus is on programming in the small, but some modularity features.

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# Teach Industrial-Strength Languages?

- Too much conceptual redundancy
- High overhead for simple programs
  - Too hard to read and write
- Want clean concepts
- Saddled w/backward compatibility

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# What Makes a Language Succeed?

- Clean, simple design
  - good enough, perfection not required
- Widely available
- Timing – dissatisfaction with alternatives
  - Java succeeded in part because of unhappiness with C++
  - Blue suffered
- Support movement of new ideas to intro level
  - Pascal: top-down design, structured programming

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# User Model

- First year students in OO CS1 or CS2
  - objects early/late, static/dynamic, functional/procedural/scripting...
- Second year students
- Faculty & TAs – assignments and libraries

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## We are in the dog food business

User model:  
Beginning  
students

Customer:  
experienced  
instructors



The consumer is not the customer

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## Principles & Motivations

James

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## Why Now?

- Happy teaching Java next 3-5 years
- In 2015, Java will be 20 years old
- State of the art has advanced
  - patches look like patches
- New languages bring great ideas
- But are for professionals, not students
- To be ready in 2015, we need to start now.

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## Motivations

- In early part of curriculum want
  - Low overhead for simple programs
  - Language levels
  - Solid generics
  - Static and dynamic typing
  - High level constructs for concurrency/parallelism
  - Support for immutables
  - Power of functional constructs

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# Grace Fundamentals

- Everything is an object
- Simple method dispatch
- Single inheritance
- Language levels for teaching
- Extensible via Libraries (control & data)
- Java / C / Python / Scala programmers should be able to read Grace programs

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# Features

- Uncluttered code; layout significant
- Structural typing
- Local type inference
- Separate subtyping from inheritance
- User-definable operators
- Sensible generics
- Lambdas
- Supports static and dynamic typing
- Parallel programming
- Equals & hashCode work automatically
- v instead of getV() for access
- Minimize incantations (public static void main)

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# What Next?

Andrew

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# Process

- Openness
- 3 Rules of 3
  - 3 compelling examples
  - 3 existing languages
  - We 3 decide!
- Make our own mistakes not anyone else's

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# Blog

- ◉ Material for review will be available at
  - ◉ <http://gracelang.org/>
- ◉ Not much there yet.

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# Help!

- ◉ Supporters
- ◉ Programmers
- ◉ Implementers
- ◉ Library Writers
- ◉ IDE Writers
- ◉ Testers
- ◉ Teachers
- ◉ Students
- ◉ Tech Writers
- ◉ Textbook Authors
- ◉ Blog editors
- ◉ Community Builders

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# How to Get Involved

- ◉ Subscribe to RSS feed at [gracelang.org](http://gracelang.org)
- ◉ Watch for e-mail list

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