

# Scala as a Beginner Language

– Experiences and plans at LTH

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2016 April 20

## Agenda

- 1 Experiences with Scala as a beginner language at LTH
  - Primary school activities at LTH Vattenhallen
  - Turtle graphics in Scala with Kojo in Swedish
- 2 Future plans for Scala as a beginner language at LTH
  - Potential pedagogical benefits and risks
  - New course: EDAA45 "Introduction to programming"

# Primary school activities at LTH Science Center Vattenhallen

- **Thousands of school kids** visiting Vattenhallen have done **programming experiements** using LTH's free teaching material in Scala and Kojo:  
[www.lth.se/programmera/uppdrag](http://www.lth.se/programmera/uppdrag)  
**Try it yourself!**
- **Hundreds of teachers** have taken LTH's **programming courses for primary school teachers**
- LTH is supporting **Skolverket** in dev of coming curricula.  
**AT LAST:**  
**Programming in school!!!**



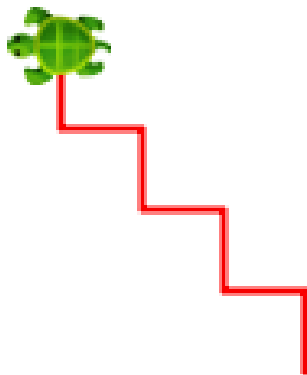
# Programing for Kids in school

- **S**equence
- **A**lternative
- **R**epetition
- **A**bstraction



# Scala for Kids: Turtle graphics in Kojo

- **S**equence
- **A**lternative
- **R**epetition
- **A**bstraction



# Experiences with Scala for kids

- Good, evolving, easy-to-use IDE available:  
**Kojo** – try it yourself: [www.kogics.net/kojo-download](http://www.kogics.net/kojo-download)
- Fulfills three important criteria:
  - **Free** and open source; schools don't have to pay
  - Available in **Swedish**; identifiers with öåä
  - Programming "**for real**"; the sky is the limit...
- Avoids beginner-unfriendly boilerplate, e.g.:  
`public static void main(String[] args)`
- Flexible syntax and powerful language constructs that enable creation of **simple** control structures:

```
upprepa(10){ fram; höger }
```

- Concise syntax and low "cost" of **abstraction**

```
def kvadrat = upprepa(10){ fram; höger }
```

# On-going curricula development of CS courses

Four new courses for the CSE program (Datateknik):

- Introduction to computer programming (Scala+Java)
- Evaluation of software systems (R)
- Discrete structures in computer science (Clojure)
- Functional programming (Lang. TBD)

More information: <http://cs.lth.se/education/>

# Why Scala?

## Potential **benefits**:

- Regular semantics, e.g. no dicotomy btw primitive types & objects
- Concise, expressive syntax: don't get drowned in a "letter soup"
- Interactive learning through experiments in the Scala REPL
- Multi-paradigm, pragmatic: imperative, object-oriented, functional
- Rich semantics: can demonstrate many modern, advanced cs concepts
- New, modern, evolving language exciting for new students
- Also non-beginners get a challenge
- Free, open source language and tools

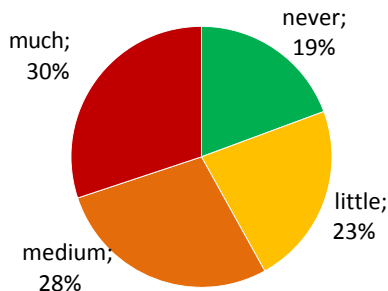
## Potential **risks**:

- Tools not becoming mature fast enough
- Lack of beginner-oriented teaching material
- Future industrial relevance and critical community mass

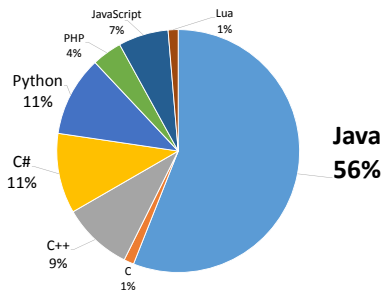


# Course intro survey 2015, CSE (Datateknik) EDA016 Programming, first course (Java)

Have programmed before?

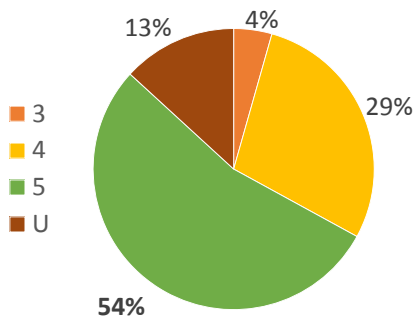


What language?



## Course results 2015, CSE (Datateknik) EDA016 Programming, first course (Java)

### Grades 2015



### Goal 2016

To increase the  
**challenge level** &  
**learning outcome**  
significantly.

# New course: EDAA45 Introduction to programming using Scala and Java

■ SOME ITEM