Eco: A language composition editor


Edd Barrett


Carl Friedrich Bolz


Lukas Diekmann


Laurence Tratt


Naveneetha Krishnan Vasudevan

KING'S College LONDON

Software Development Team

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Our problem

Our problem

We want **better** programming languages

Our problem

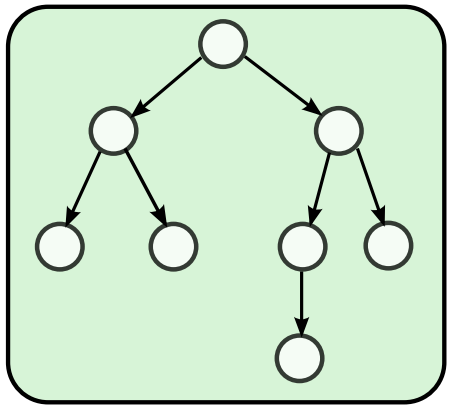
We want **better** programming languages

But better always seems to end up **bigger**

Language composition

Underlying language composition challenges

Parsing

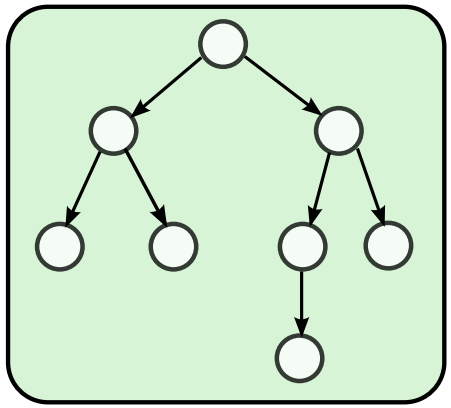


Running

```
SUB     AX,AX
MOV     ES,AX
SUB     BH,BH
MOV     BL,INT_NUMBER
SHL     BX,1
SHL     BX,1
MOV     DI,ES:[BX]
MOV     ES,ES:[BX+2]
ADD     DI,4
LEA     SI,TAG
MOV     CX,TAG_LEN
```

Underlying language composition challenges

Parsing



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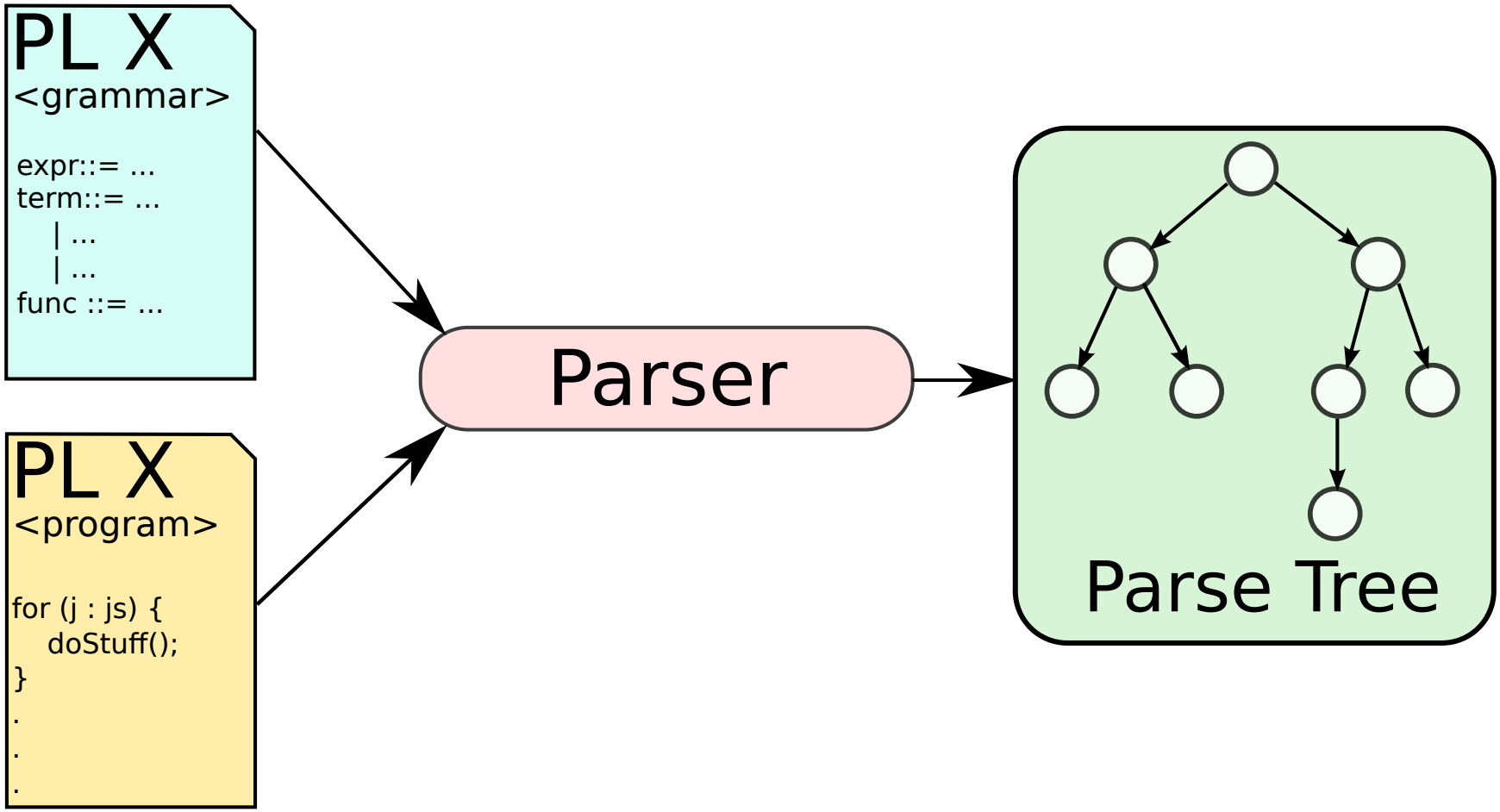

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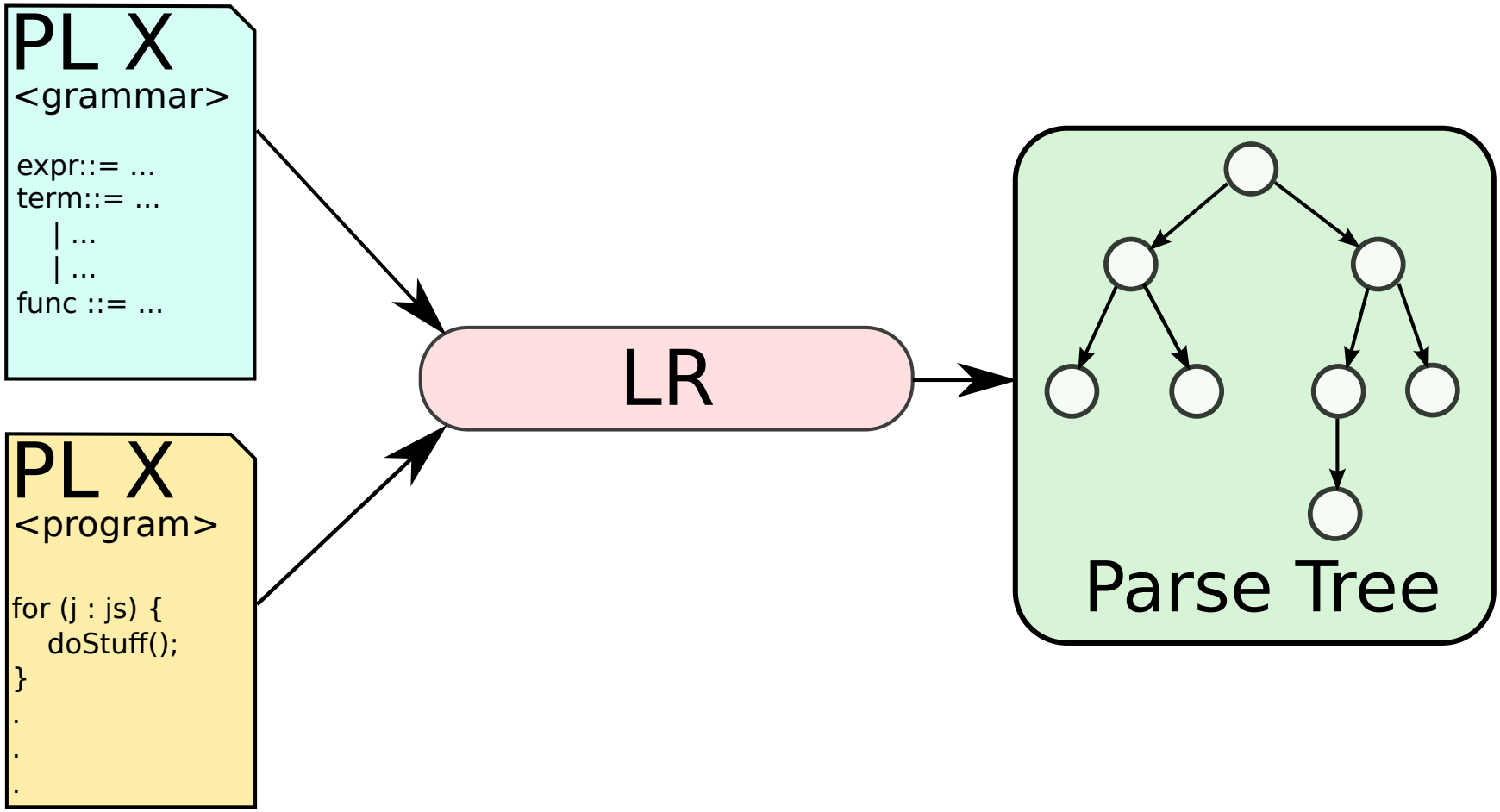

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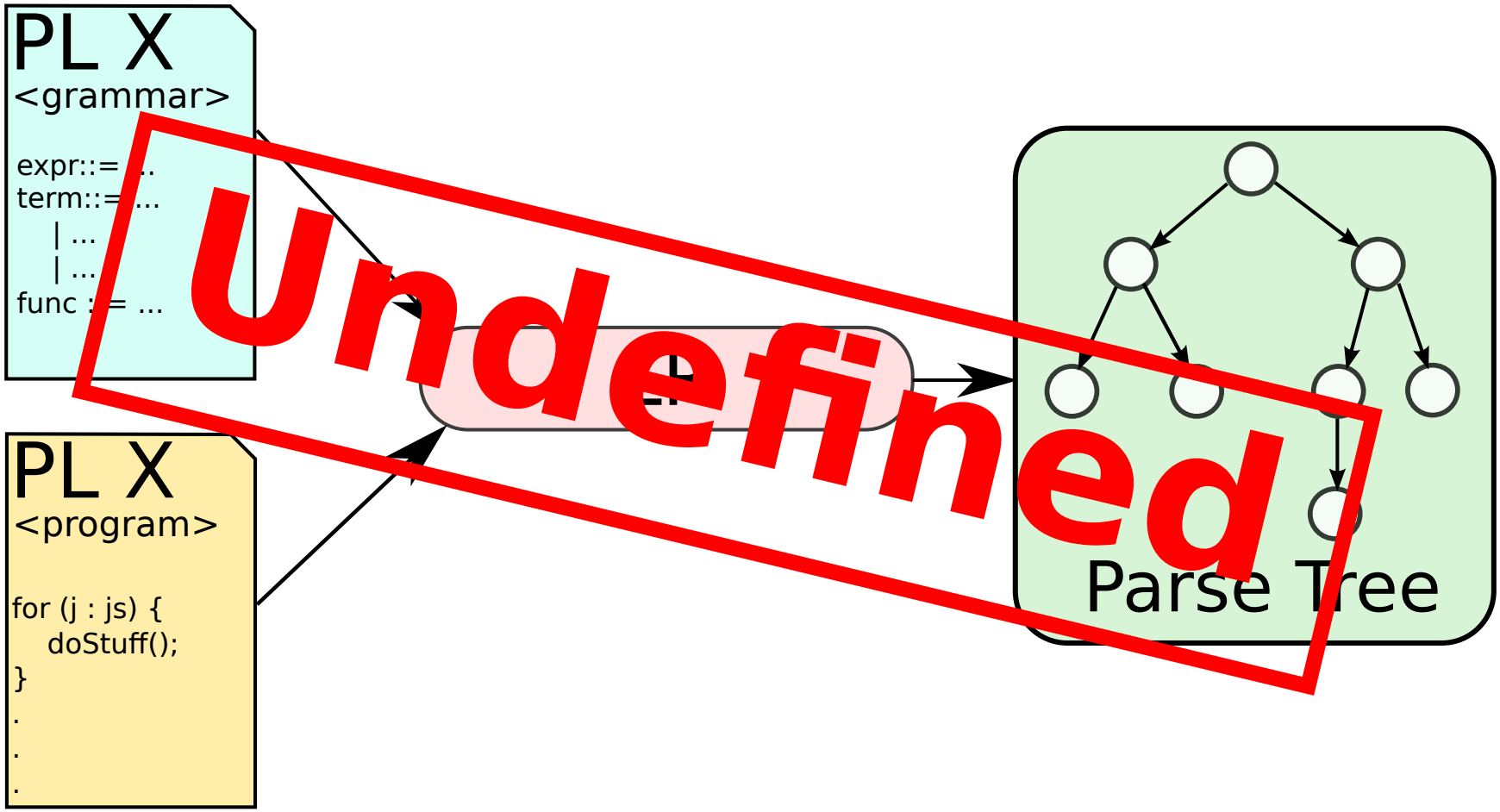

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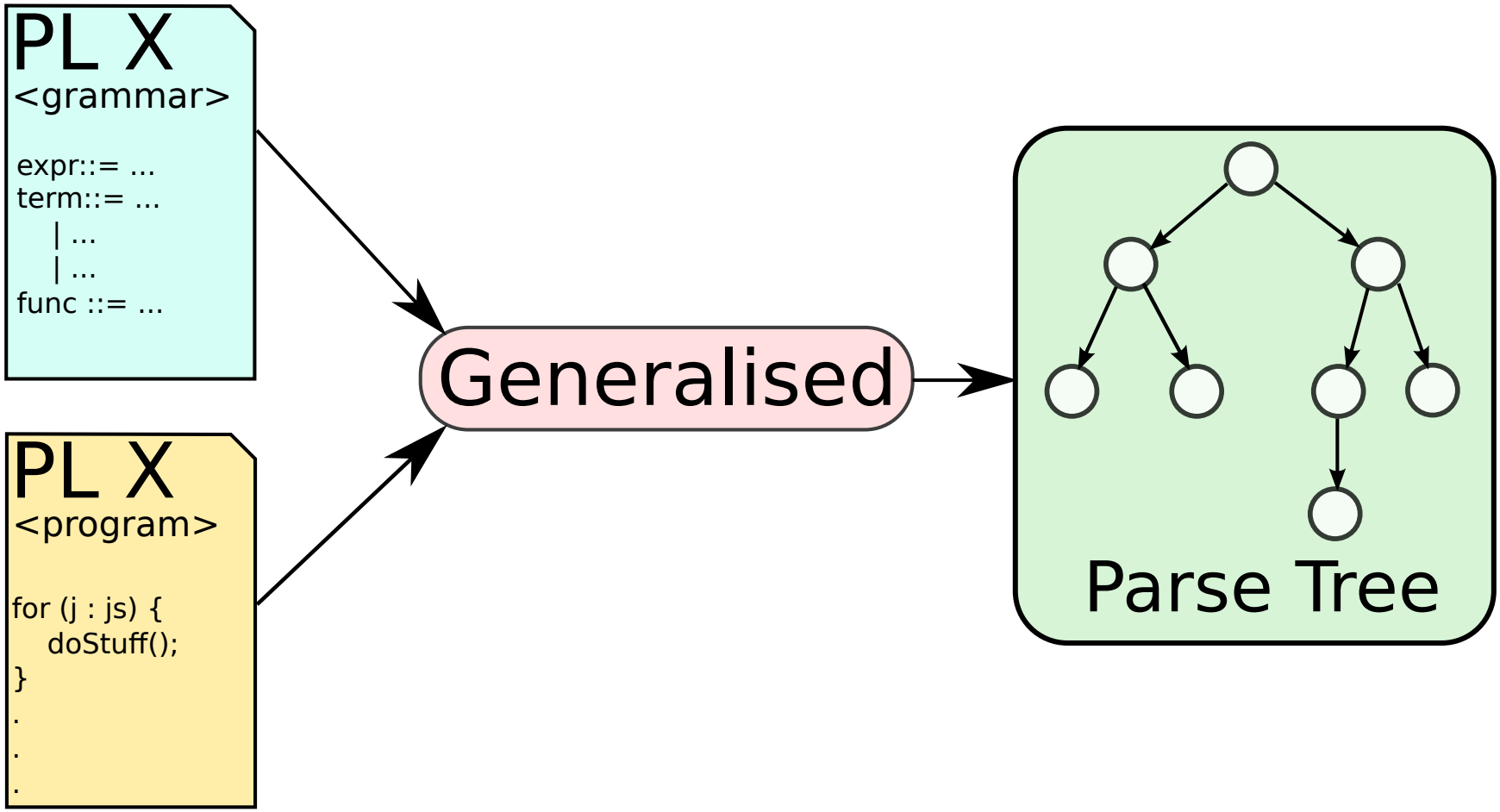

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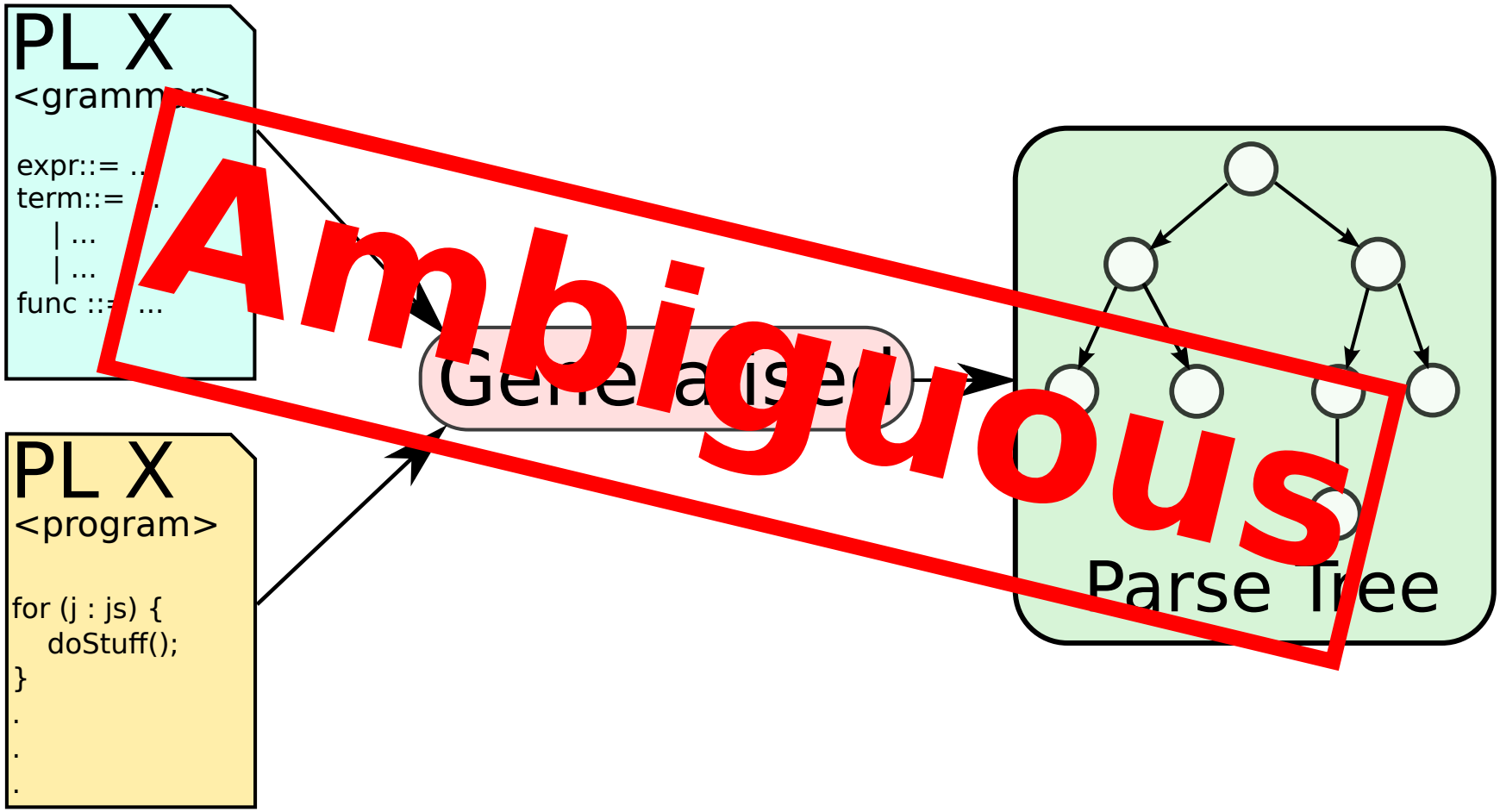

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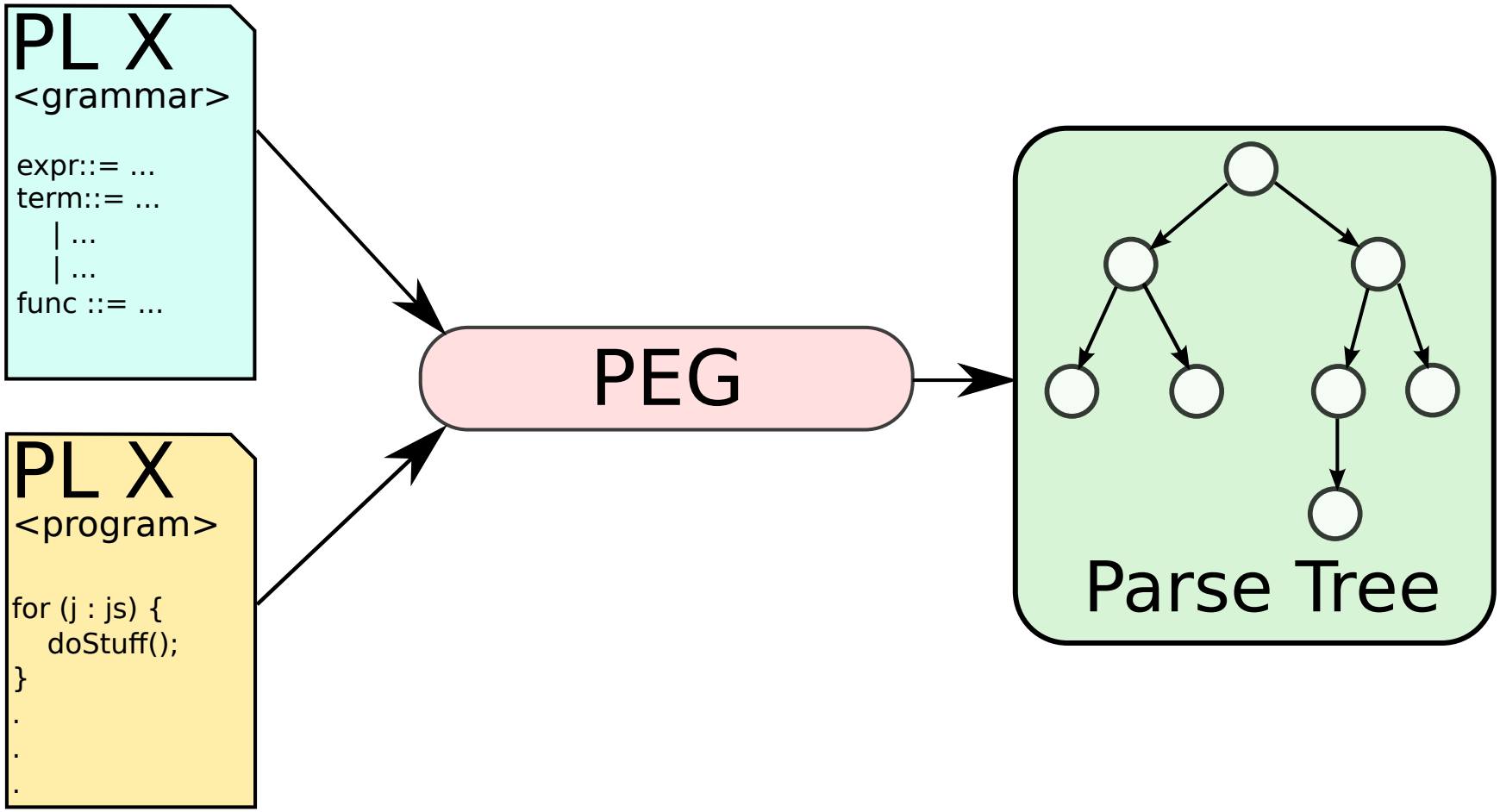

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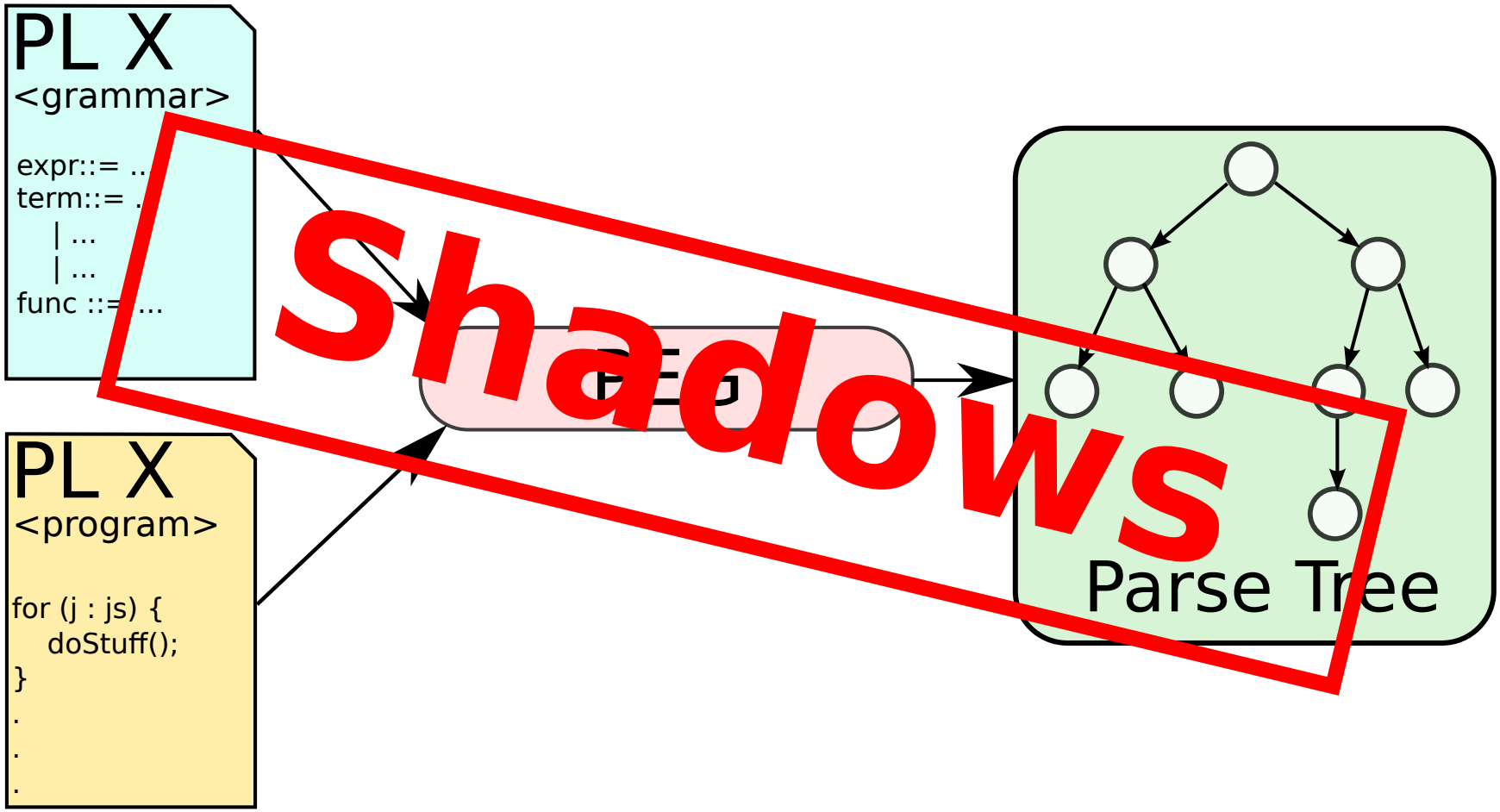

The only choice?

Syntax-directed editing (SDE)

The challenge

Challenge:
SDE's power +
a text editor feel?

Demo

Challenges

- Whitespace-sensitive languages
- Incremental AST

Indentation

The traditional way to parse indentation based languages is too slow.

Indentation

```
def calc_indentl(l):
  if prev(l) == None:
      l.indentl = 0
  elif prev(l).wsl == l.wsl:
      l.indentl = prev(l).indentl
  elif prev(l).wsl < l.wsl:
      l.indentl = prev(l).indentl + 1
  else:
      assert prev(l).wsl > l.wsl
      prevl = prev(prev(l))
      while prevl != None:
          if prevl.wsl == l.wsl:
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- Afterwards, affected succeeding lines need to be updated as well
- Worst-case: O(n)

Incremental ASTs

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print x
```

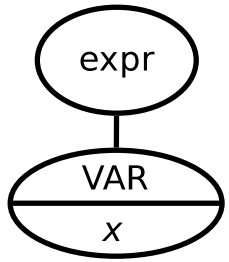

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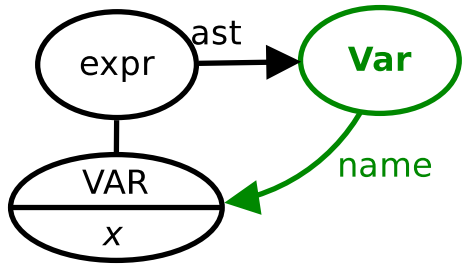

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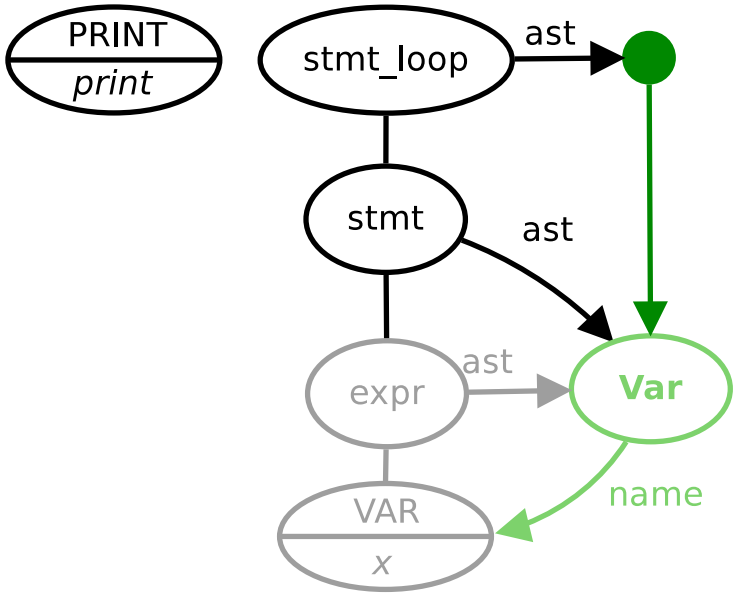

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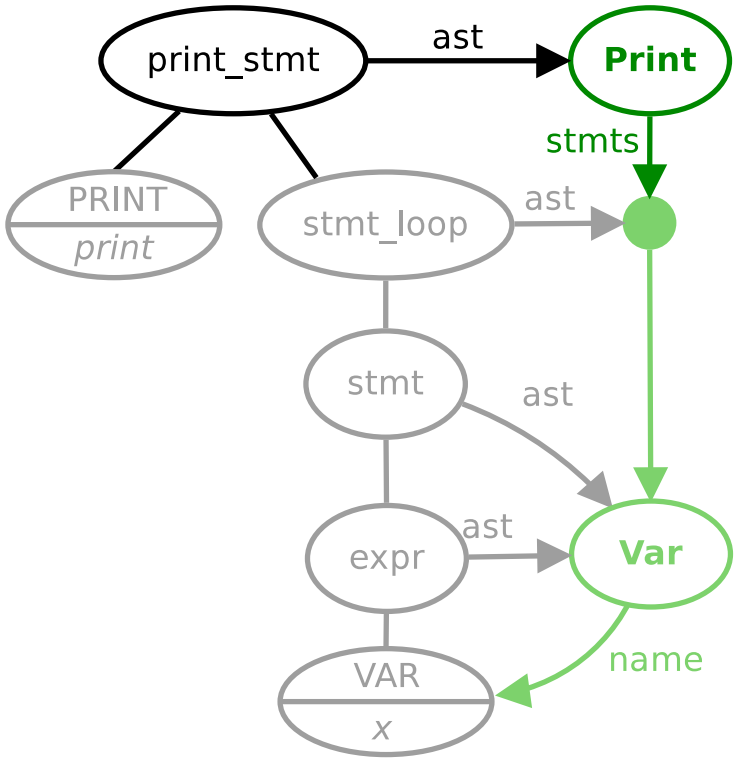
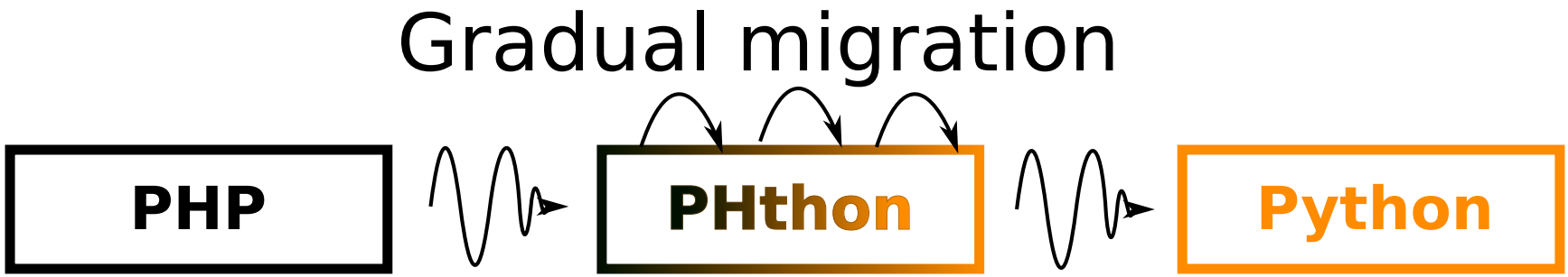


What is it good for?

First experiment

Unipycation

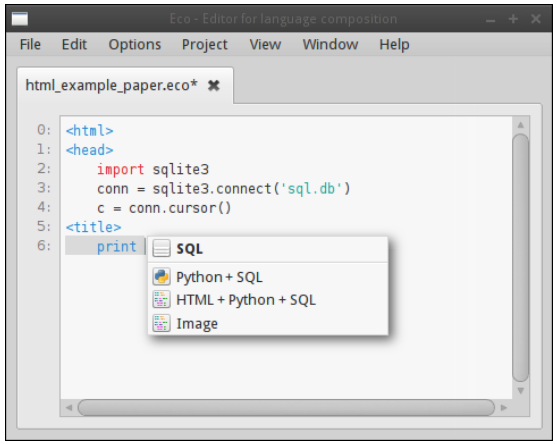
Recent experiment

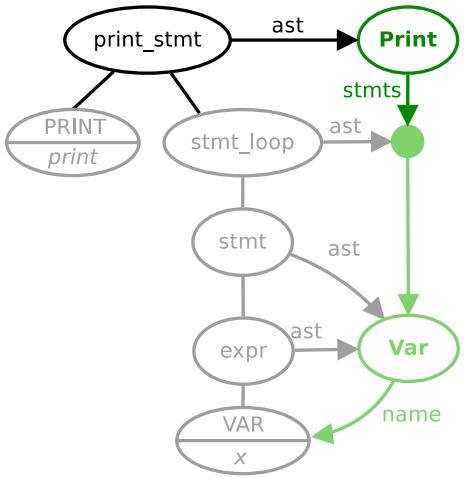


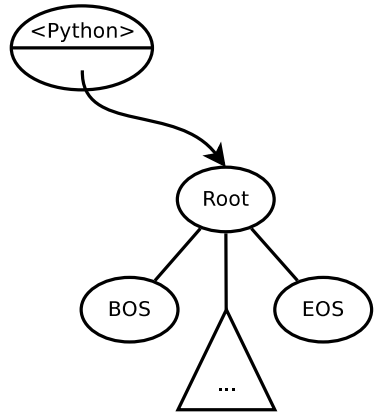
What's next?

Incremental semantic analysis on ASTs and code generation

Thanks for listening







http://soft-dev.org/