IMPROVING CODE COMPLETION

work by
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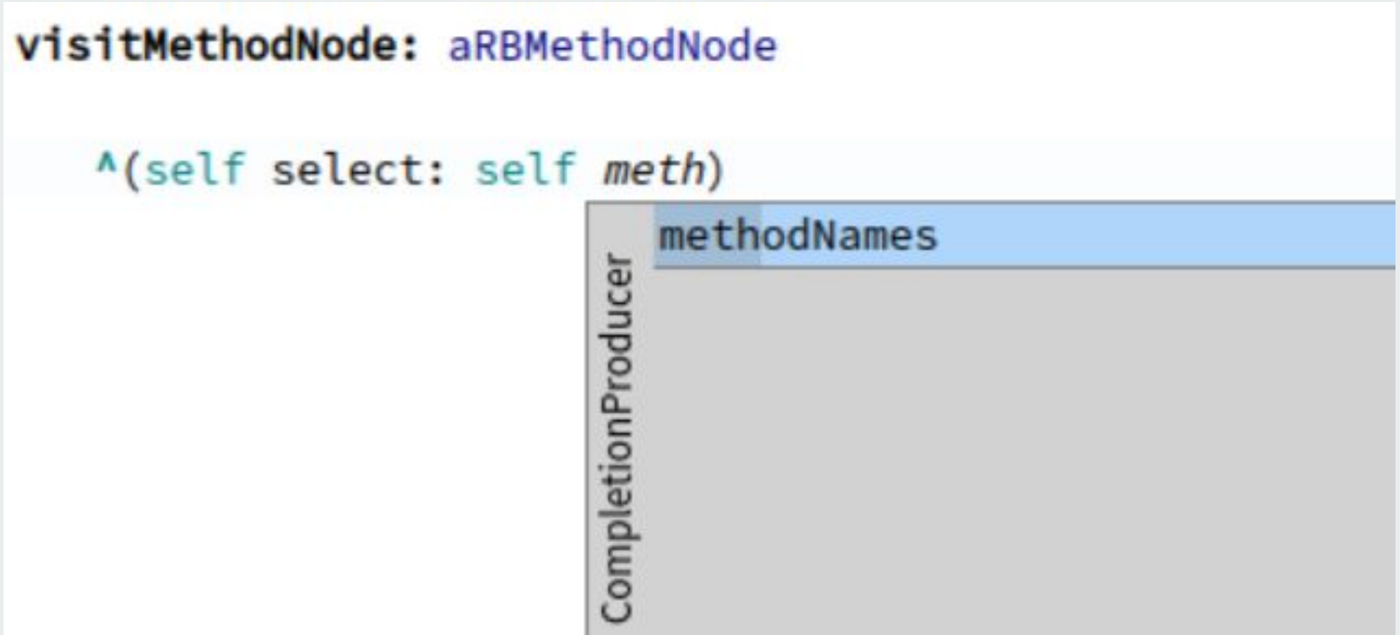
What is Code Completion?



```
visitMethodNode: aRBMethodNode

    ^(self select: self meth)
```

Problem

- ➥ on a Parser level
- ➥ on a Model level
- ➥ on a Sorter level

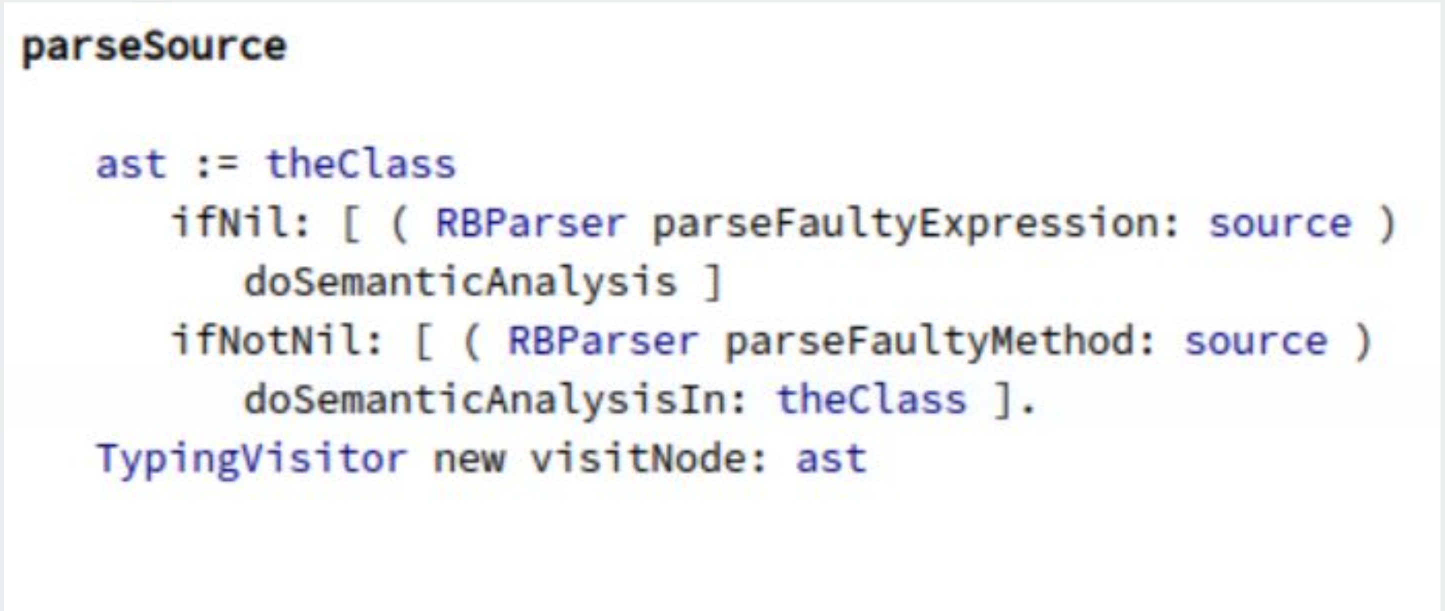
Problem: parser

Old completion used a dedicated parser (Shout) that was originally shared with syntax highlighter

Solution: use RB Parser

RBParser is used for syntax highlighting
We parse at every keystroke!
We can parse with Syntax Errors

Solution: parseSource



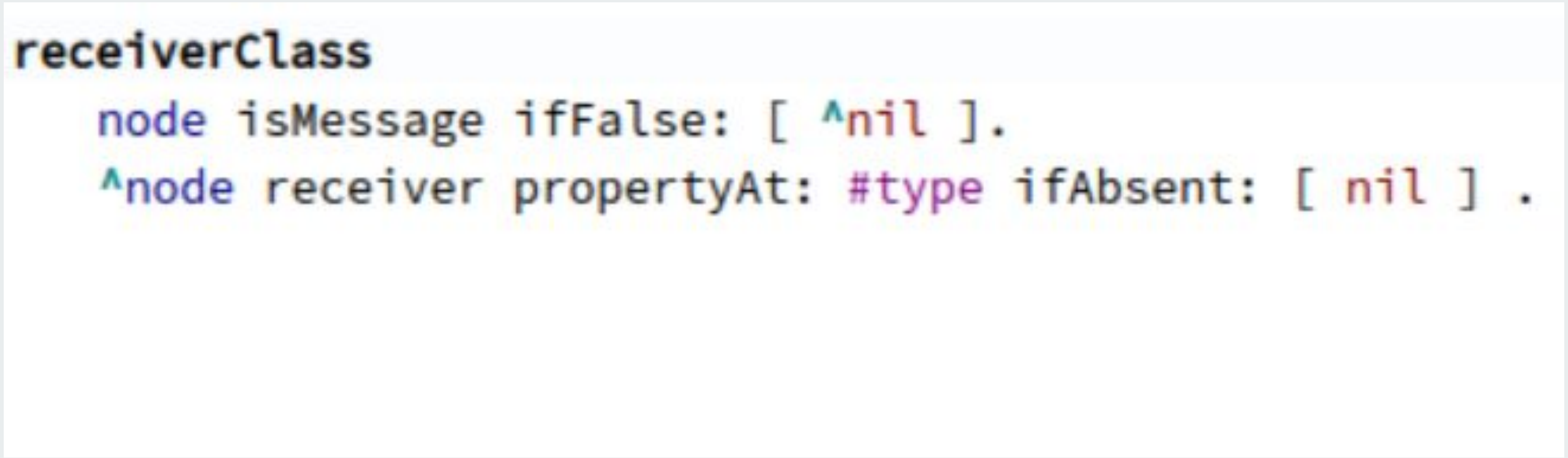
```
parseSource

    ast := theClass
        ifNil: [ ( RBParser parseFaultyExpression: source )
            doSemanticAnalysis ]
        ifNotNil: [ ( RBParser parseFaultyMethod: source )
            doSemanticAnalysisIn: theClass ].
    TypingVisitor new visitNode: ast
```

Solution: TypingVisitor

AST has not enough information
    self, super, class of literals, Globals and direct assignments to temps.

Solution: type check



```
receiverClass
    node isMessage ifFalse: [ ^nil ].
    ^node receiver propertyAt: #type ifAbsent: [ nil ] .
```

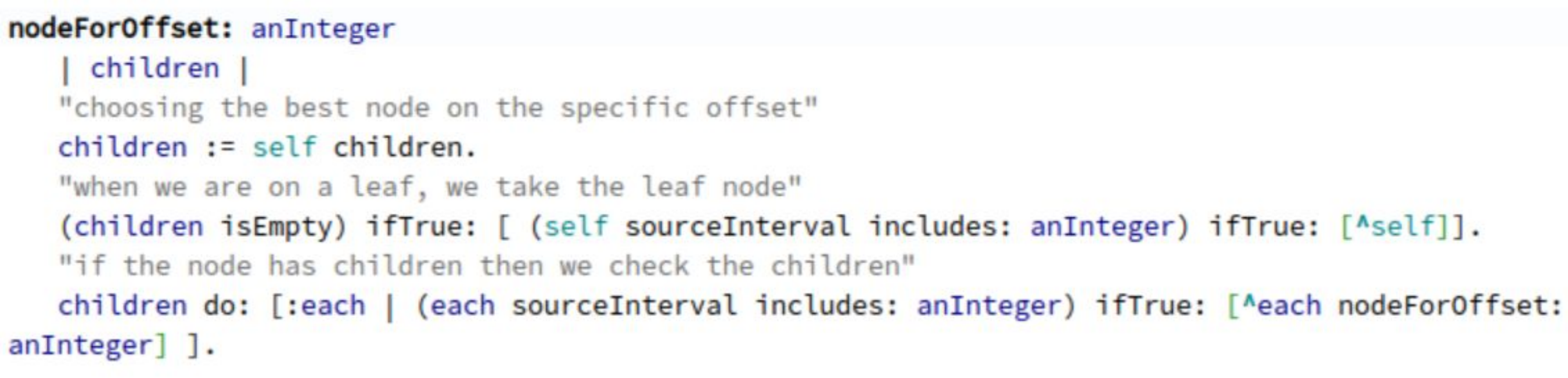
Problem: model

Code is very hard to understand and change. And the implementation behind the model itself is unnecessarily complicated

Solution: model

- Type annotated AST
- CompletionProducer for suggesting completion options based on node type

Solution: finding nodes



```
nodeForOffset: anInteger
   | children |
   "choosing the best node on the specific offset"
   children := self children.
   "when we are on a leaf, we take the leaf node"
   (children isEmpty) ifTrue: [ (self sourceInterval includes: anInteger) ifTrue: [^self]].
   "if the node has children then we check the children"
   children do: [:each | (each sourceInterval includes: anInteger) ifTrue: [^each nodeForOffset:
anInteger] ].
```

Solution: model results

- Using the AST simplifies the code a lot
- It is faster (no Benchmarks yet)

Problem: sorter

It was very difficult to implement a sorting strategy as there was no separate implementation of sorting

Solution: sorter

- you can choose the sorting strategy you want in the settings (alphabetic by default)
- sorting strategies based on n-gram and OCompletion will be added later

Refactoring results

# of classes **43** vs **22**

# of methods **485** vs **243**

# lines of code **3369** vs **1383**

More improvements

- ➥ added completion for symbols
- ➥ fixed AST implementation

Fixing AST bugs

- ➥ incorrect stop in RBSequenceNode
- ➥ incorrect start in ParseErrorNode
- ➥ not recognising missing closing ‘|’ in temp declaration as incorrect syntax

Future work

- ➡ ML based sorting strategy
- ➡ completing with syntax errors
- ➡ going beyond selector completion

Thanks!

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