

Universidade do Minho  
Escola de Engenharia  
Departamento de Informática

Master Course in Computing Engineering  
João Carlos Alves Cruz

# QG – An Attribute Grammar based System to assess Grammars Quality

Pre Dissertation Report

*Supervised by:* Pedro Rangel Henriques

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# Context

- The term engineering is used to apply mathematical, technical and scientific knowledge for the creation, maintenance and improvement of products
- The right use of this discipline leads to better results in terms of product quality and productivity
- We know for a fact that software development suffers from the lack of use engineering, therefore consequences arises

# Motivation

- The problem is that these principles and fundamentals of software engineering are not being applied, in a sustained and efficient way, to the development and maintenance of grammar-dependent software
- In this context, the following problem was identified: there is no tool for qualitative analysis of grammars
- Therefore a system for assessing automatically the language/grammar quality is proposed

# Main Aims

- Assessing the quality of Attribute Grammar automatically;
- Assessing Language quality;
- Provide well founded techniques and proven methods to grammar engineering;
- Control the development process of attribute grammars, improving the performance, efficiency and reliability

# How? Measurement Theory

- In everyday life we measure things, to predict, to control, to improve and to understand
- Measurement is a good and old practice in engineering discipline, specially to improve the product quality

in software...

Intuitive understanding

```
graph TD; A[Intuitive understanding] --> B[Attribute Characterization]; B --> C[Assigning metrics to capture those characteristics];
```

Attribute Characterization

Assigning metrics to capture those characteristics

# Quality Grammar System

```
grammar binarip;  
  
bins  
: b1= bit{0}  
  (b2= bit{$b1.numero}{$b1.numero = $b2.numero;})  
  {System.out.println("Total: "+$b1.numero);}  
  ;  
  
bit [int anterior] returns [int numero]  
: NUM {$numero = ($anterior * 2) + $NUM.int;}  
  ;  
  
NUM : '0' | '1';  
  
Sep: ('\r'?''\n'|' '\t')+ ->skip;
```

Input  
Attribute Grammar



Repository of quality  
grammar/language  
characteristics



Scanner/parser



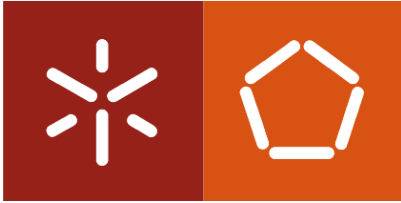
Generate AST and  
convert it on tool  
data structure

Calculate Size/Form/Lexographic Metrics

Evaluate Quality assumptions/comments



Output  
Quality Report



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