

MODULE KWALA-SYNTAX

**Syntax**

...

SYNTAX  $\#id ::= \text{object}$   
| null

SYNTAX  $\text{Variable} ::= \#nt$

SYNTAX  $\text{VariableName} ::= v \ \#nt$

SYNTAX  $\text{Selector} ::= \text{<init>} \{V\}$

SYNTAX  $\text{TypeName} ::= \#id$   
|  $\#id / \text{TypeName}$

SYNTAX  $\text{TypeReference} ::= \text{< } \#id , \text{TypeName} >$

SYNTAX  $\text{FieldReference} ::= \text{< } \#id , \text{TypeReference} , \#id , \text{TypeReference} >$

SYNTAX  $\text{MethodReference} ::= \text{< } \#id , \text{TypeName} , \text{Selector} >$

SYNTAX  $\text{Params} ::= \text{List}(\text{Variable}, " ")$

SYNTAX  $\text{NewInstructionBase} ::= \text{Variable} \text{ =new } \text{TypeReference} \ @ \ \#nt$

SYNTAX  $\text{NewInstruction} ::= \text{NewInstructionBase} \ @ \ \#nt$   
|  $\text{NewInstructionBase} \ ( \ \text{Params} \ )$

SYNTAX  $\text{GetInstruction} ::= \text{Variable} \text{ =getField } \text{FieldReference} \ \text{Variable}$

SYNTAX  $\text{PutInstruction} ::= \text{Variable} \text{ =getstatic } \text{FieldReference}$   
|  $\text{putfield } \text{Variable} \text{ = } \text{Variable} \ \text{FieldReference}$   
|  $\text{putstatic } \text{Variable} \ \text{FieldReference}$

SYNTAX  $\text{PhiInstruction} ::= \text{Variable} \text{ =phi } \ ( \ \text{Params} \ )$

SYNTAX  $\text{PhiPhiInstruction} ::= \text{Variable} \text{ =phiPhi } \ ( \ \text{Params} \ )$

SYNTAX  $\text{InvokeSpecialInstruction} ::= \text{invokespecial } \text{MethodReference} \ \text{Params} \ @ \ \#nt \text{ exception: } \text{Variable}$

SYNTAX  $\text{Instruction} ::= \text{NewInstruction}$   
|  $\text{GetInstruction}$   
|  $\text{PutInstruction}$   
|  $\text{PhiPhiInstruction}$   
|  $\text{return}$   
|  $\text{InvokeSpecialInstruction}$   
|  $\text{noinstruction}$   
|  $\text{main}$

SYNTAX  $\text{BBEdge} ::= \#id \rightarrow \#id ;$

SYNTAX  $\text{BlockBody} ::= \text{List}(\text{Instruction}, " ")$

SYNTAX  $\text{Block} ::= \#id : \{ \text{BlockBody} \}$

SYNTAX  $\text{TaskUnit} ::= \text{BBEdge}$   
|  $\text{Block}$   
|  $\text{start}$   
|  $\text{analysis}$

SYNTAX  $\text{Task} ::= \text{TaskUnit}$   
|  $\text{Task} \ \text{Task}$

END MODULE

MODULE KWALA

IMPORTS KWALA-SYNTAX

SYNTAX  $\text{RelLast} ::= \text{List}(\text{RelElement}, " ")$

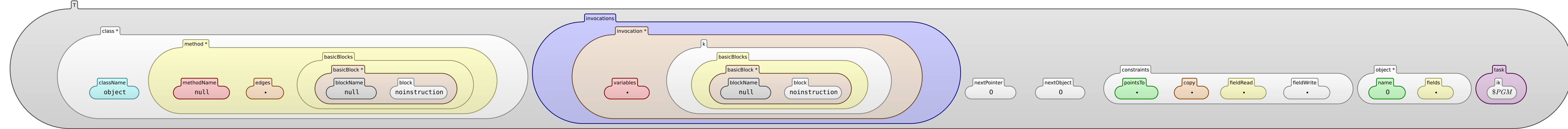
**Semantics**

...

**Configuration**

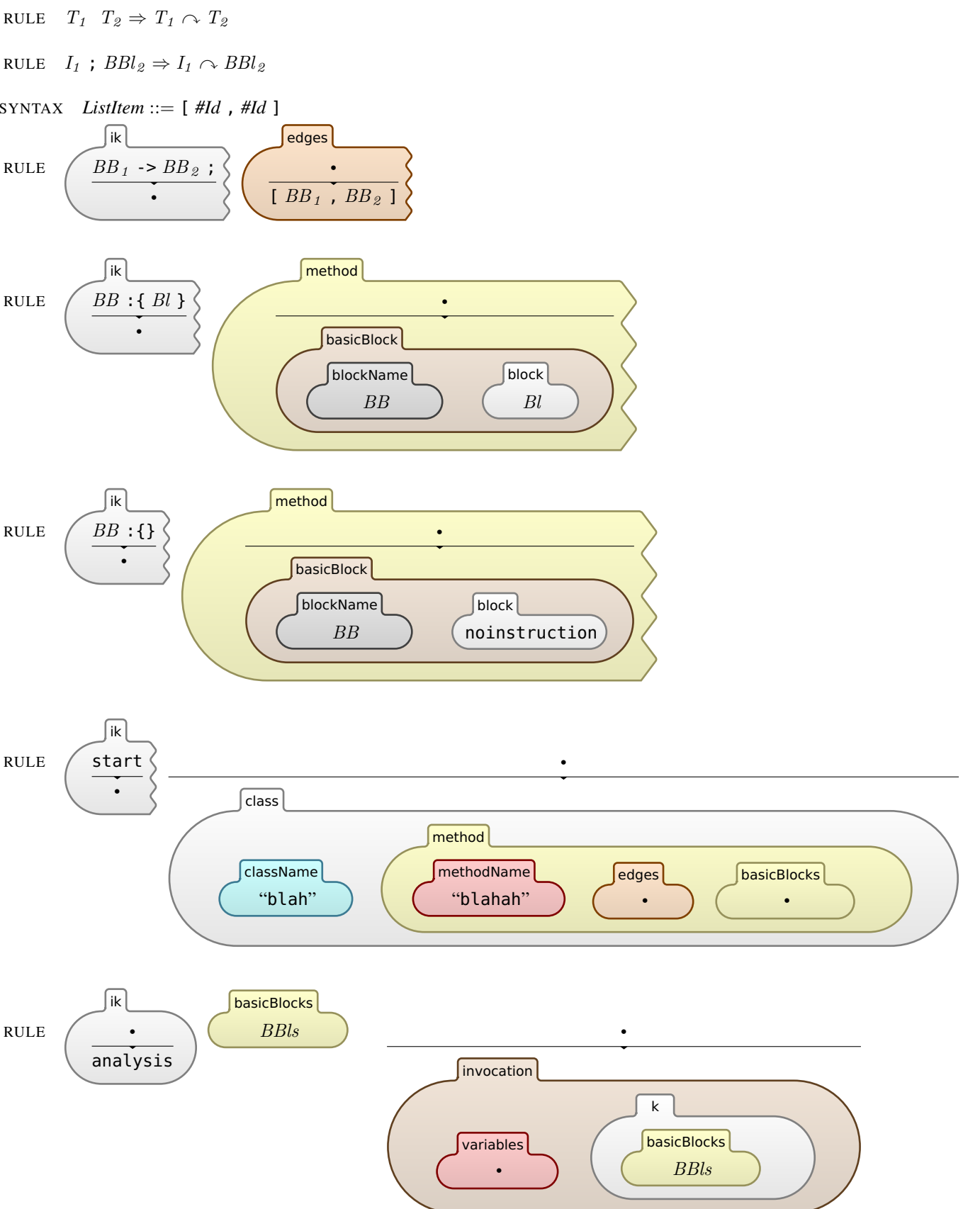
...

CONFIGURATION:



**Processing Basic Blocks**

...



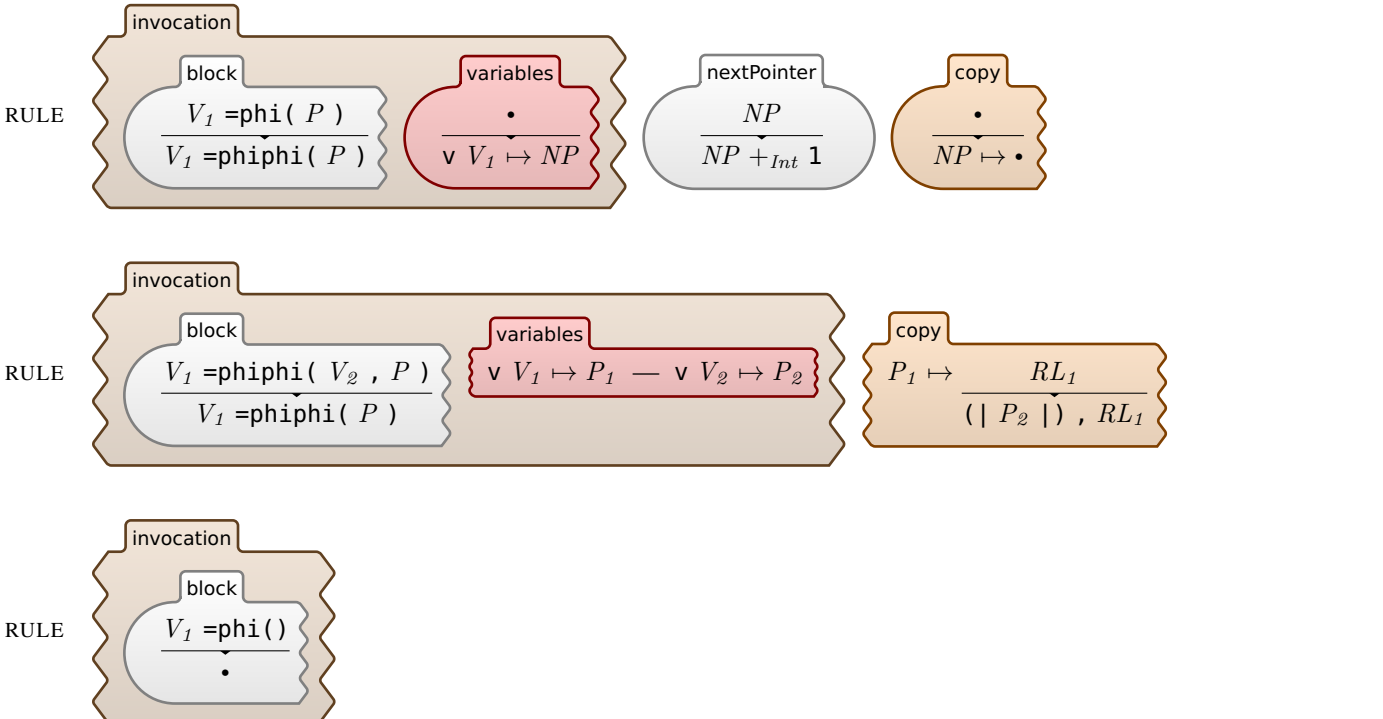
**Gathering Constraints**

...

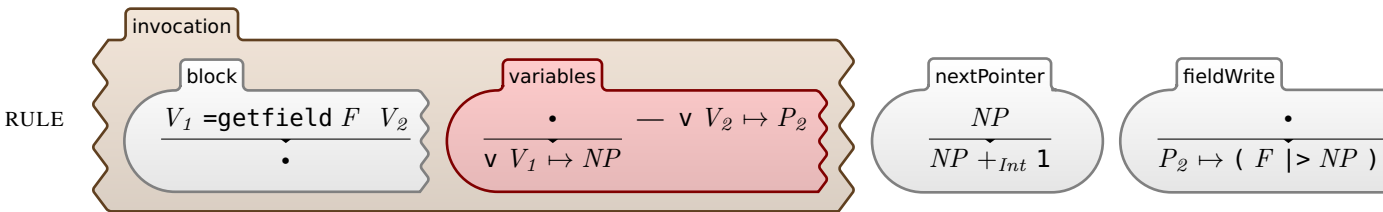
SYNTAX  $\text{RelElement} ::= ( \ \text{FieldReference} \text{ > } \#nt \ )$   
|  $\{ \ \#nt \}$

SYNTAX  $K ::= \text{RelList}$

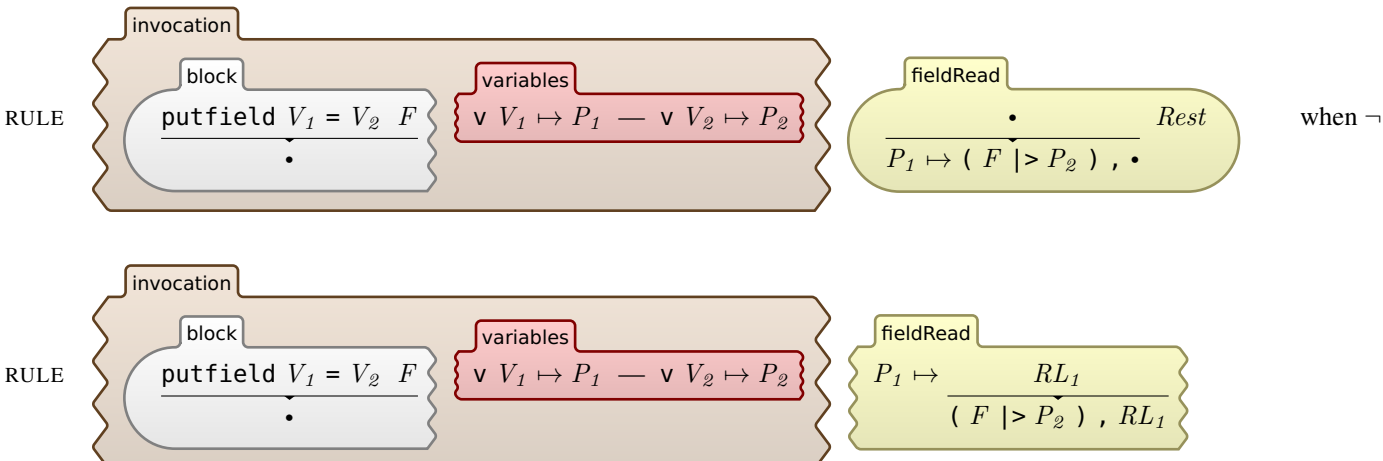
**Phi functions**



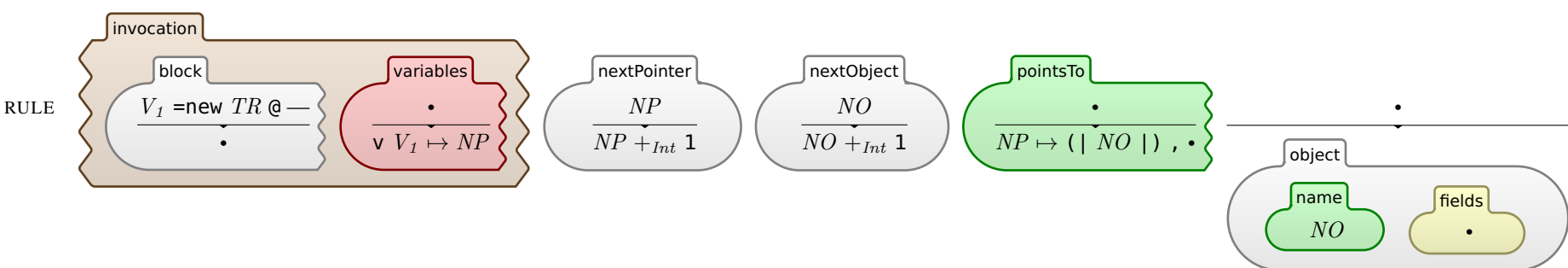
**Get field**



**Put field**



**New instruction**



END MODULE