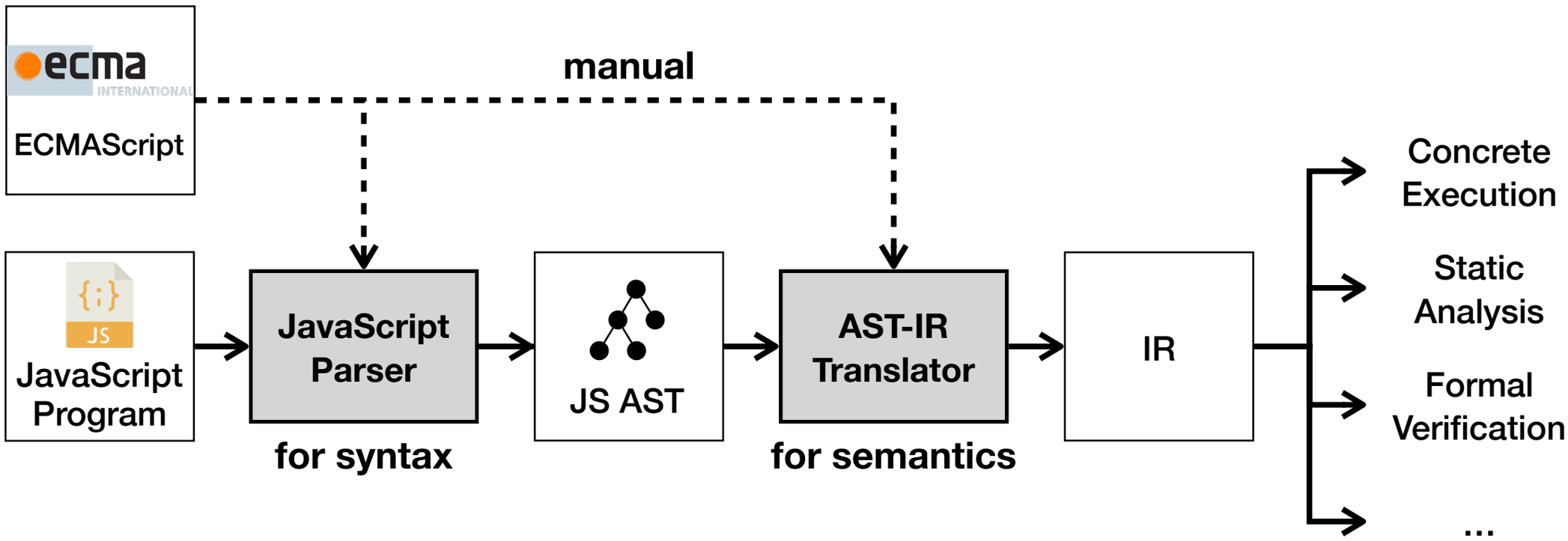
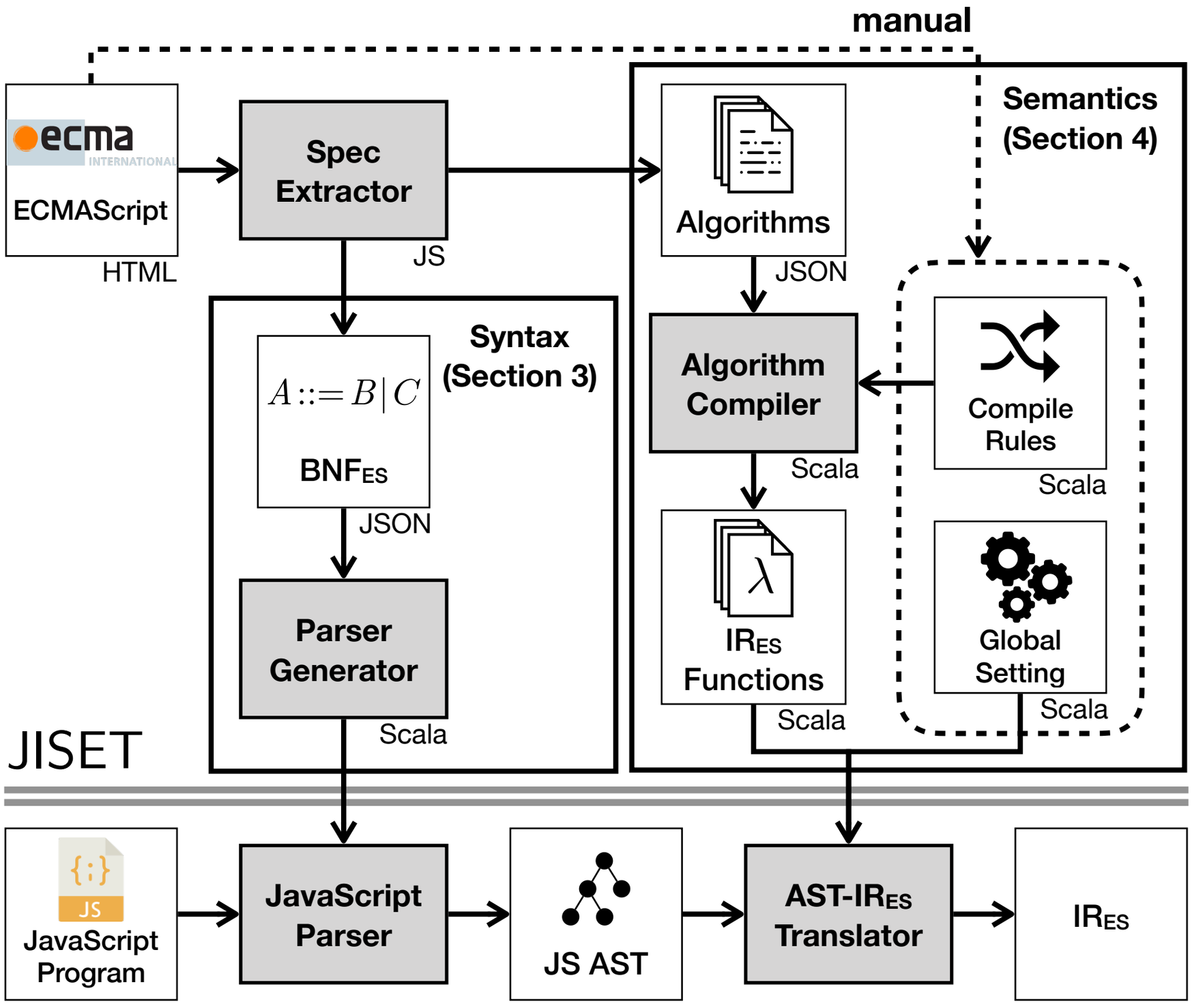

ecma
INTERNATIONAL
ECMAScript
manual
JS
JavaScript
Program
JavaScript
Parser
for syntax
JS AST
AST-IR
Translator
for semantics
IR
Concrete
Execution
Static
Analysis
Formal
Verification
...


manual
ECMAScript
HTML
Spec Extractor
JS
Algorithms
JSON
Semantics (Section 4)
Syntax (Section 3)
$A ::= B \mid C$
BNF$_{ES}$
JSON
Parser Generator
Scala
Algorithm Compiler
Scala
Compile Rules
Scala
λ
IR$_{ES}$ Functions
Scala
Global Setting
Scala
JISET
JS
JavaScript Program
JavaScript Parser
JS AST
AST-IR$_{ES}$ Translator
IR$_{ES}$

ArrayLiteral`[Yield, Await]` :

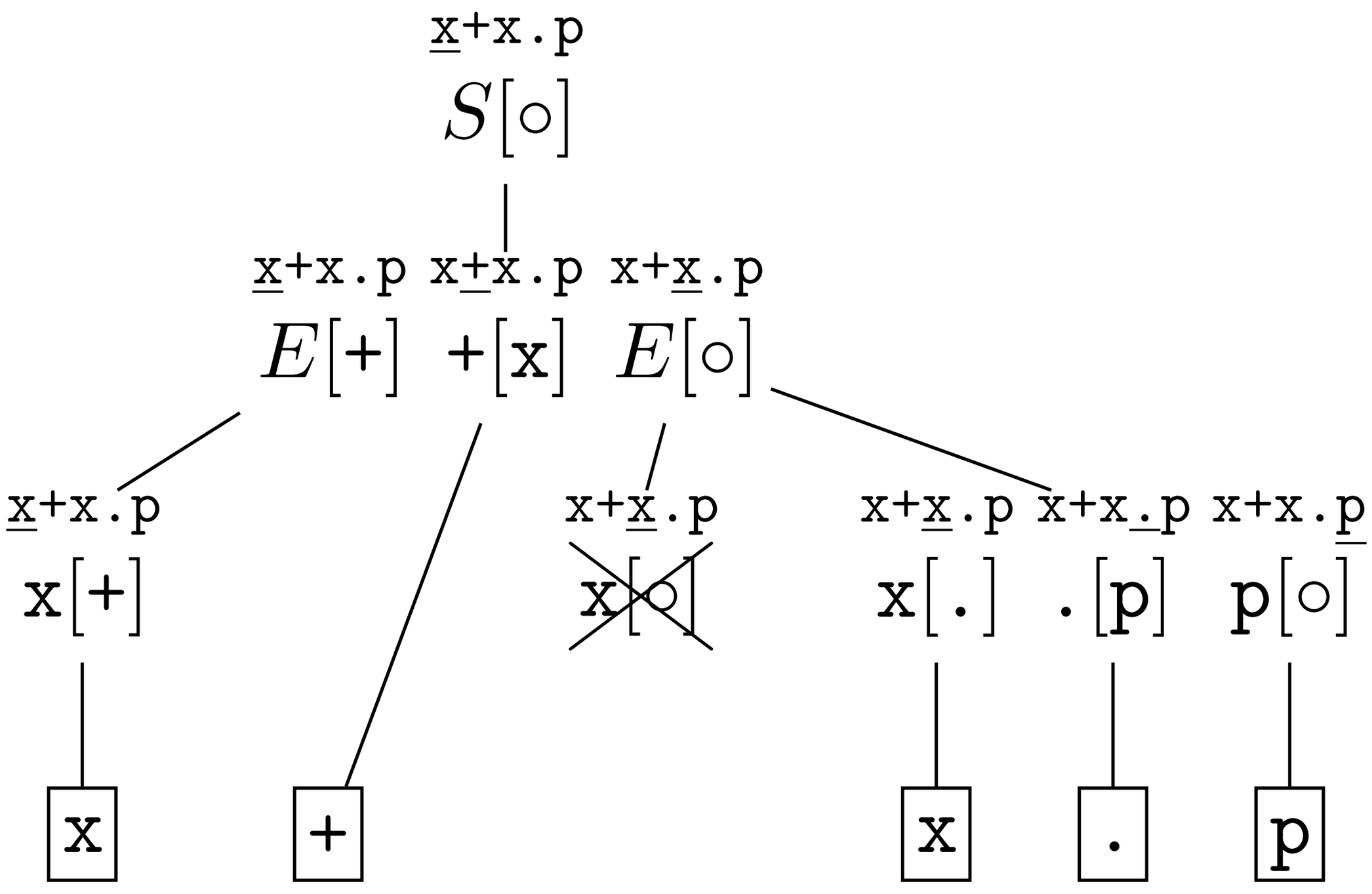
`[` *Elision*`opt` `]`

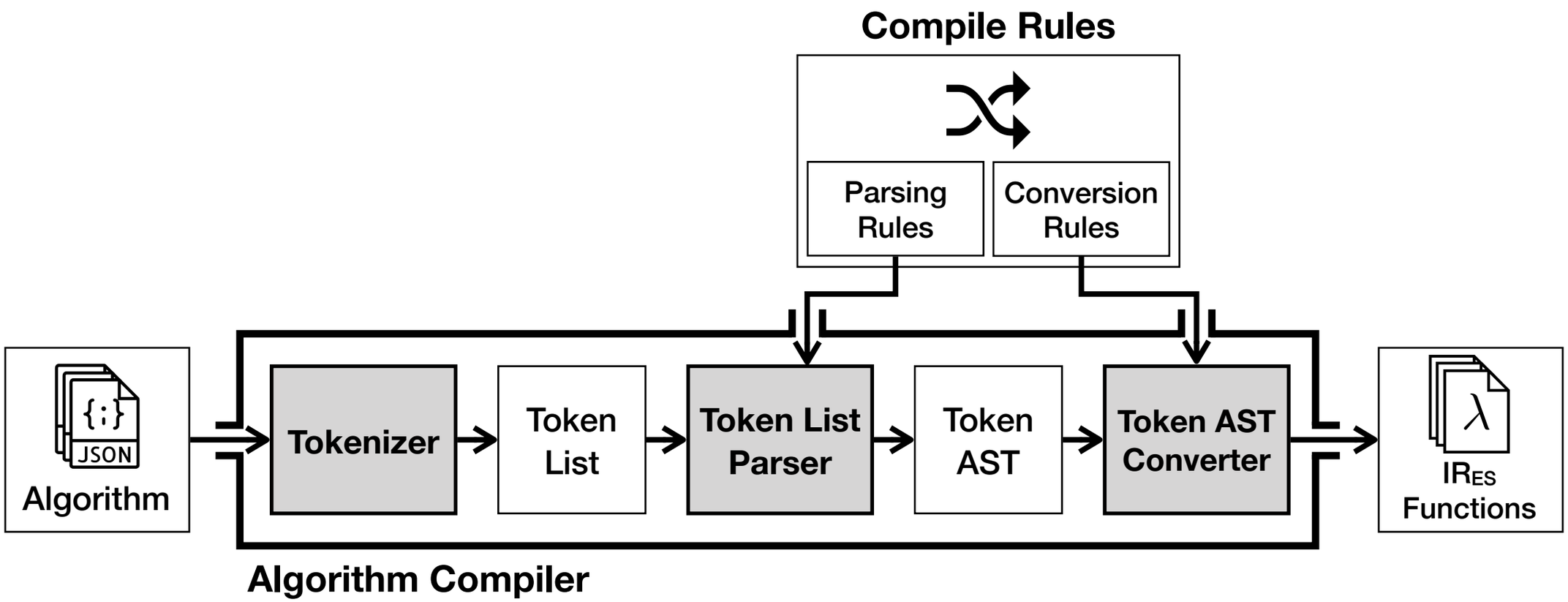
`[` *ElementList*`[?Yield, ?Await]` `]`

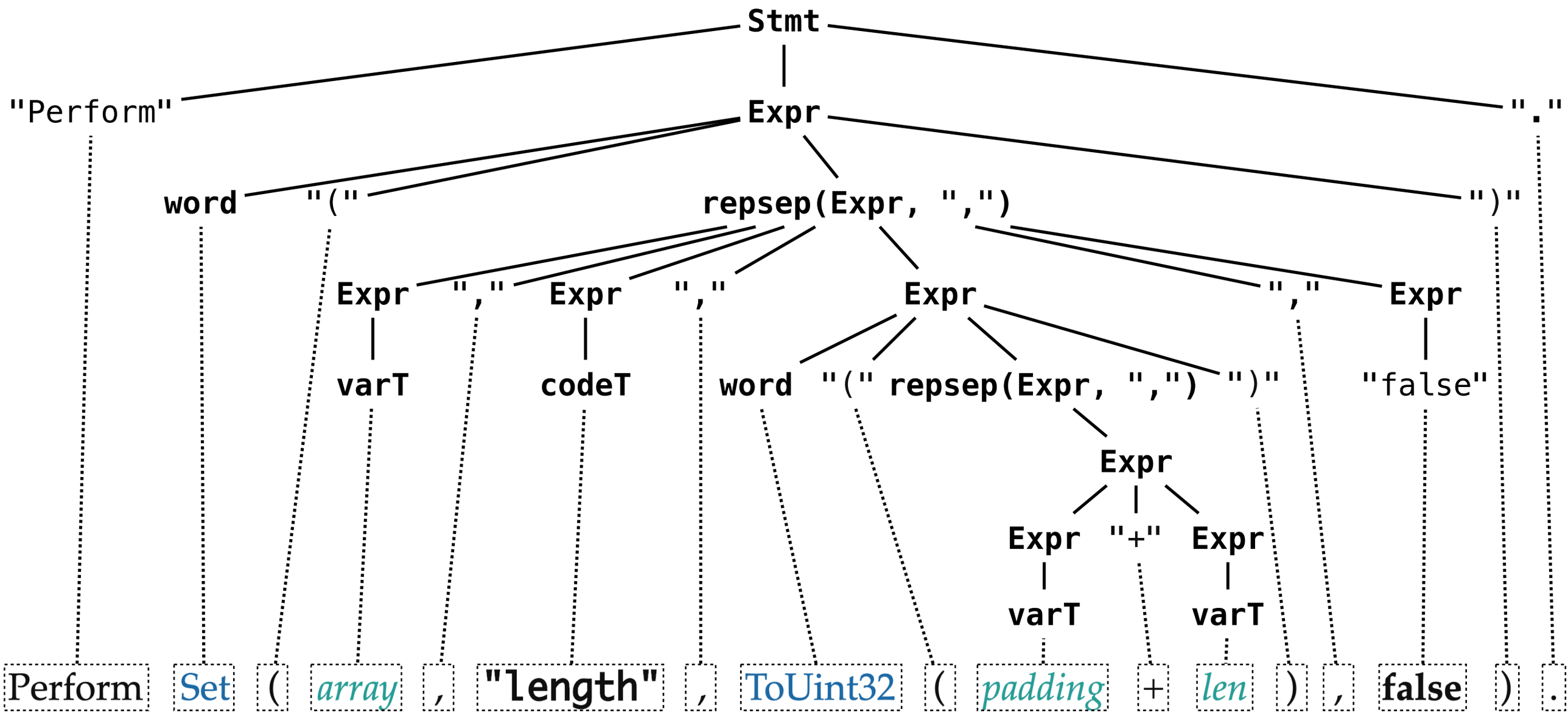
`[` *ElementList*`[?Yield, ?Await]` `,` *Elision*`opt` `]`

ArrayLiteral : `[` *ElementList* `,` *Elision*$_{\texttt{opt}}$ `]`

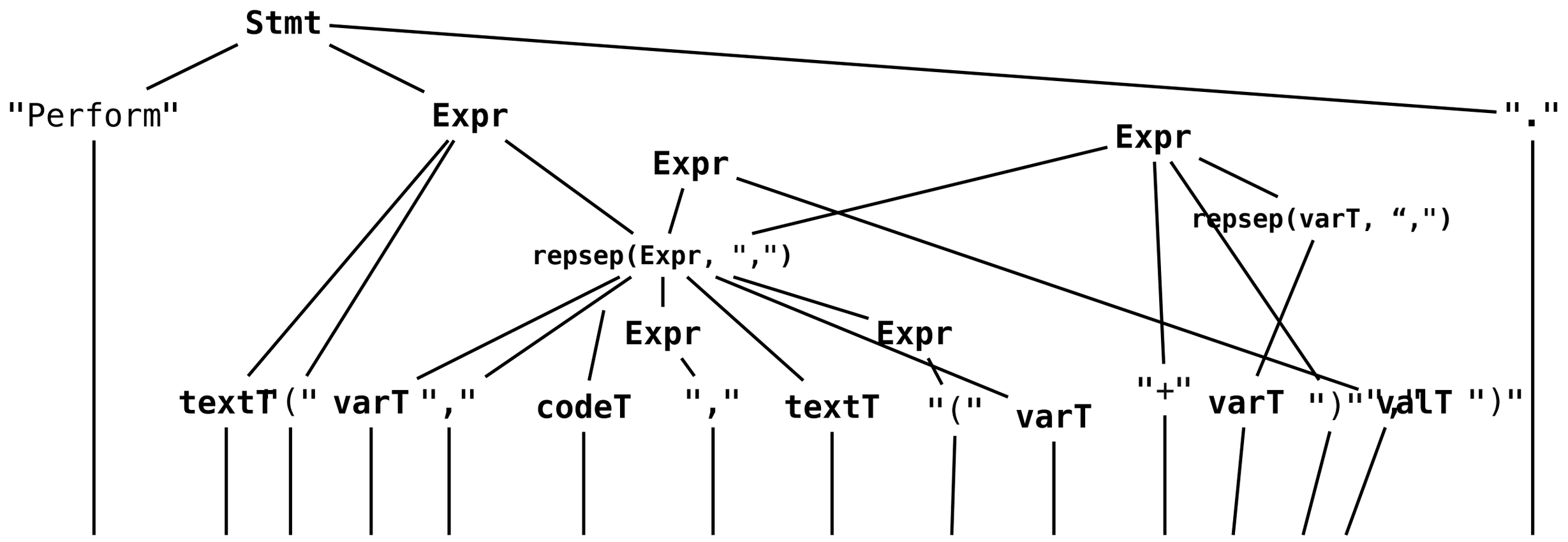
1. Let *array* be ! ArrayCreate(0).
2. Let *len* be the result of performing ArrayAccumulation for *ElementList* with arguments *array* and 0.
3. ReturnIfAbrupt(*len*).
4. Let *padding* be the ElisionWidth of *Elision*; if *Elision* is not present, use the numeric value zero.
5. Perform Set(*array*, `"length"`, ToUint32(*padding* + *len*), **false**).
6. NOTE: The above Set cannot fail because of the nature of the object returned by ArrayCreate.
7. Return *array*.


x+x.p
S[○]
x+x.p x+x.p x+x.p
E[+] +[x] E[○]
x+x.p x+x.p x+x.p x+x.p x+x.p
x[+] x[○] x[.] .[p] p[○]
x + x . p

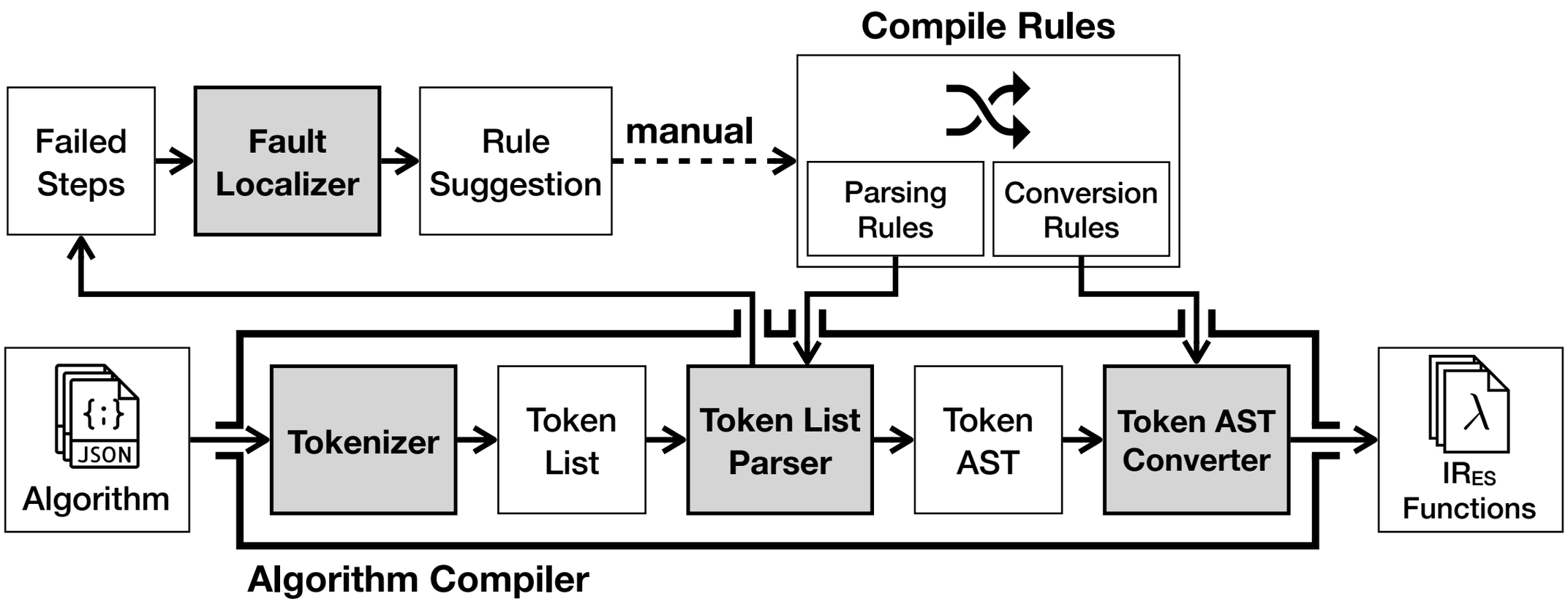

Compile Rules
Parsing Rules
Conversion Rules
JSON
Algorithm
Tokenizer
Token List
Token List Parser
Token AST
Token AST Converter
λ
IRES Functions
Algorithm Compiler

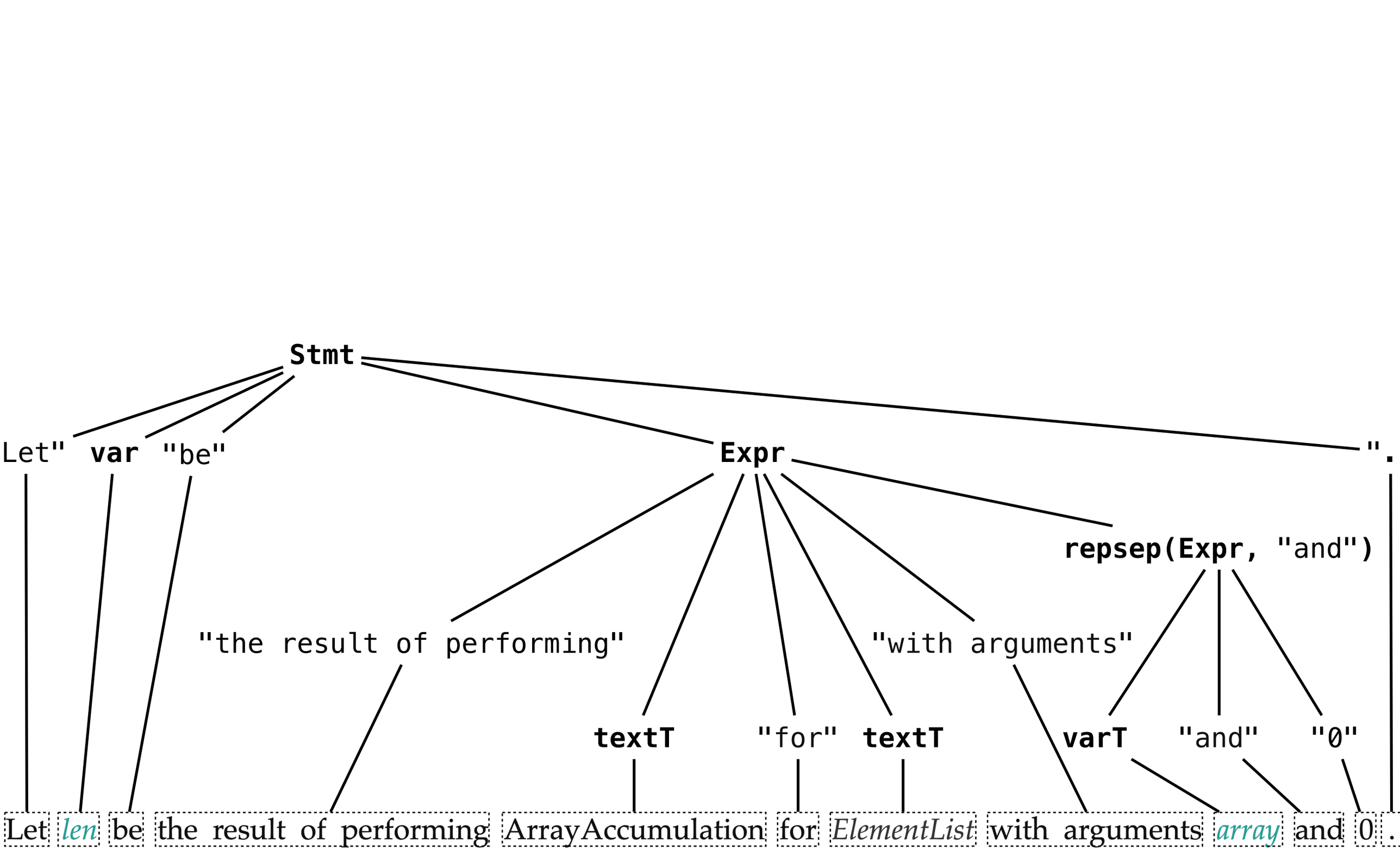

Stmt
"Perform"
Expr
"."
word
"("
repsep(Expr, ",")
")"
Expr
","
Expr
","
Expr
","
Expr
varT
codeT
word
"("
repsep(Expr, ",")
")"
"false"
Expr
Expr
"+"
Expr
varT
varT
Perform
Set
(
array
,
"length"
,
ToUint32
(
padding
+
len
)
,
false
)
.

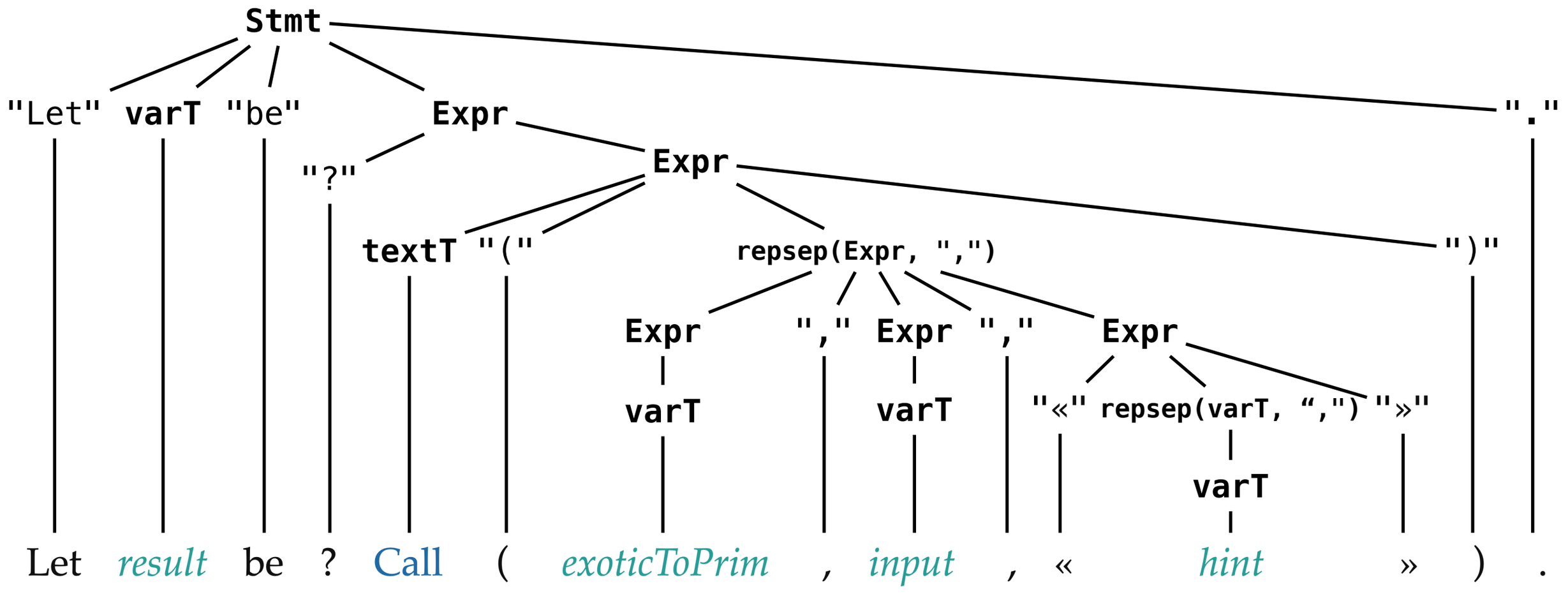
Perform Set(*array*, **"length"**, ToUint32(*padding* + *len*), **false**).

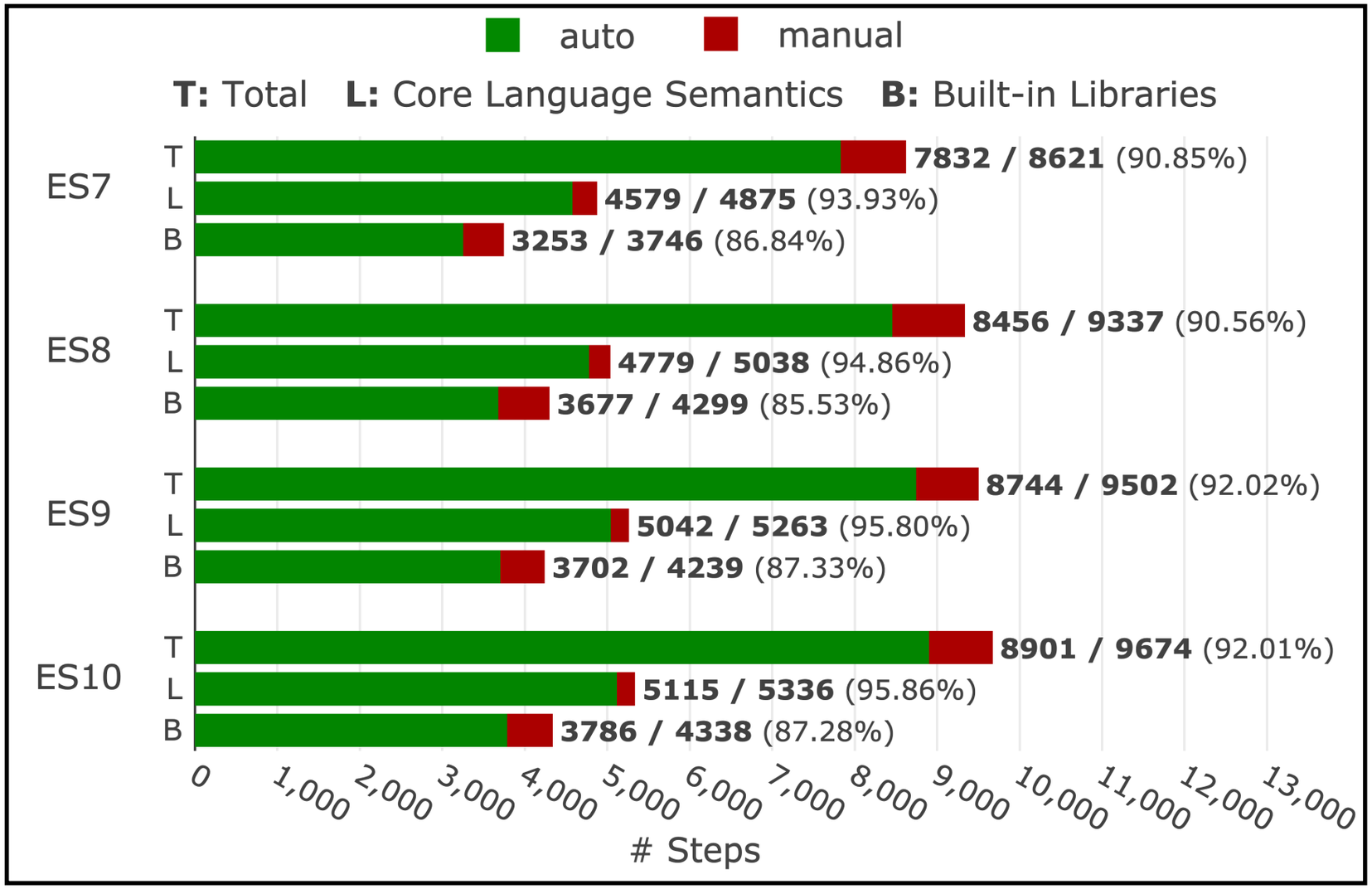


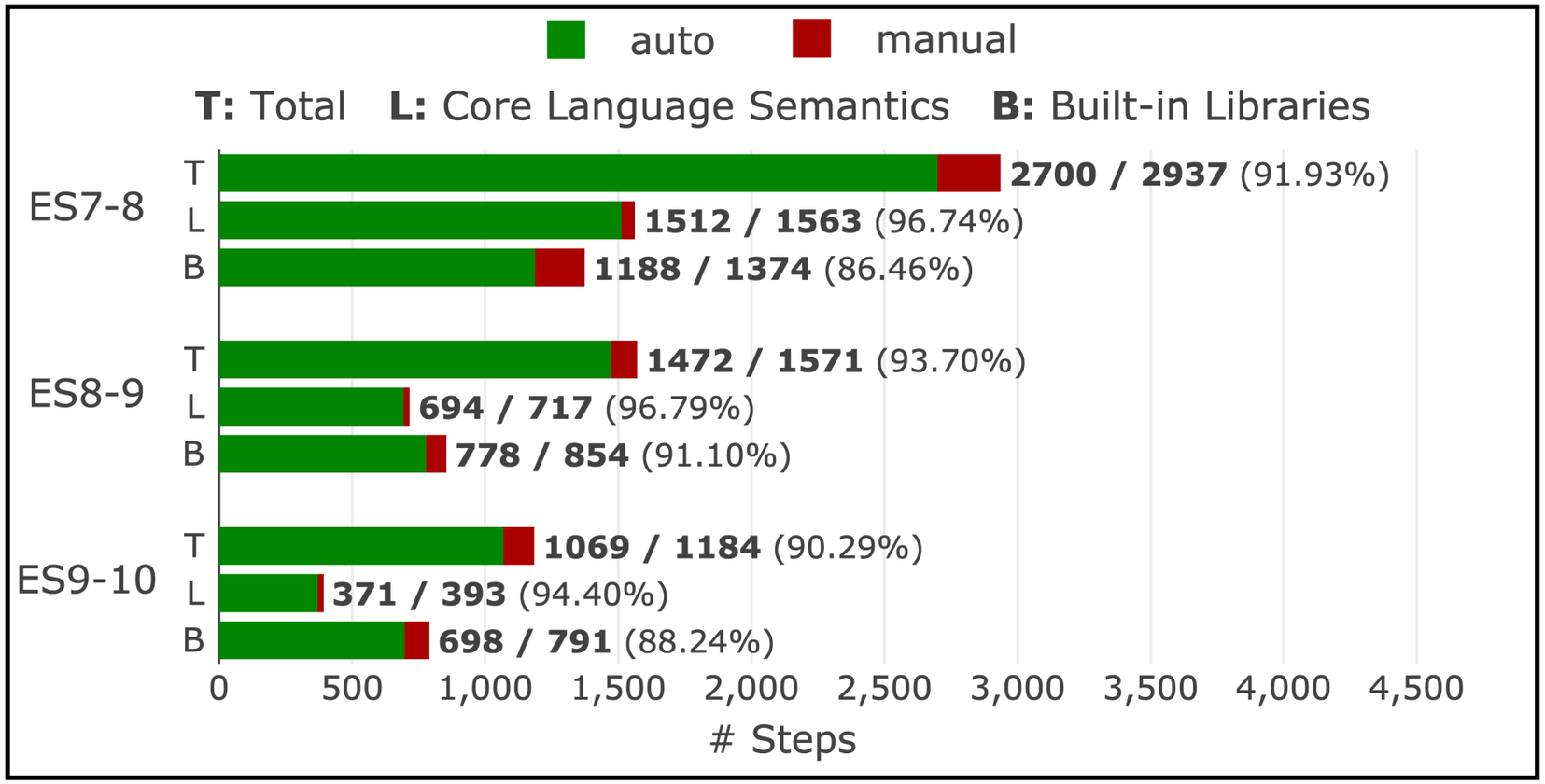
Let *result* be ? Call (*exoticToPrim* , *input* , «

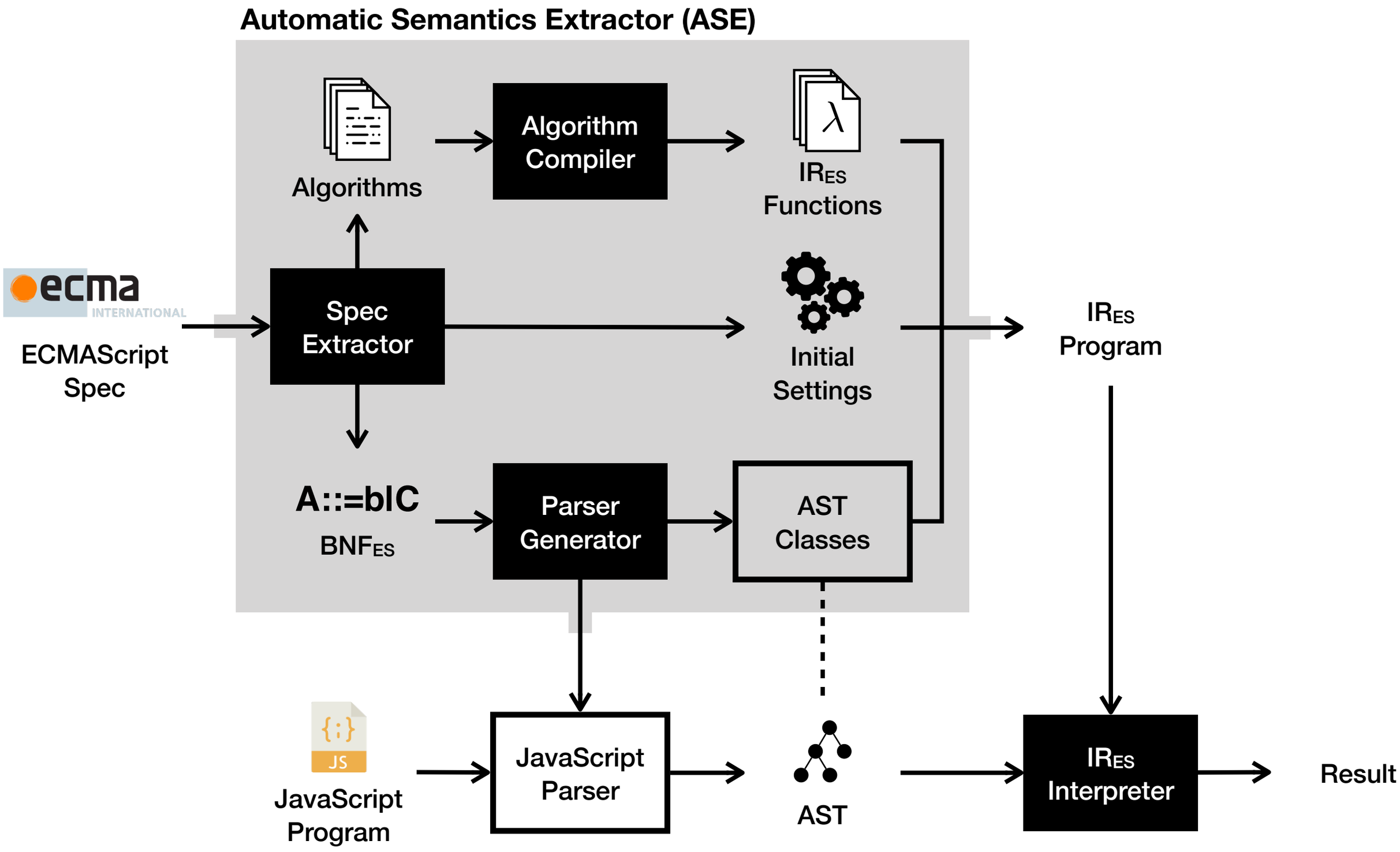

Compile Rules
Failed Steps
Fault Localizer
Rule Suggestion
manual
Parsing Rules
Conversion Rules
JSON
Algorithm
Tokenizer
Token List
Token List Parser
Token AST
Token AST Converter
IRES Functions
Algorithm Compiler

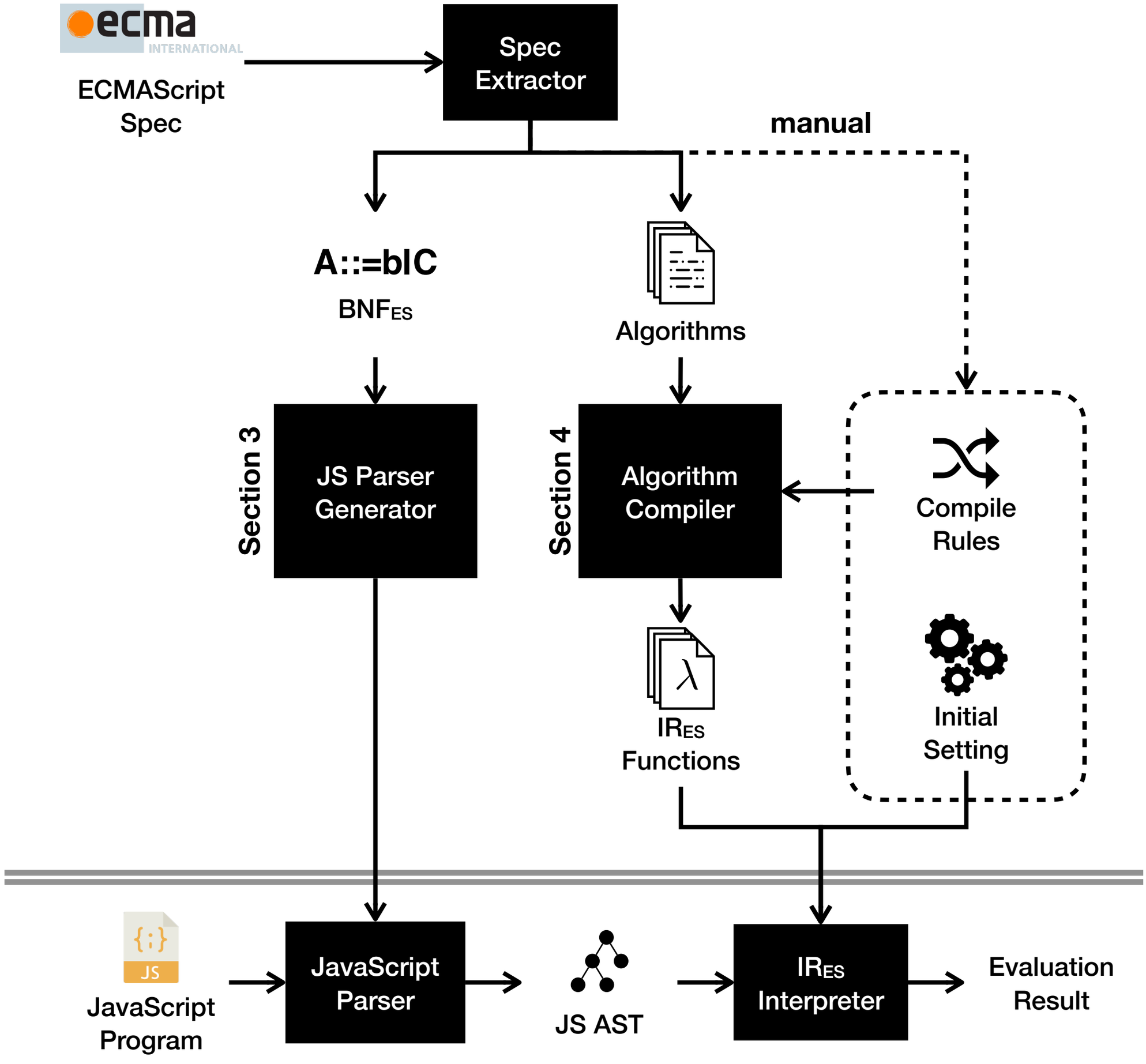

Stmt
Let"
var
"be"
Expr
".
repsep(Expr, "and")
"the result of performing"
"with arguments"
textT
"for"
textT
varT
"and"
"0"
Let
len
be
the result of performing
ArrayAccumulation
for
ElementList
with arguments
array
and
0
.

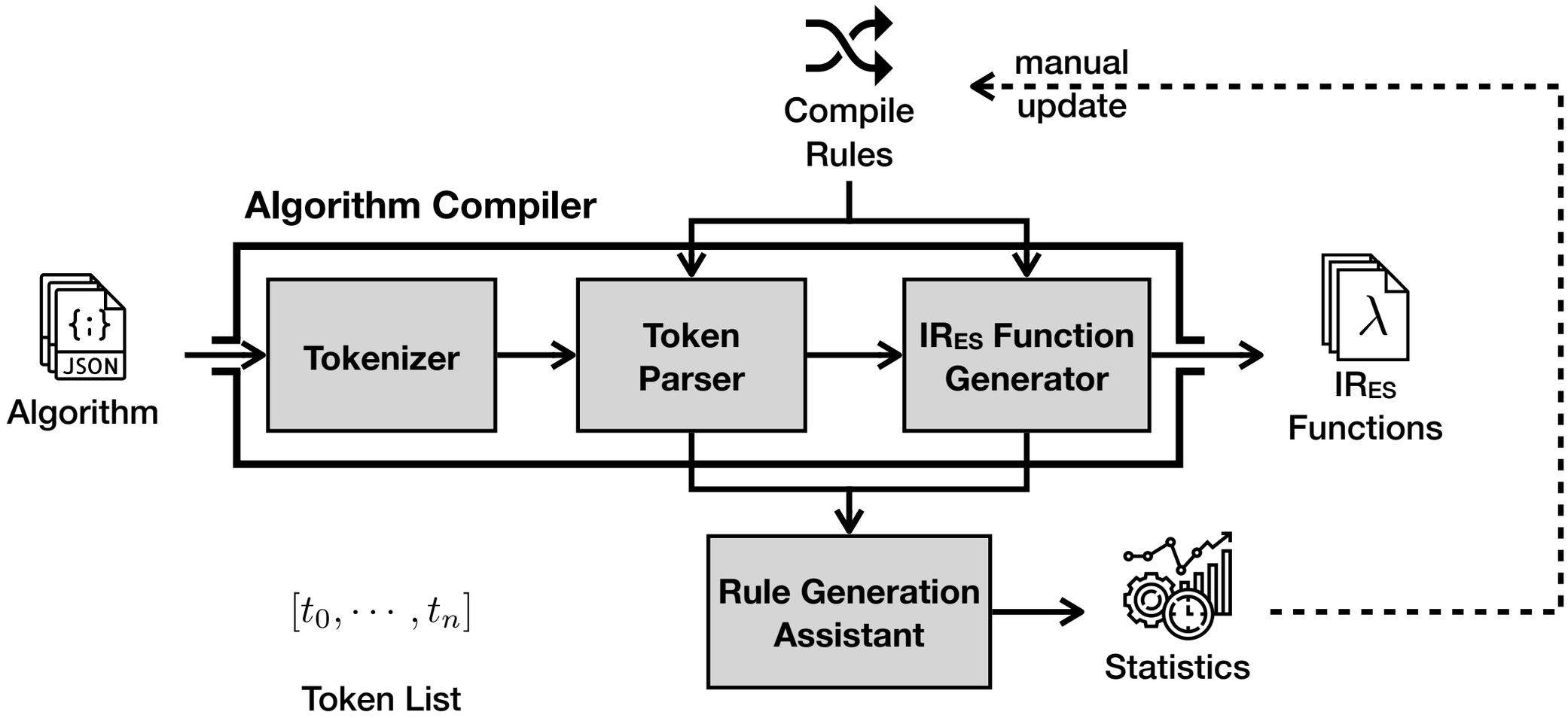

Stmt
"Let"
varT
"be"
Expr
"."
"?"
Expr
textT
"("
repsep(Expr, ",")
")"
Expr
","
Expr
","
Expr
varT
varT
"«"
repsep(varT, “,”)
"»"
varT
Let
result
be
?
Call
(
exoticToPrim
,
input
,
«
hint
»
)
.

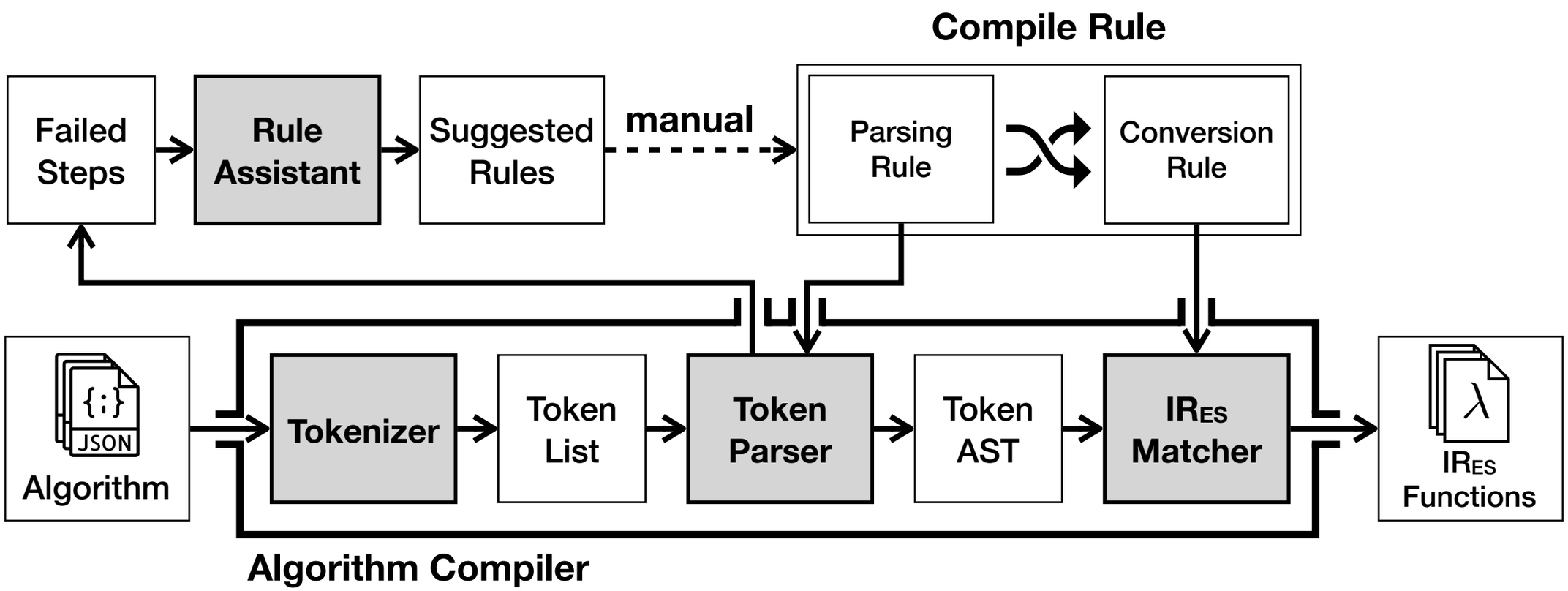

auto
manual
T: Total L: Core Language Semantics B: Built-in Libraries
ES7
T
L
B
7832 / 8621 (90.85%)
4579 / 4875 (93.93%)
3253 / 3746 (86.84%)
ES8
T
L
B
8456 / 9337 (90.56%)
4779 / 5038 (94.86%)
3677 / 4299 (85.53%)
ES9
T
L
B
8744 / 9502 (92.02%)
5042 / 5263 (95.80%)
3702 / 4239 (87.33%)
ES10
T
L
B
8901 / 9674 (92.01%)
5115 / 5336 (95.86%)
3786 / 4338 (87.28%)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
Steps


auto
manual
T: Total
L: Core Language Semantics
B: Built-in Libraries
ES7-8
T
L
B
2700 / 2937 (91.93%)
1512 / 1563 (96.74%)
1188 / 1374 (86.46%)
ES8-9
T
L
B
1472 / 1571 (93.70%)
694 / 717 (96.79%)
778 / 854 (91.10%)
ES9-10
T
L
B
1069 / 1184 (90.29%)
371 / 393 (94.40%)
698 / 791 (88.24%)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
Steps


Automatic Semantics Extractor (ASE)
Algorithms
Algorithm Compiler
IRES Functions
ECMAScript Spec
Spec Extractor
Initial Settings
IRES Program
A::=bIC
BNFES
Parser Generator
AST Classes
JavaScript Program
JavaScript Parser
AST
IRES Interpreter
Result


ECMAScript Spec
Spec Extractor
manual
A::=bIC
BNFES
Algorithms
Section 3
JS Parser Generator
Section 4
Algorithm Compiler
Compile Rules
Initial Setting
IRES Functions
JavaScript Program
JavaScript Parser
JS AST
IRES Interpreter
Evaluation Result


Compile
Rules
manual
update
Algorithm Compiler
JSON
Algorithm
Tokenizer
Token
Parser
IRES Function
Generator
IRES
Functions
$[t_0, \cdots, t_n]$
Token List
Rule Generation
Assistant
Statistics


Compile Rule
Failed Steps
Rule Assistant
Suggested Rules
manual
Parsing Rule
Conversion Rule
Algorithm
JSON
Tokenizer
Token List
Token Parser
Token AST
IRES Matcher
IRES Functions
Algorithm Compiler