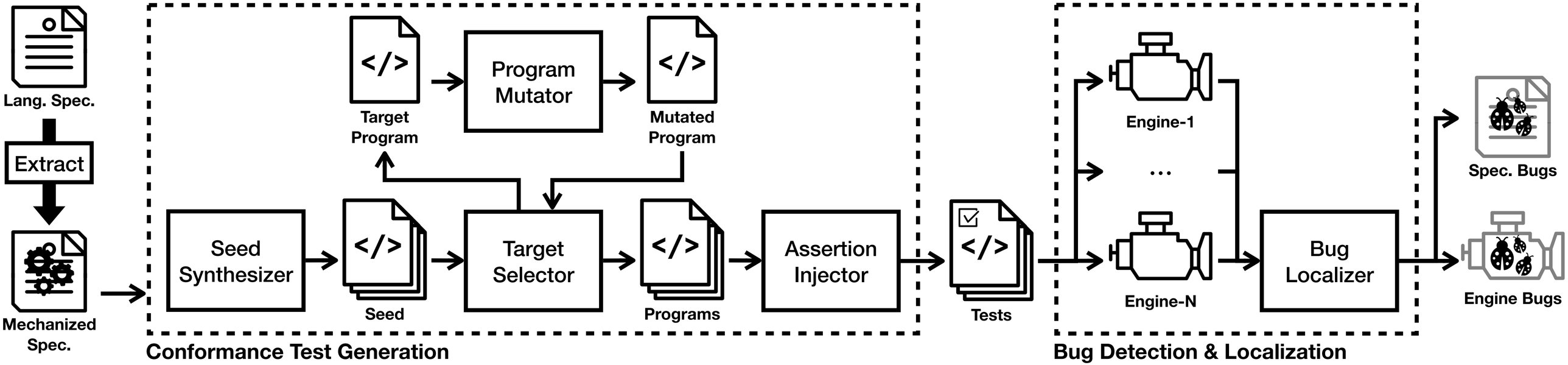

Lang. Spec.
Extract
Mechanized Spec.
Seed Synthesizer
Seed
Target Selector
Programs
Assertion Injector
Target Program
Program Mutator
Mutated Program
Conformance Test Generation
Tests
Engine-1
...
Engine-N
Bug Localizer
Spec. Bugs
Engine Bugs
Bug Detection & Localization

7.2.15 Abstract Equality Comparison

1. If Type(x) is the same as Type(y), then
    a. Return the result of performing Strict Equality Comparison x === y.
2. If x is **null** and y is **undefined**, return **true**.
3. If x is **undefined** and y is **null**, return **true**.

...

10. If Type(x) is either String, Number, BigInt, or Symbol and Type(y) is Object, return the result of the comparison x == ToPrimitive(y).
11. If Type(x) is Object and Type(y) is either String, Number, BigInt, or Symbol, return the result of the comparison ToPrimitive(x) == y.

...

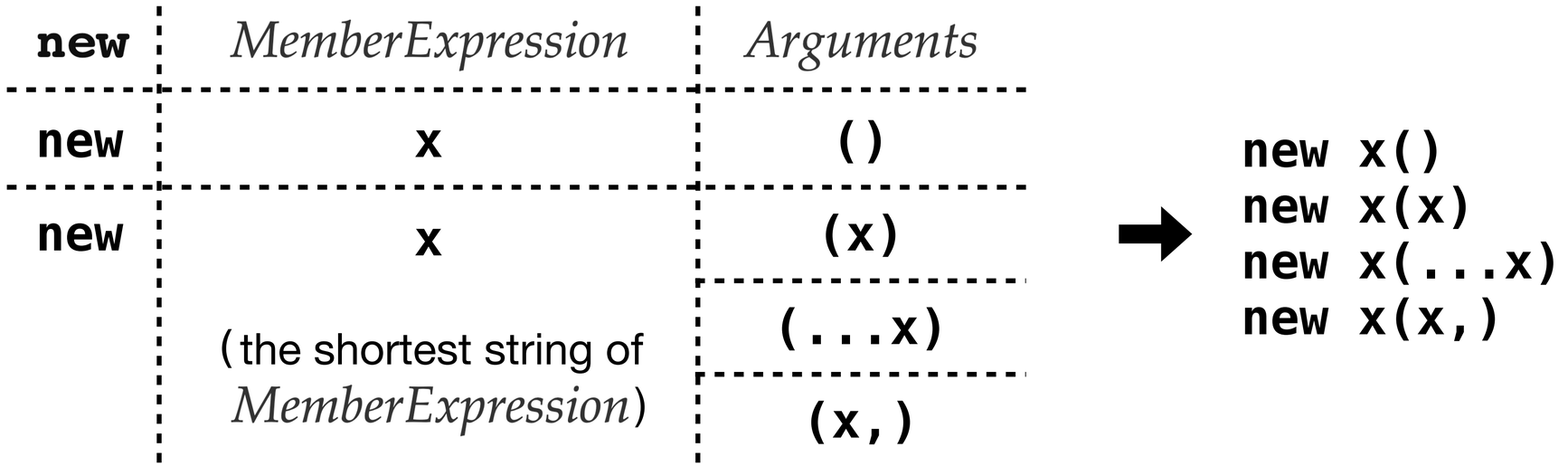
MemberExpression **:**

PrimaryExpression

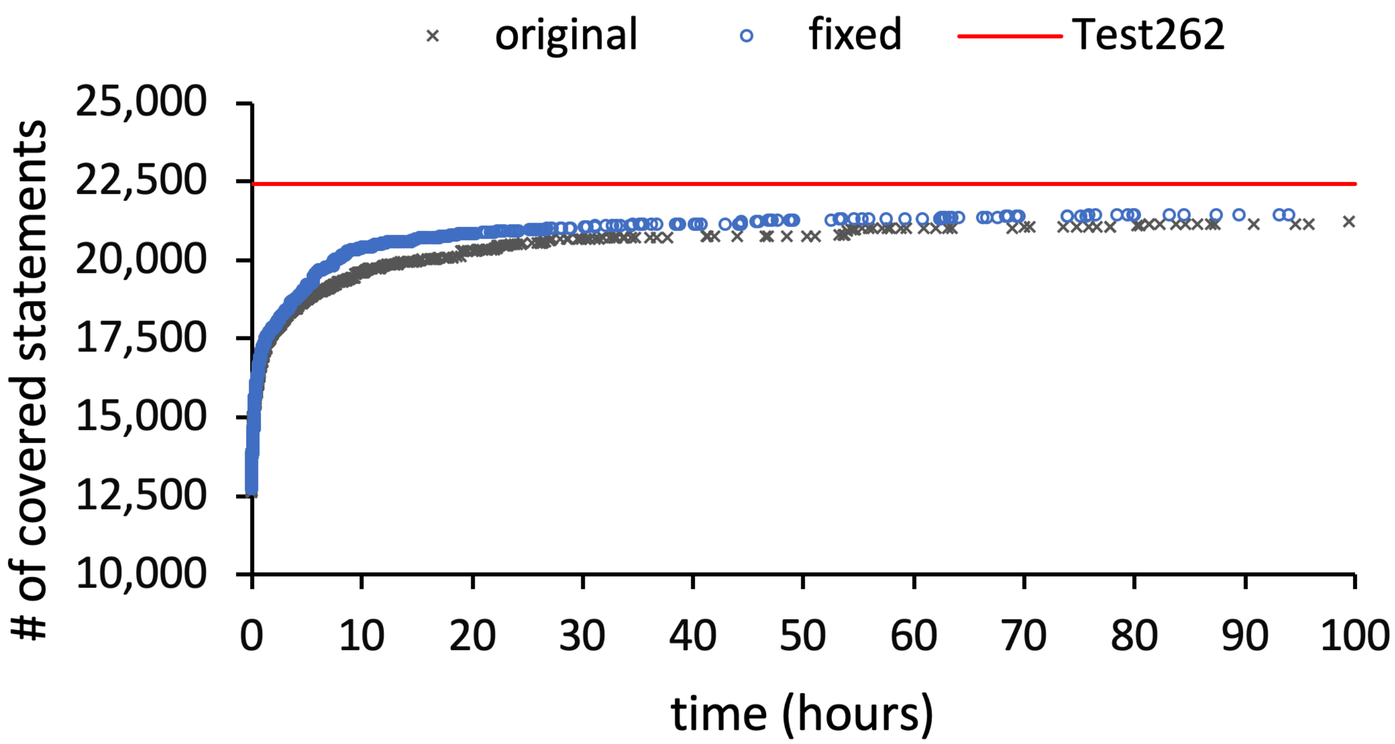
MemberExpression **[** *Expression* **]**

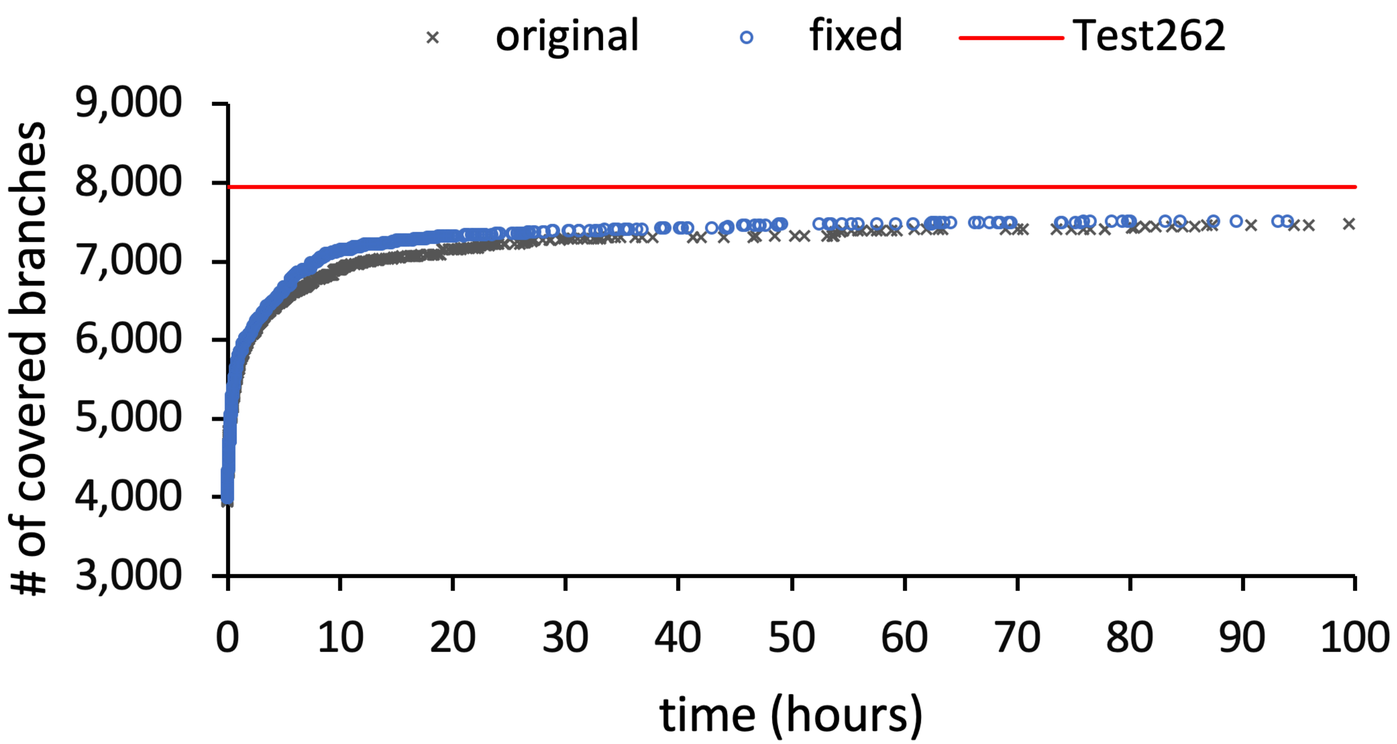
MemberExpression **.** *IdentifierName*

new *MemberExpression* *Arguments*

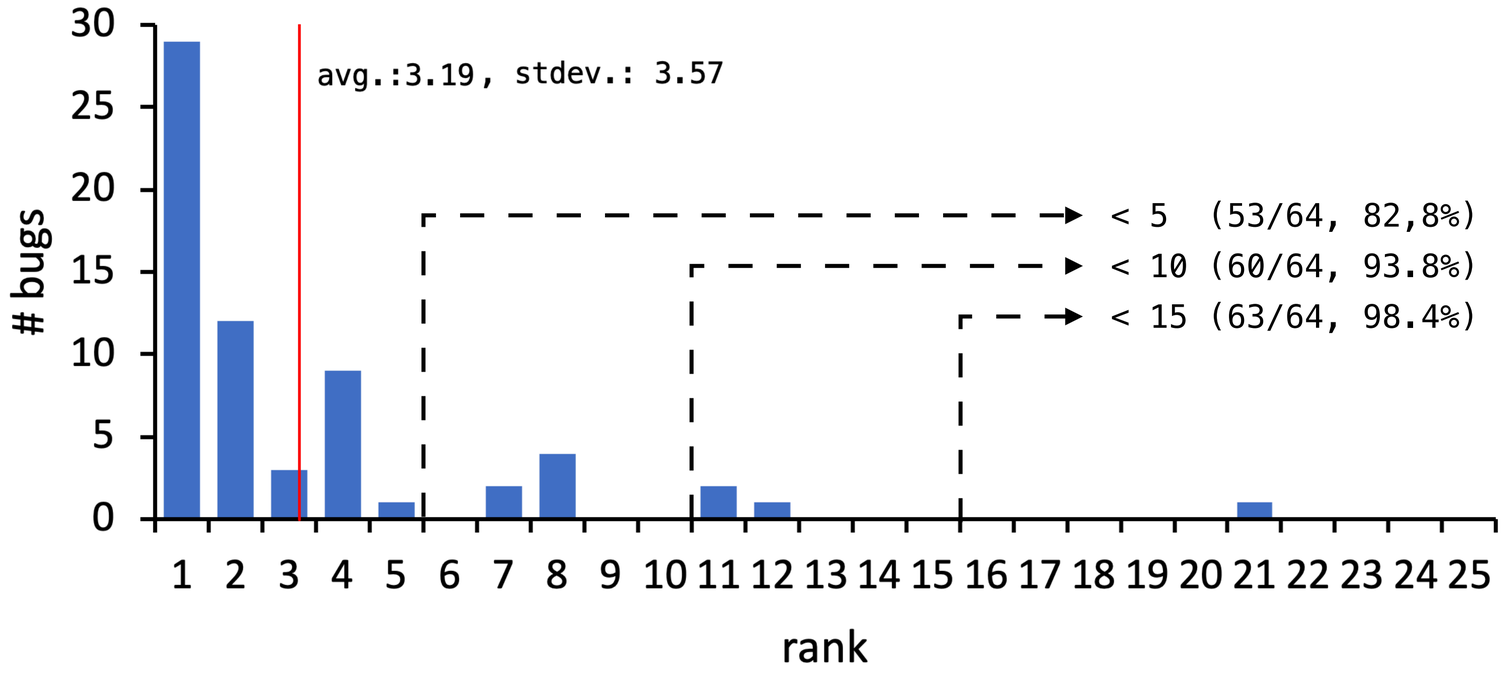

new
MemberExpression
Arguments
new
x
()
new
x
(x)
(...x)
(x,)
(the shortest string of MemberExpression)
new x()
new x(x)
new x(...x)
new x(x,)

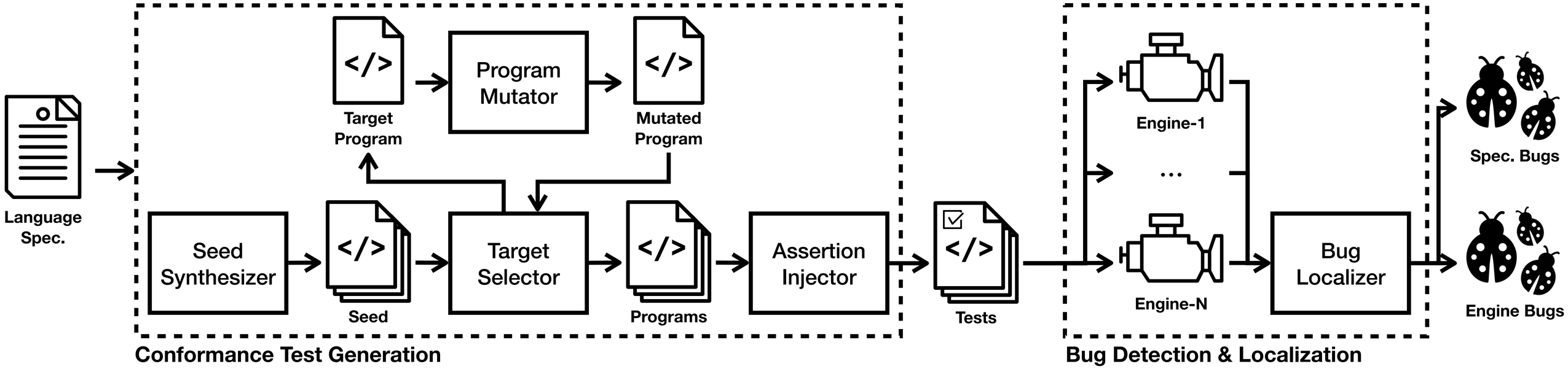
Array.prototype.indexOf (*searchElement* [, *fromIndex*])


original
fixed
Test262
# of covered statements
25,000
22,500
20,000
17,500
15,000
12,500
10,000
0
10
20
30
40
50
60
70
80
90
100
time (hours)


original
fixed
Test262
# of covered branches
9,000
8,000
7,000
6,000
5,000
4,000
3,000
0
10
20
30
40
50
60
70
80
90
100
time (hours)

x	#bugs < x	total	ratio
5	53	64	82.8%
10	60	64	93.8%
15	63	64	98.4%
20	63	64	98.4%




Language Spec.
Seed Synthesizer
Seed
Target Selector
Target Program
Program Mutator
Mutated Program
Programs
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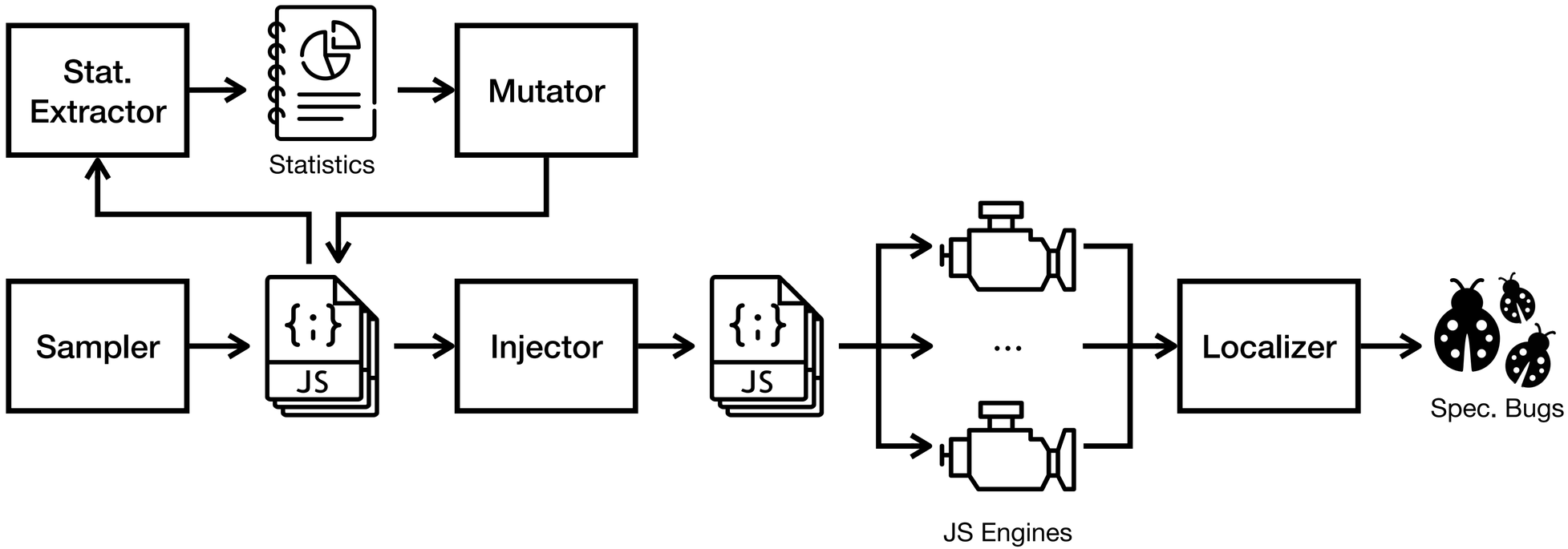
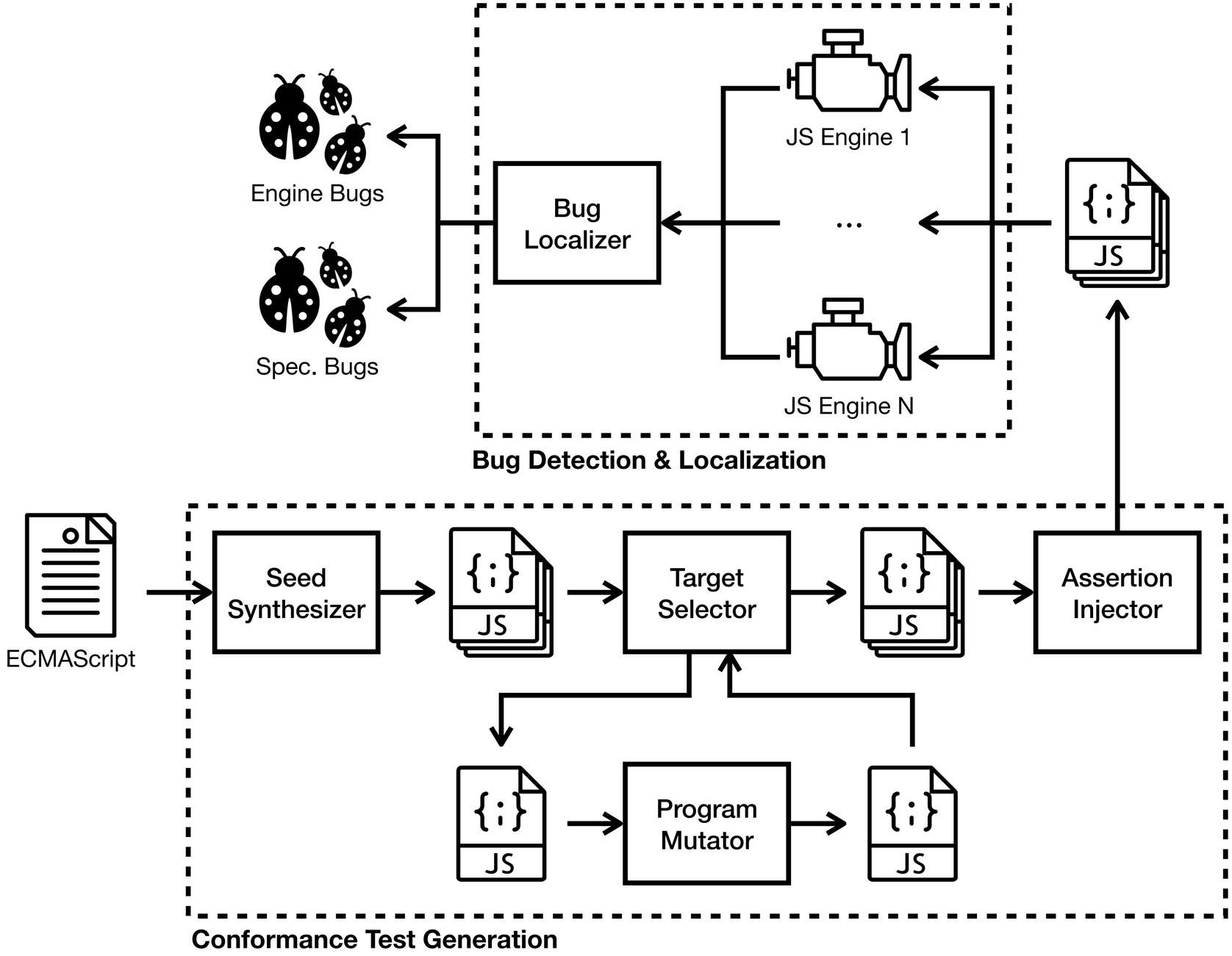
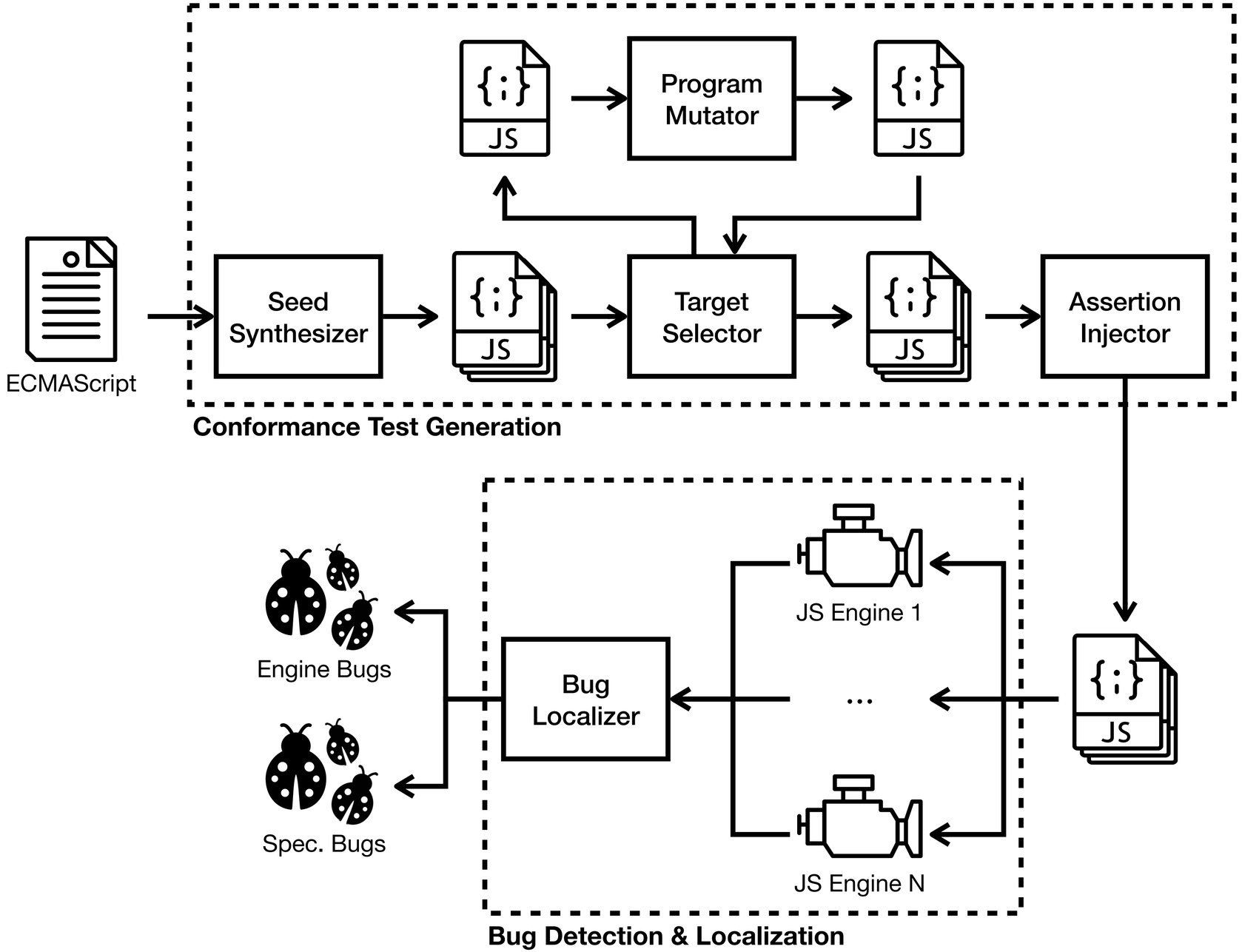
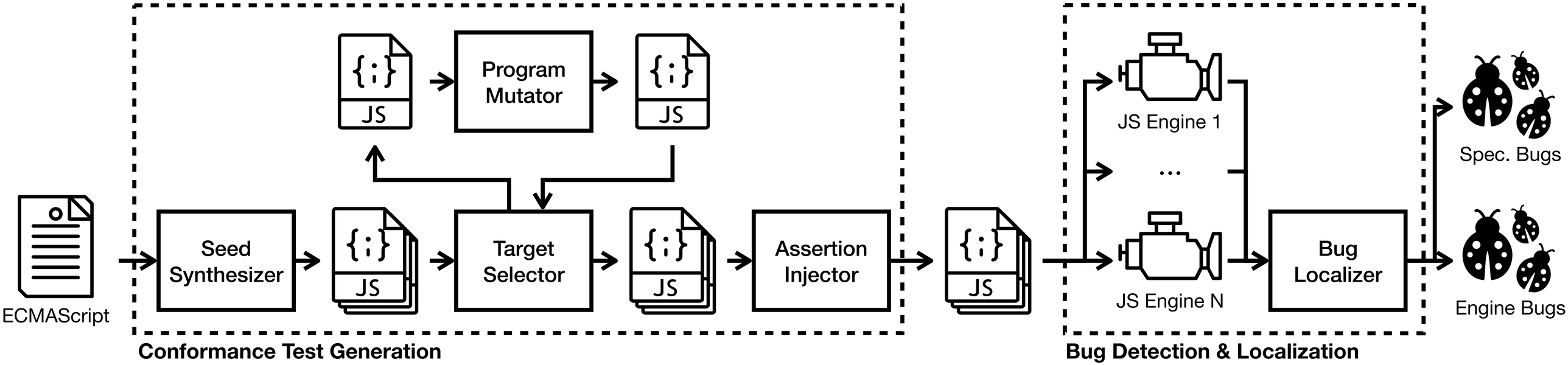
Conformance Test Generation
Tests
Engine-1
...
Engine-N
Bug Localizer
Bug Detection & Localization
Spec. Bugs
Engine Bugs


Stat.
Extractor
Statistics
Mutator
Sampler
JS
Injector
JS
...
Localizer
Spec. Bugs
JS Engines


Engine Bugs
Spec. Bugs
Bug Localizer
JS Engine 1
...
JS Engine N
JS
Bug Detection & Localization
ECMAScript
Seed Synthesizer
JS
Target Selector
JS
Assertion Injector
JS
Program Mutator
JS
Conformance Test Generation


Program Mutator
JS
JS
ECMAScript
Seed Synthesizer
JS
Target Selector
JS
Assertion Injector
Conformance Test Generation
JS Engine 1
...
JS Engine N
Bug Localizer
Engine Bugs
Spec. Bugs
JS
Bug Detection & Localization


ECMAScript
Seed Synthesizer
JS
Target Selector
JS
Program Mutator
JS
JS
Assertion Injector
JS
Conformance Test Generation
JS Engine 1
...
JS Engine N
Bug Localizer
Spec. Bugs
Engine Bugs
Bug Detection & Localization

ArrayLiteral`[Yield, Await]` :

[*Elision*`opt`]

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

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