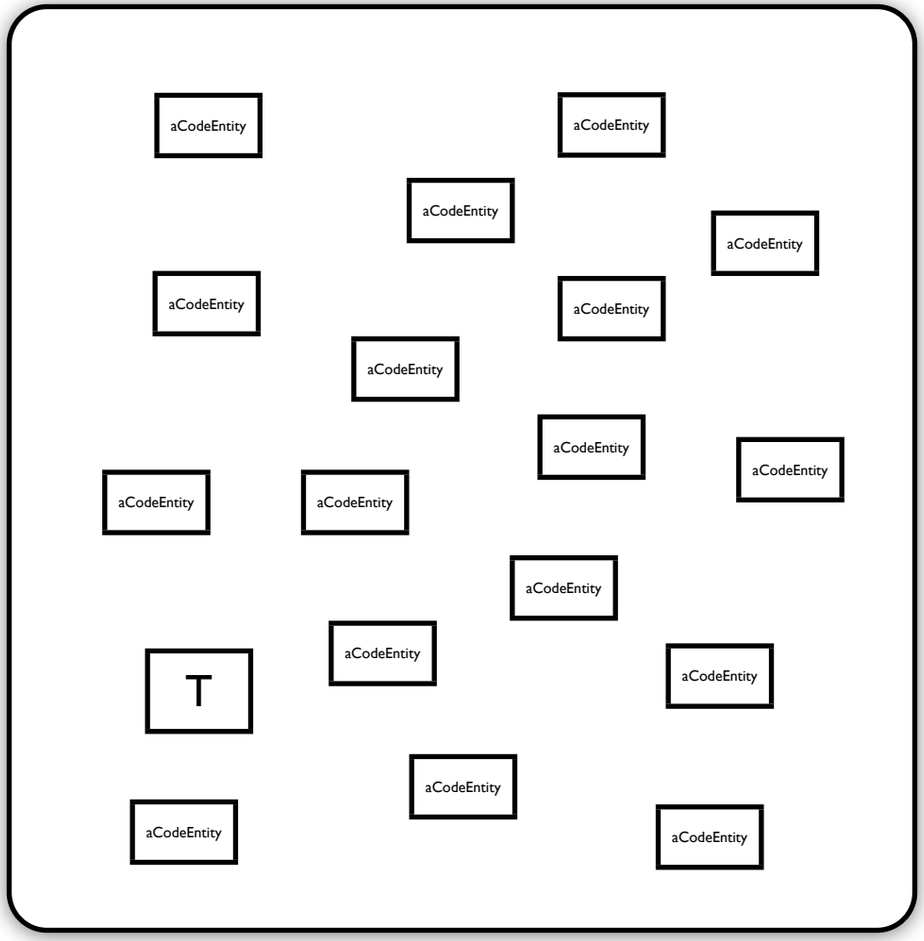
Impact of code changes in a cherry-picking scenario

Intuition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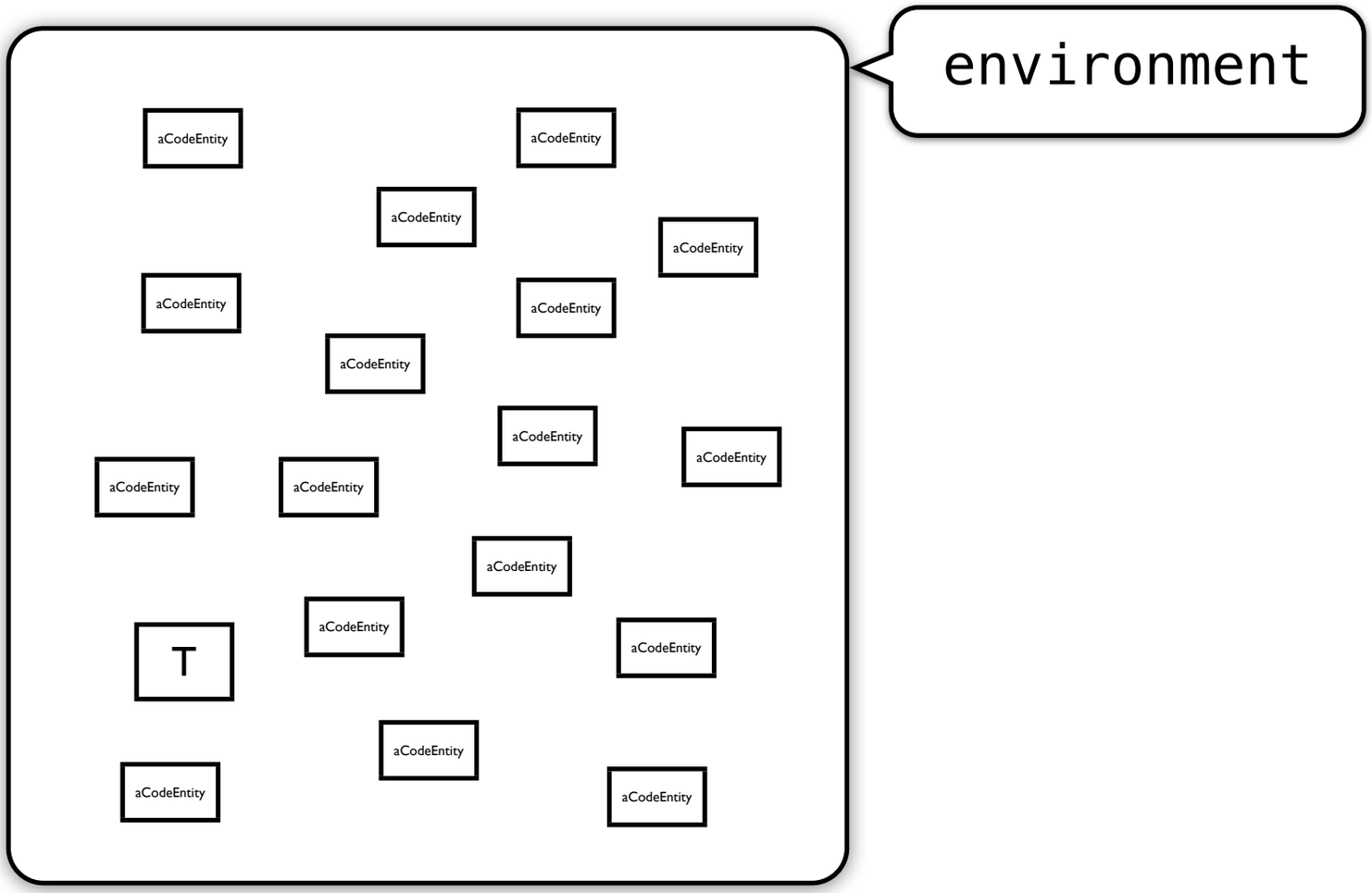
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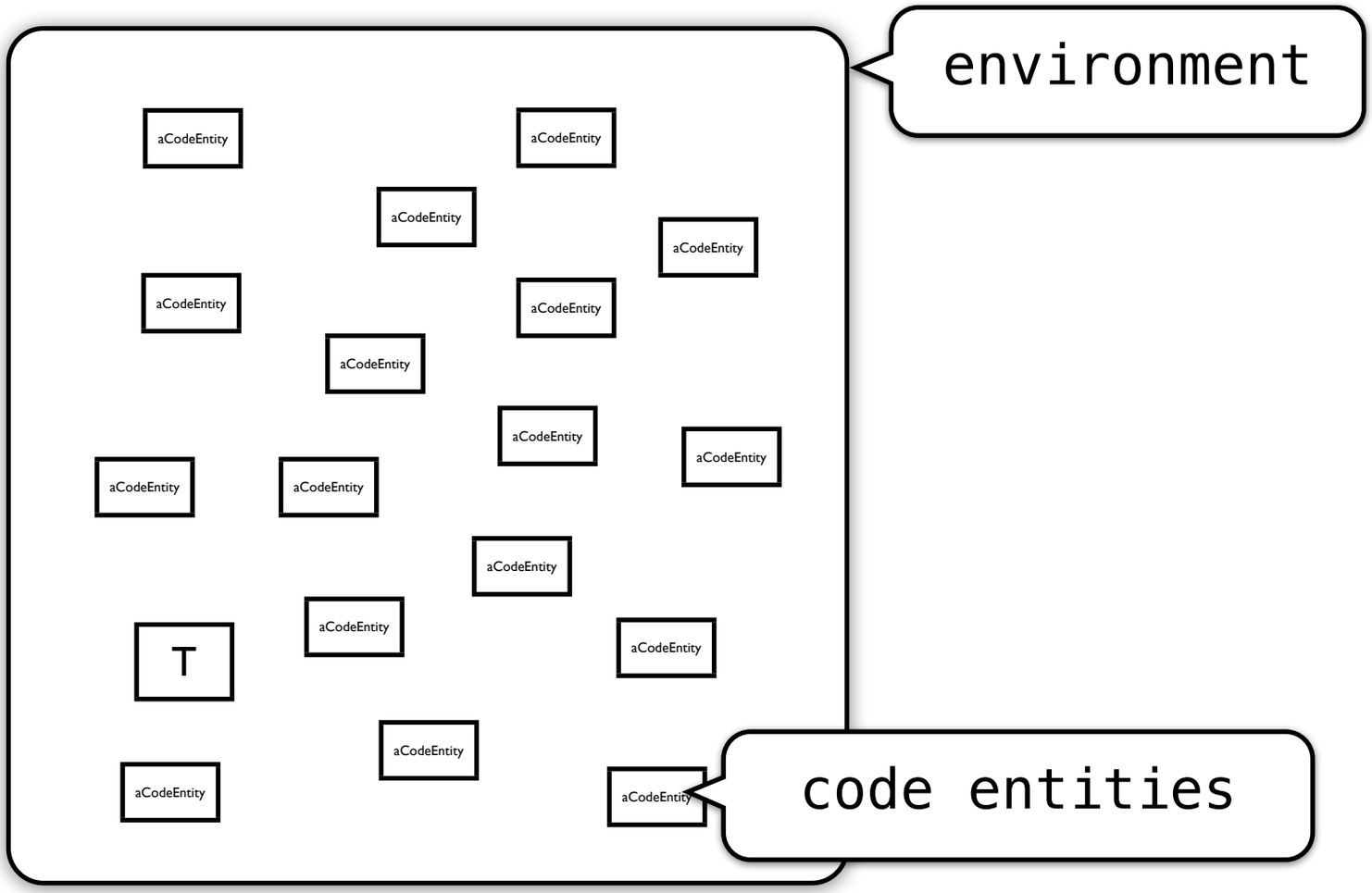
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Impact

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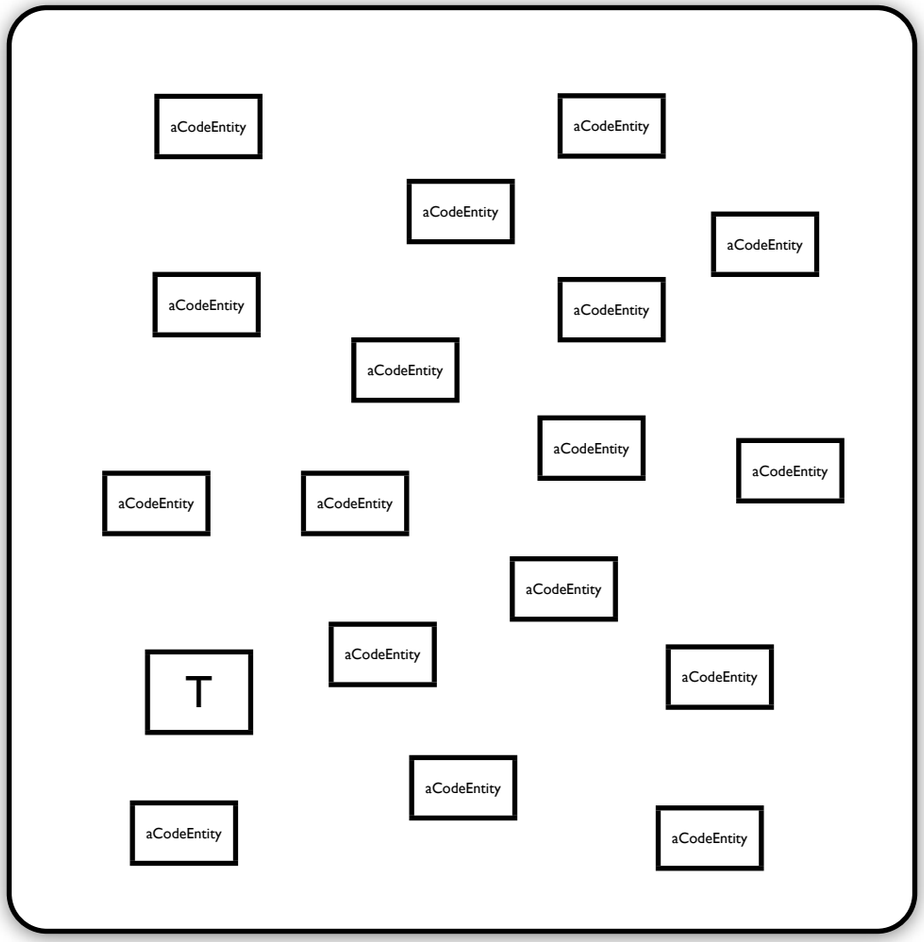
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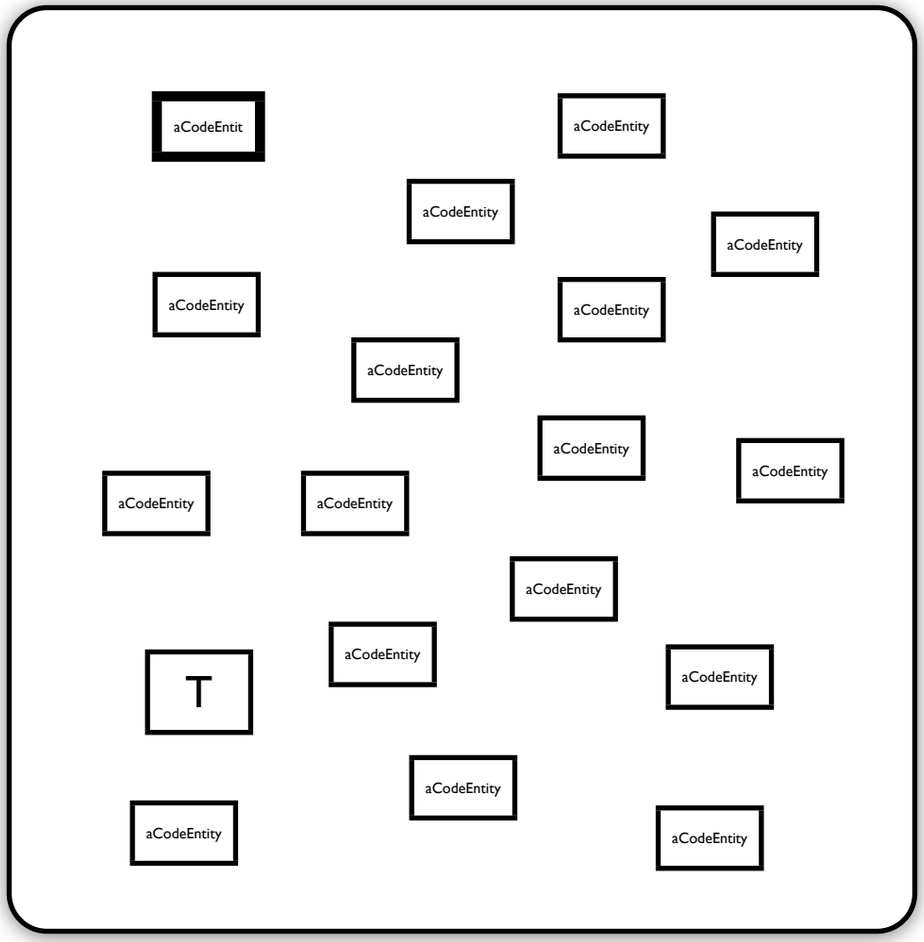
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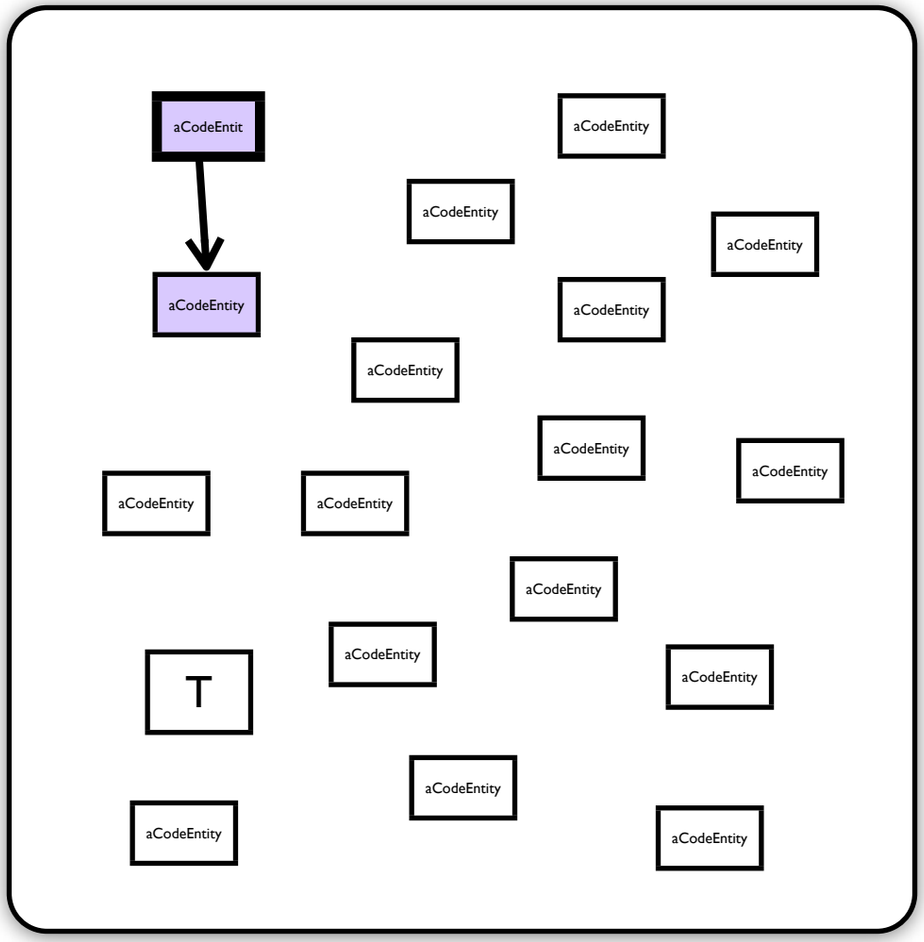
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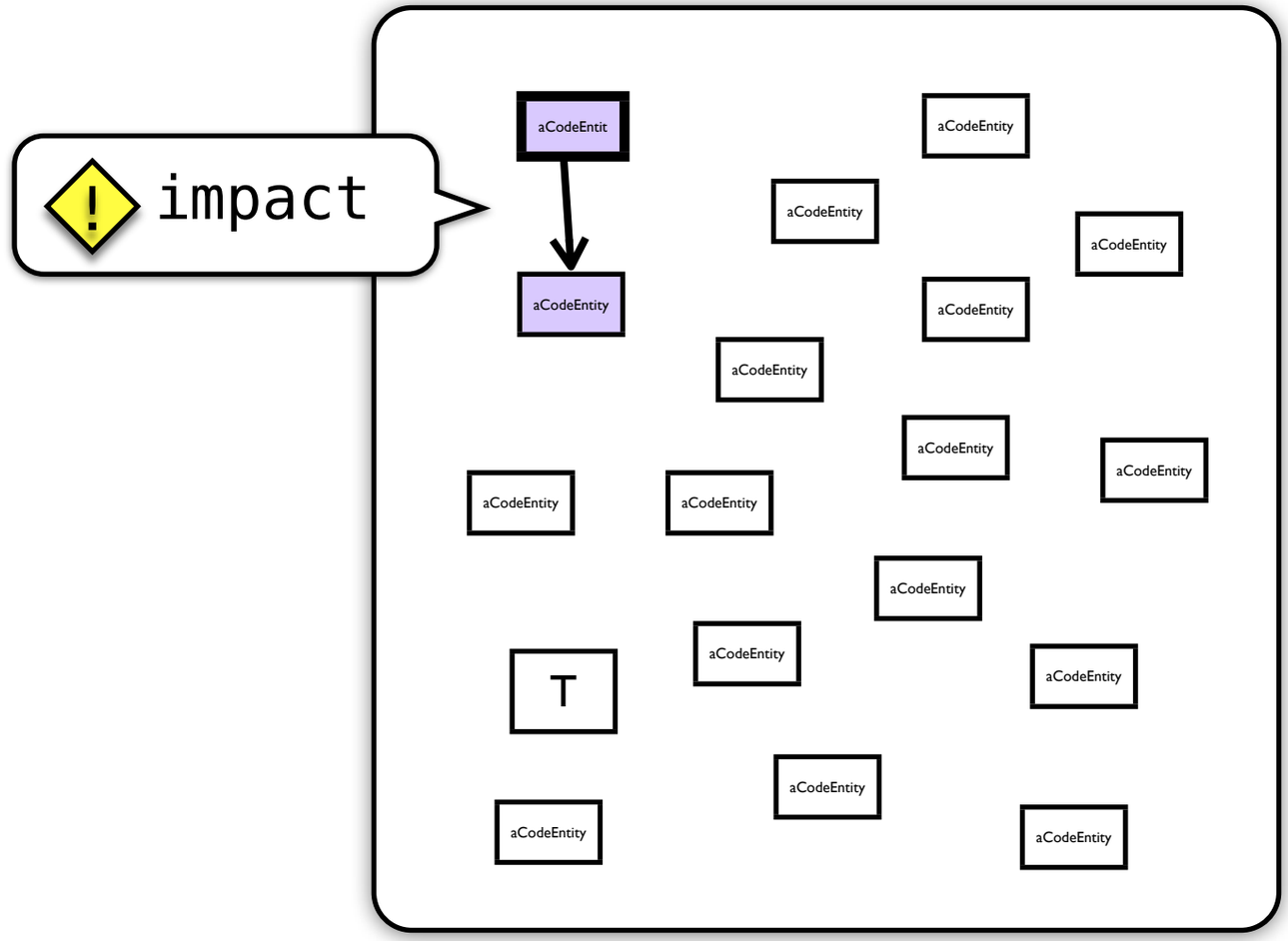
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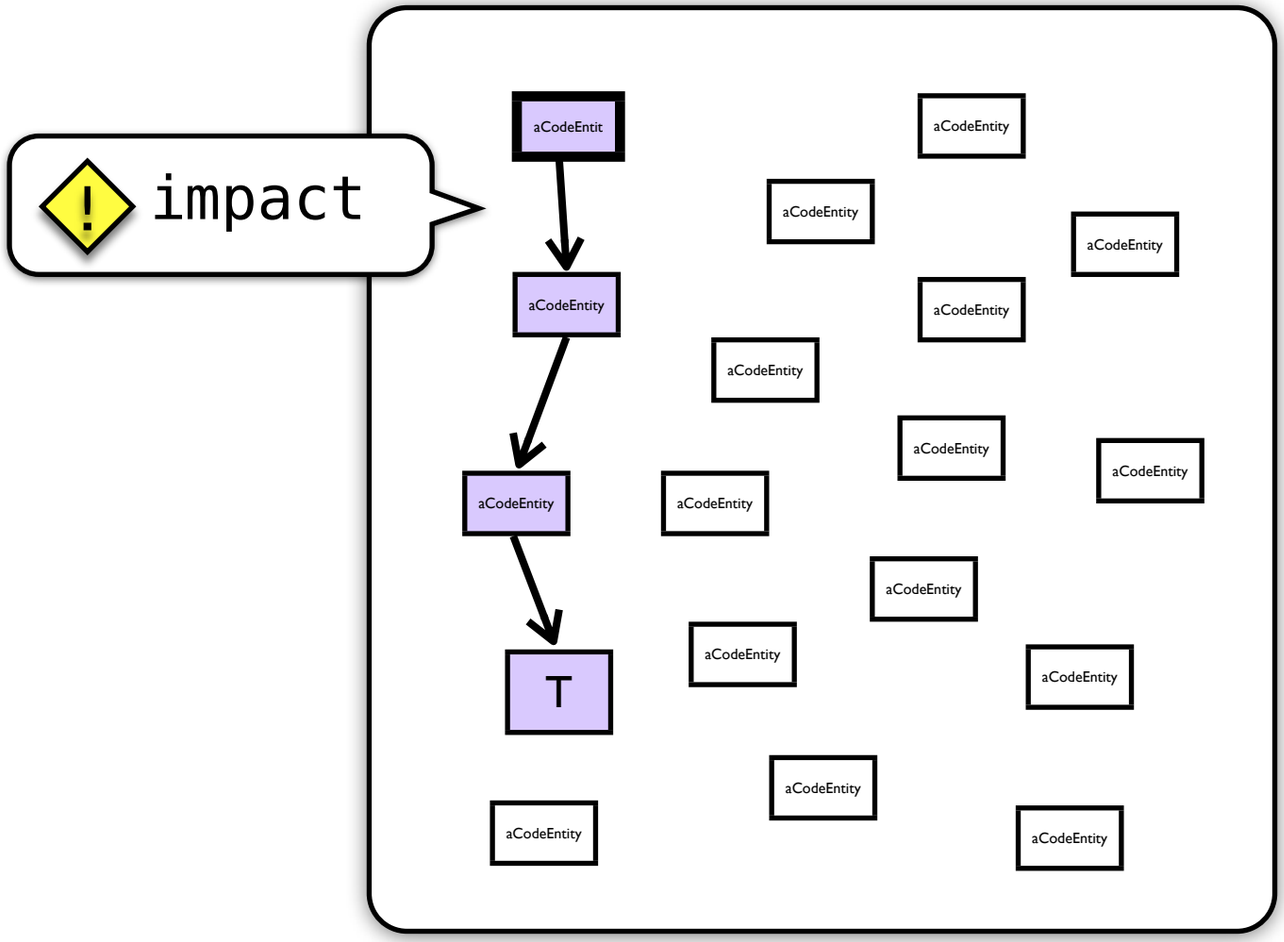
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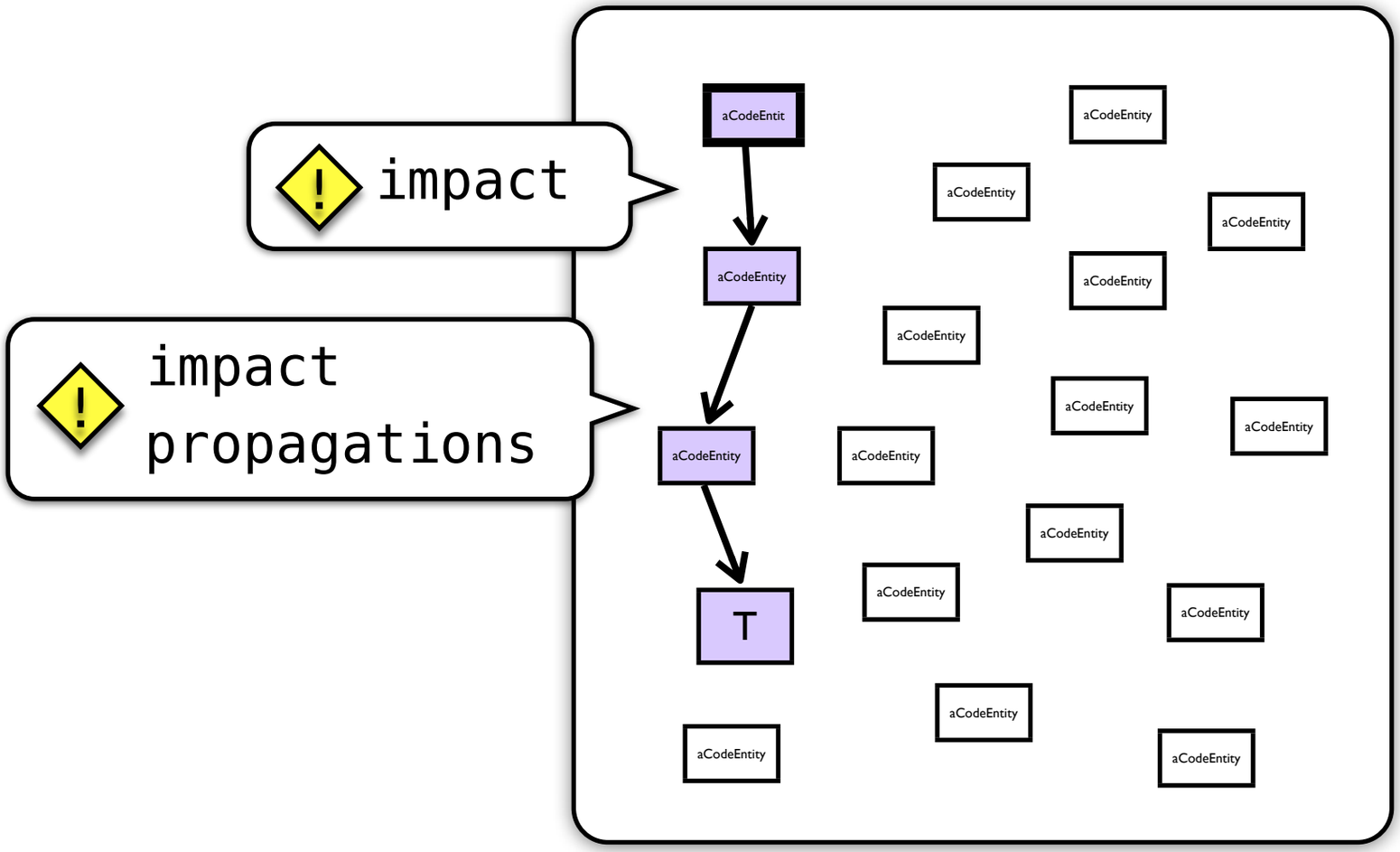
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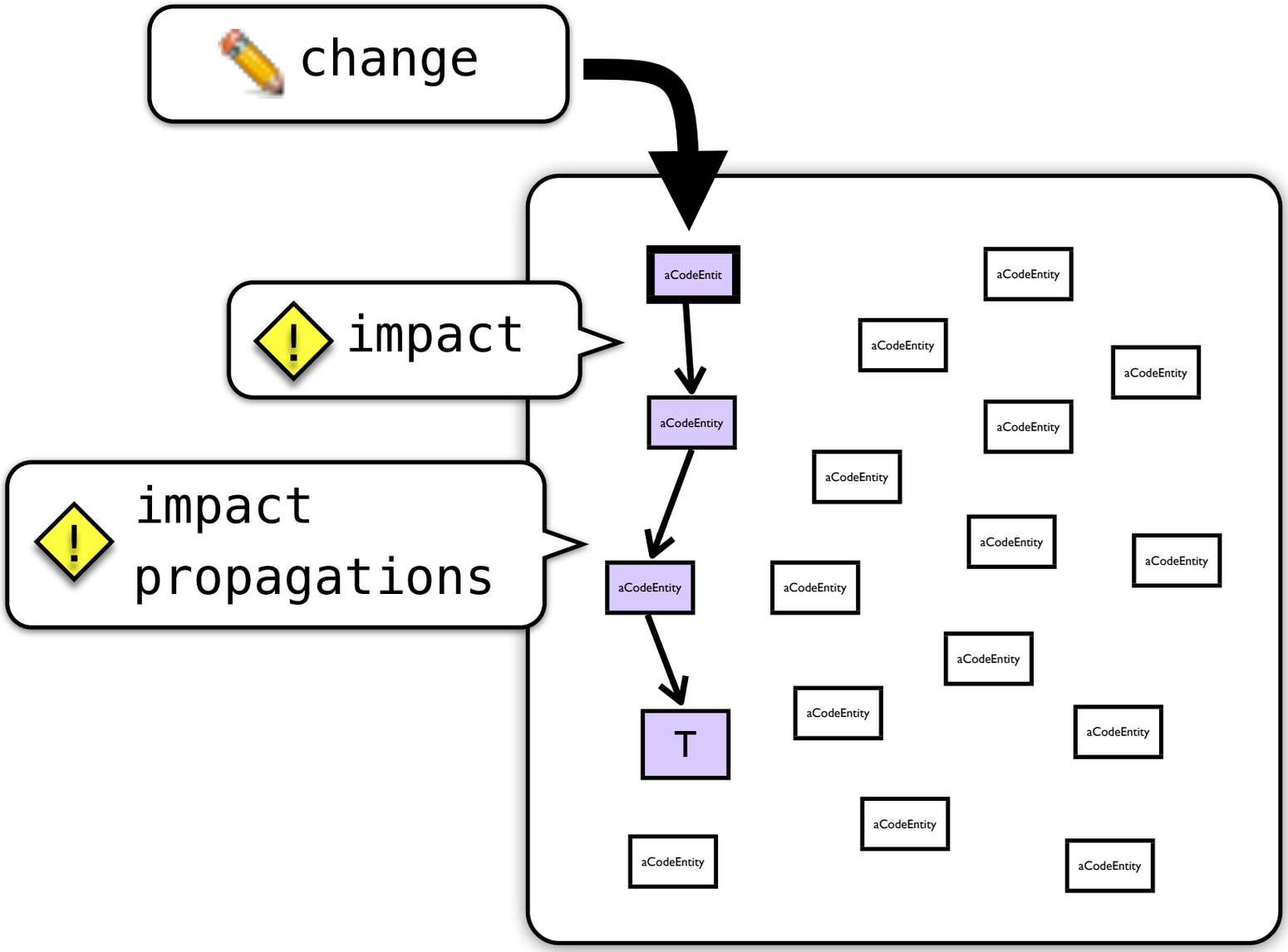
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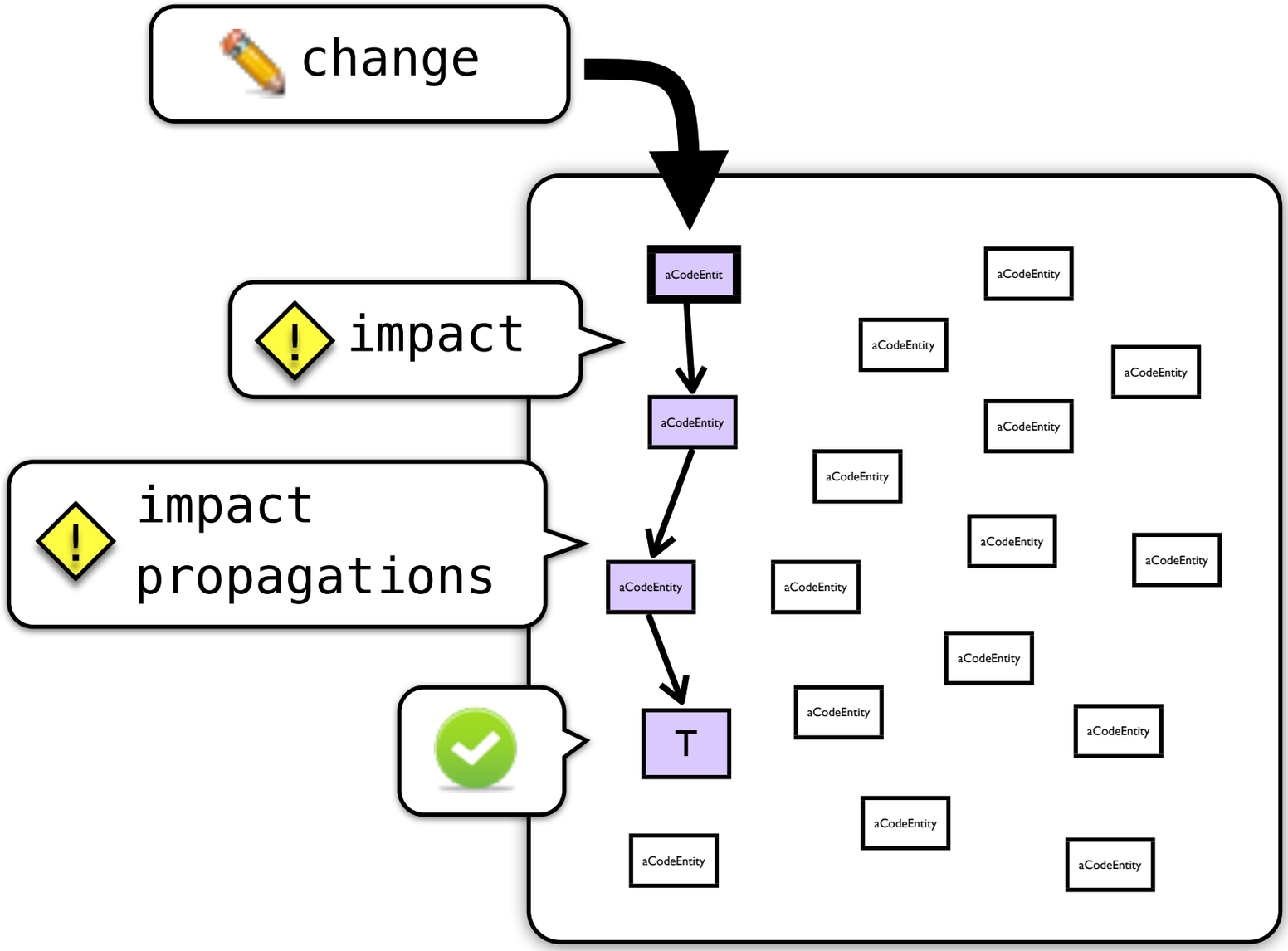
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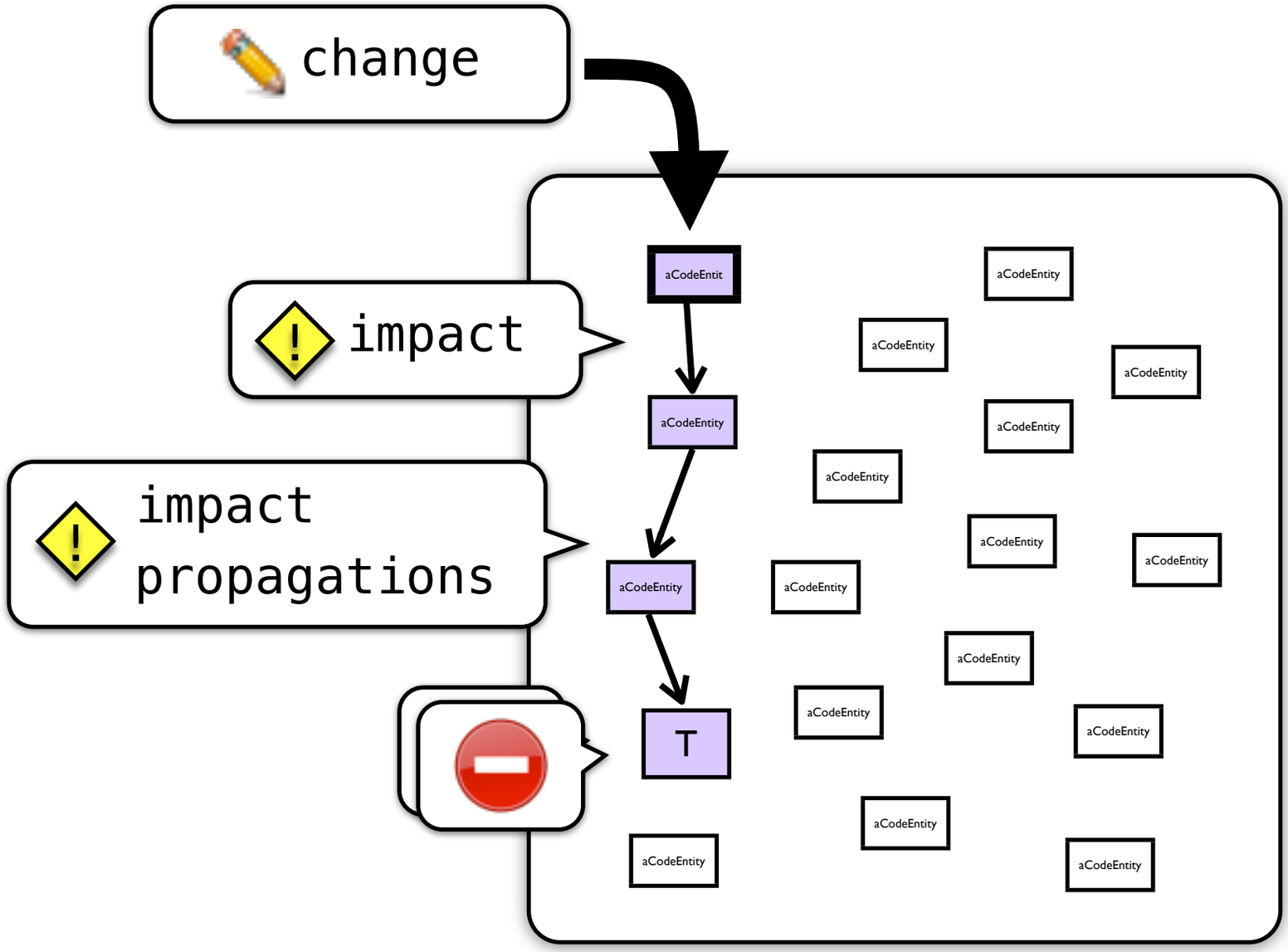
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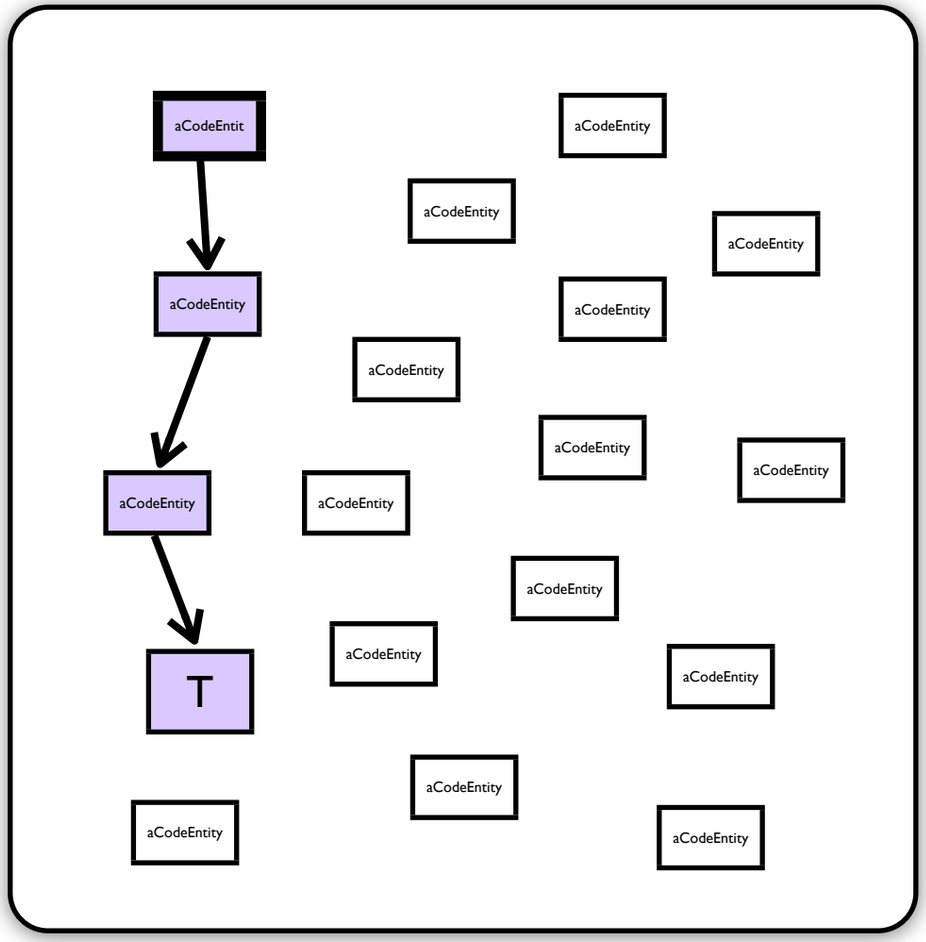
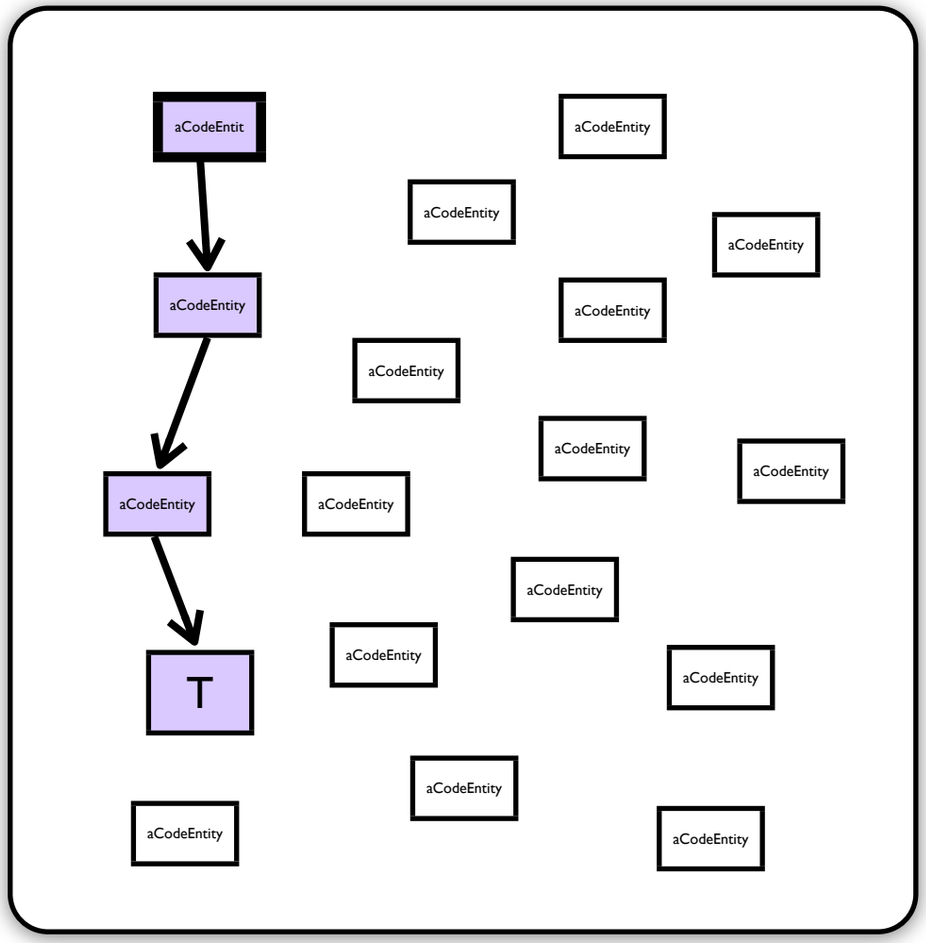
Applications

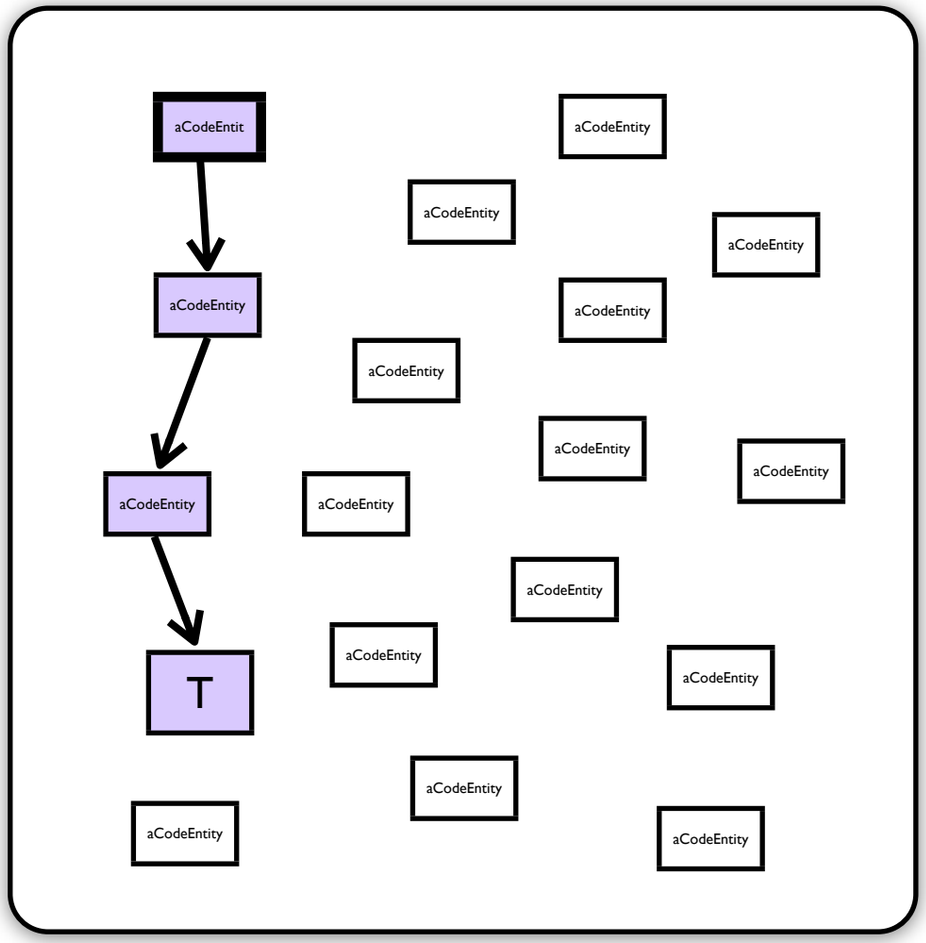


Applications



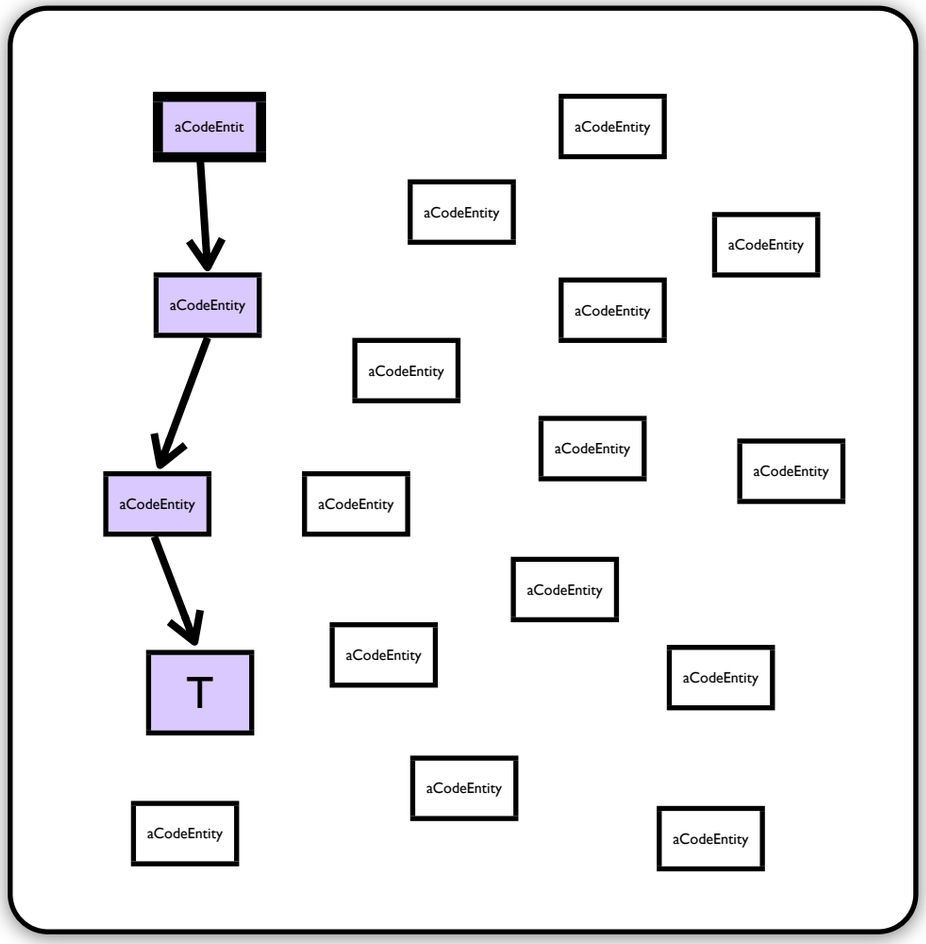
- Software comprehension

Applications



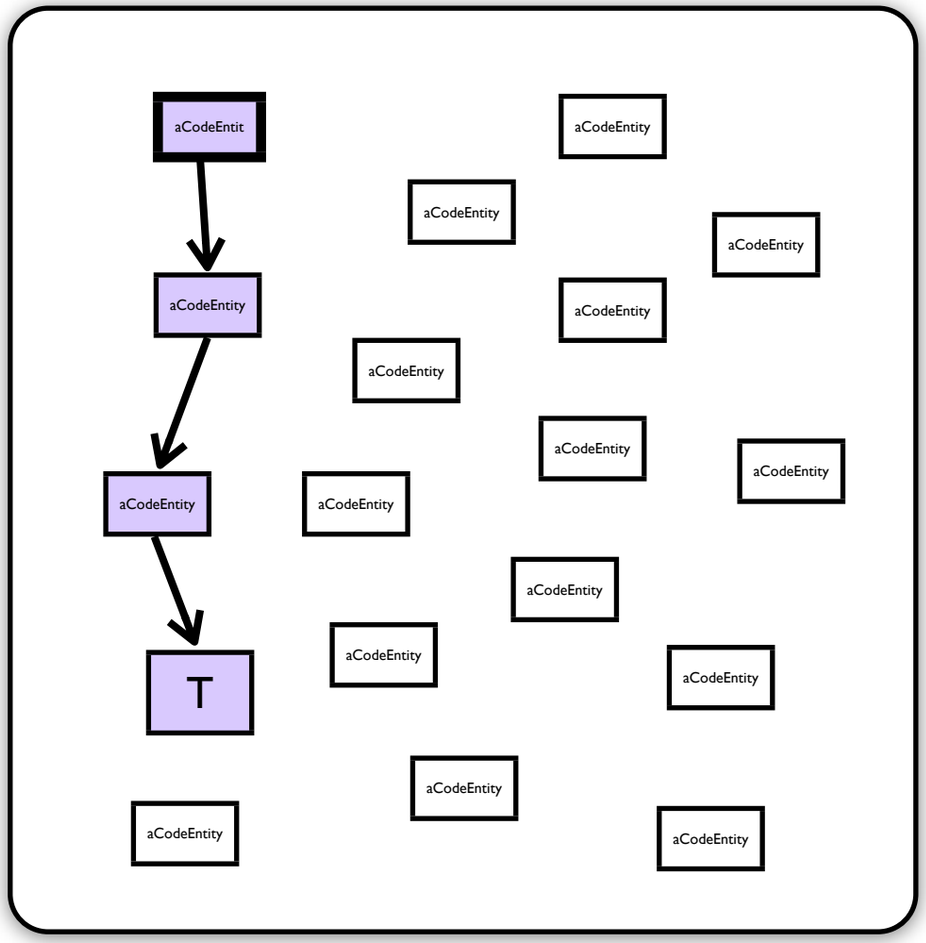
- Software comprehension
- Change propagation

Applications



- Software comprehension
- Change propagation
- Regression testing

Applications



- Software comprehension
- Change propagation
- Regression testing
- Cost measurement

Example

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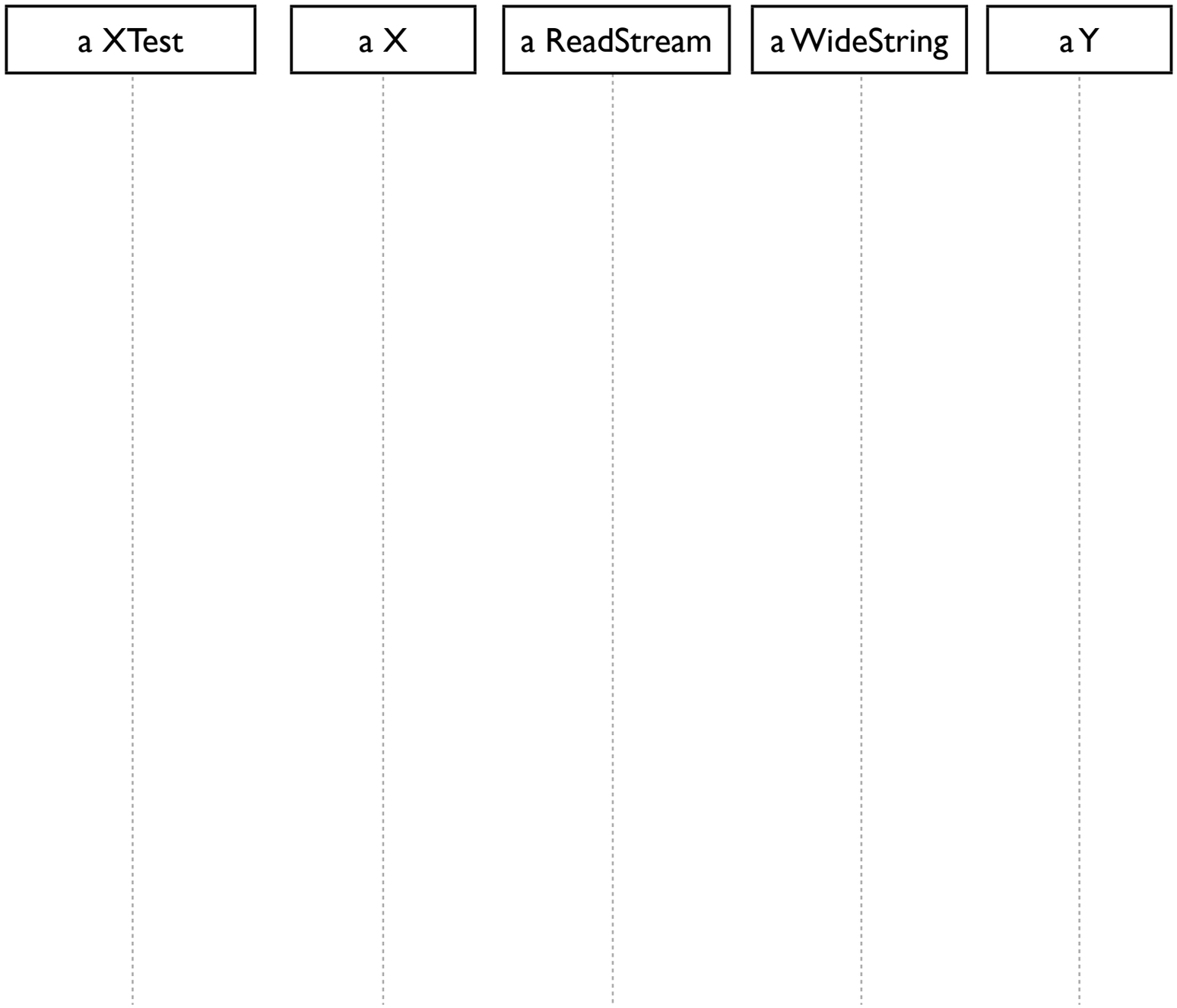
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a XTest
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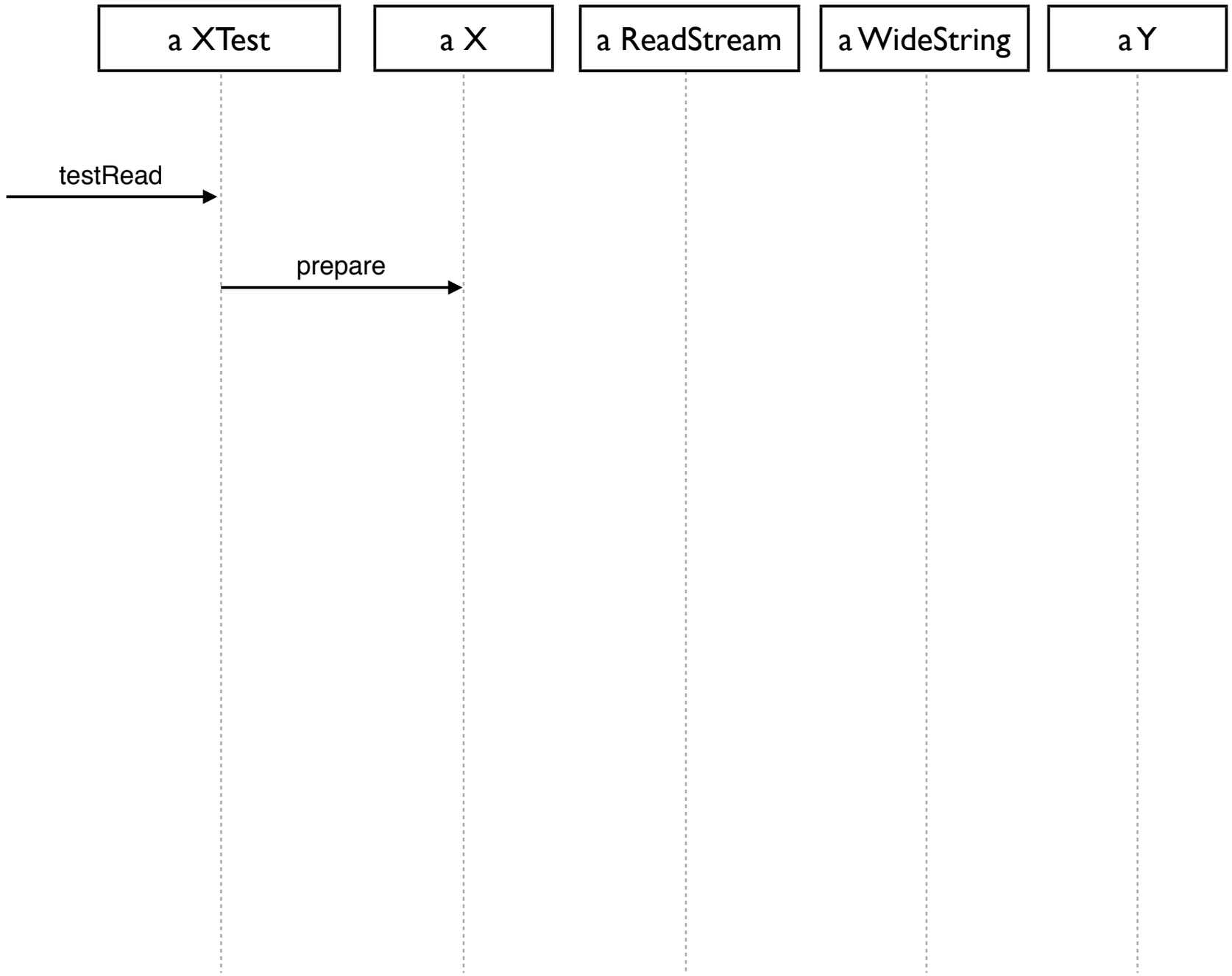
testRead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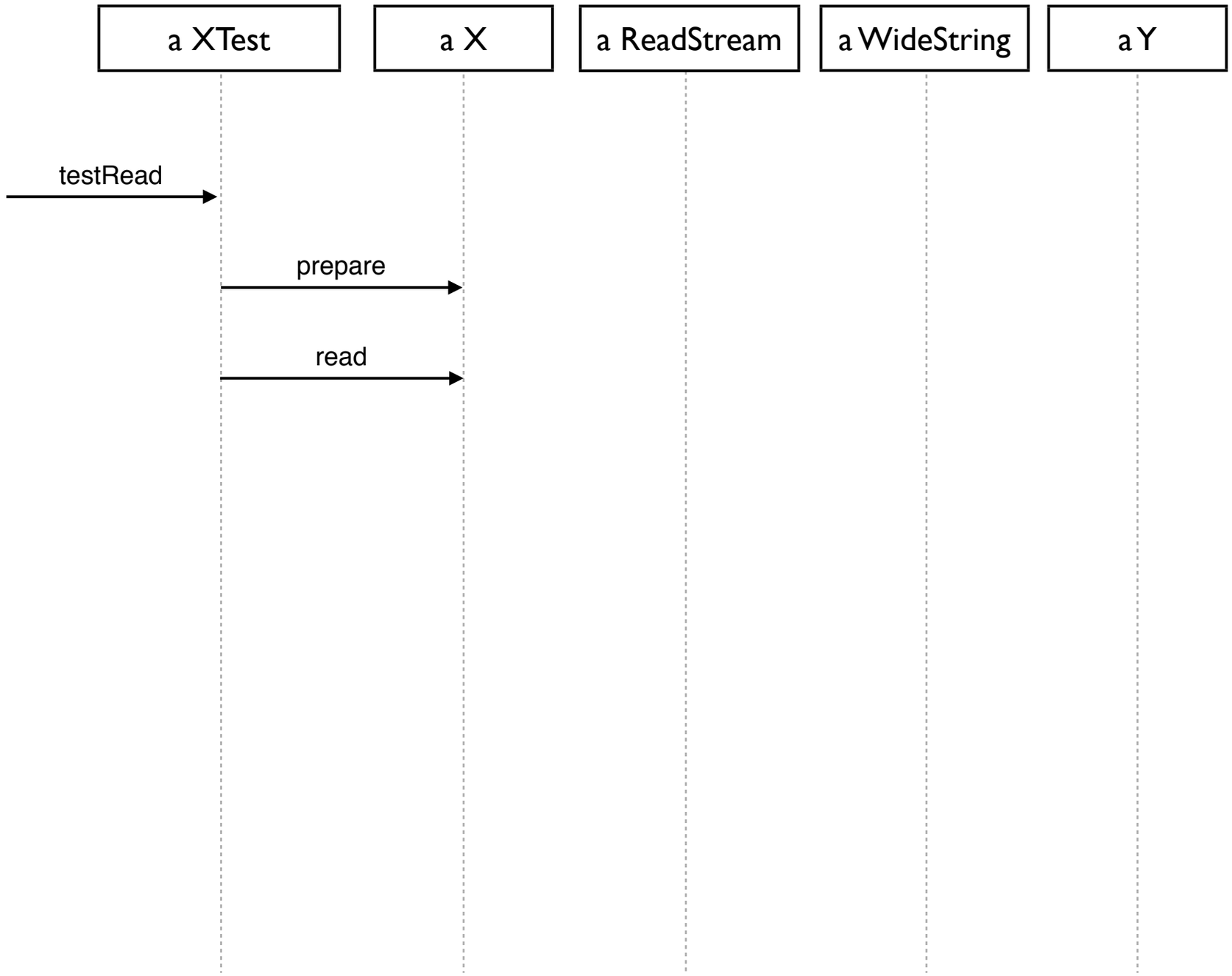
testRead
prepare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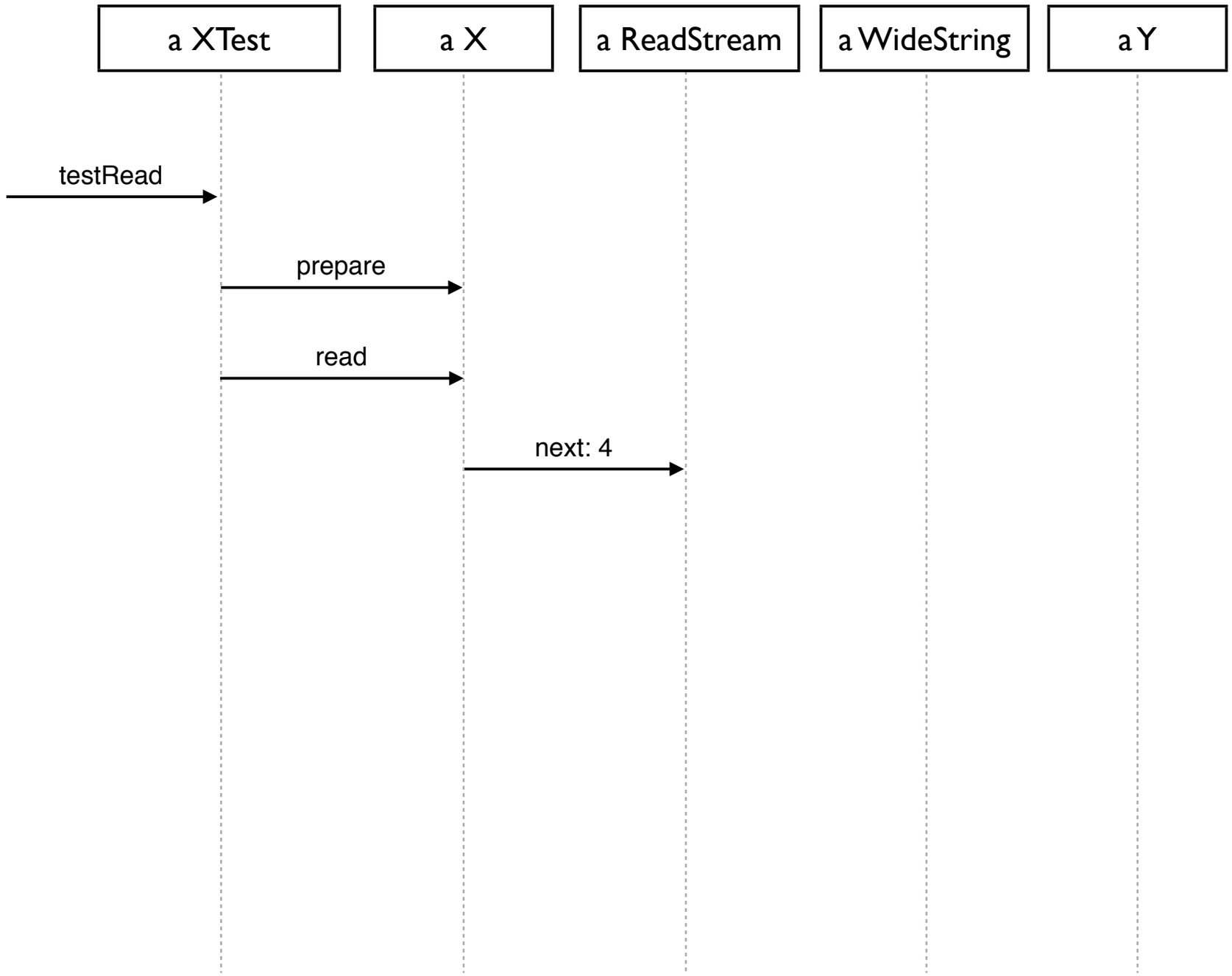
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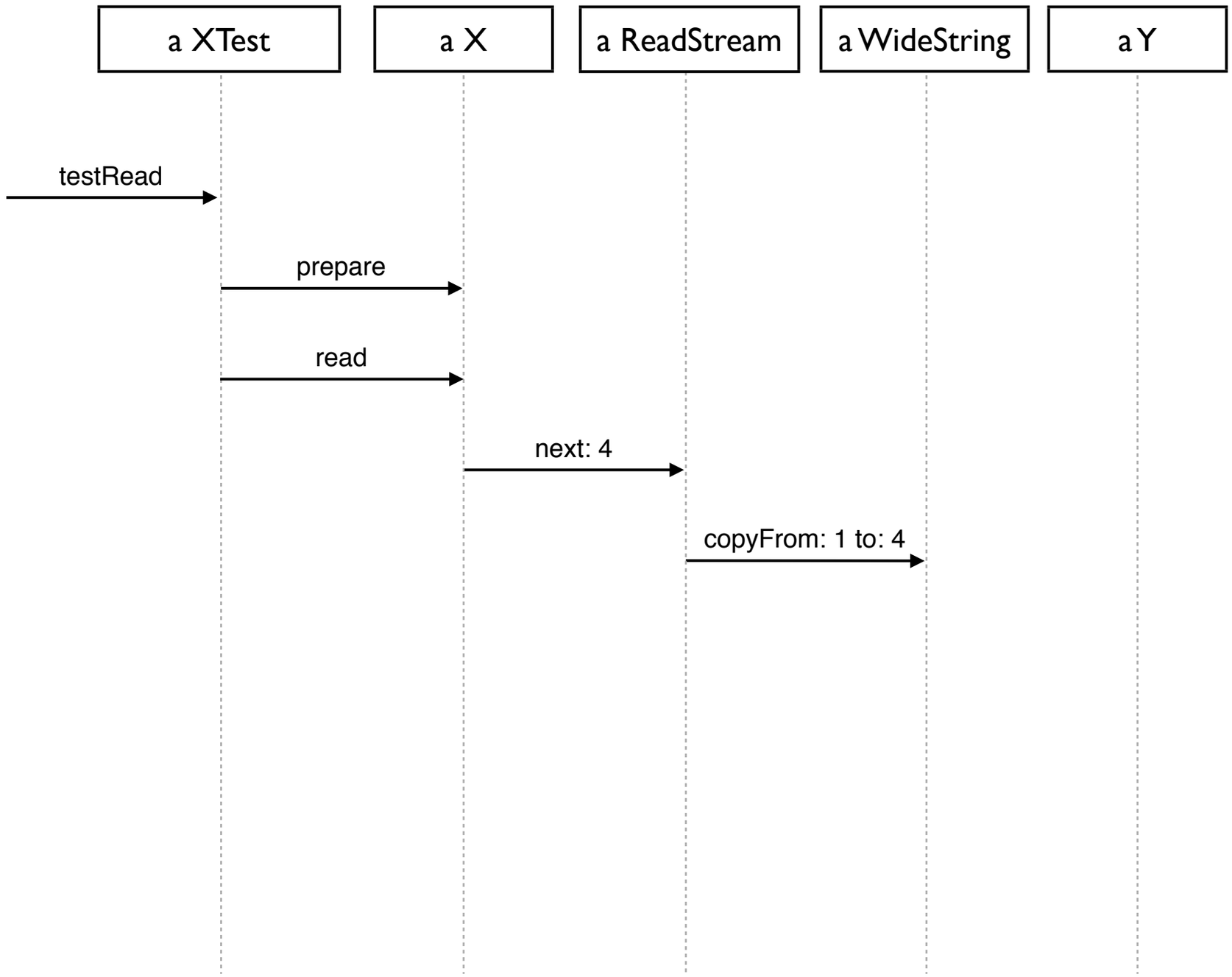
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next: 4
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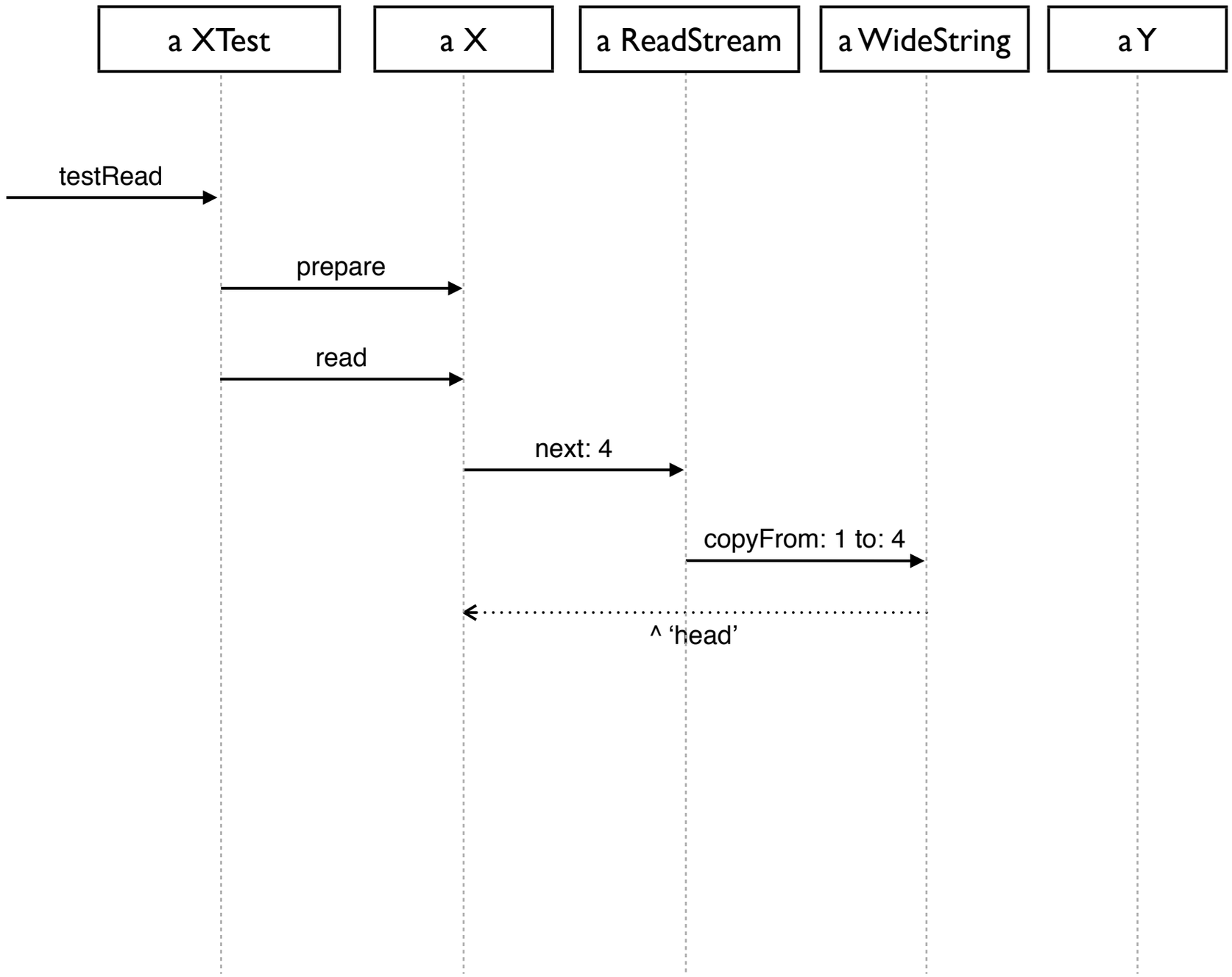
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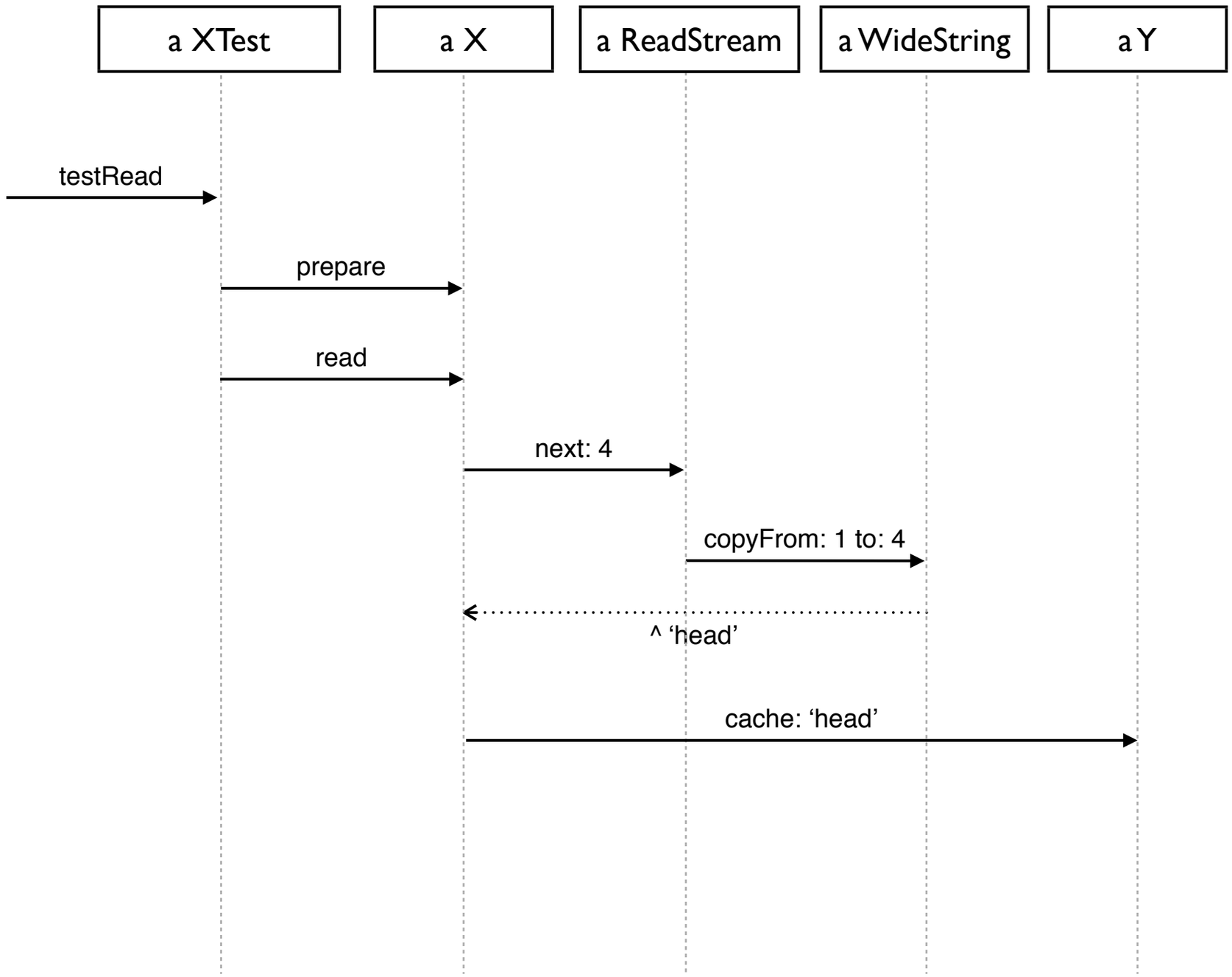
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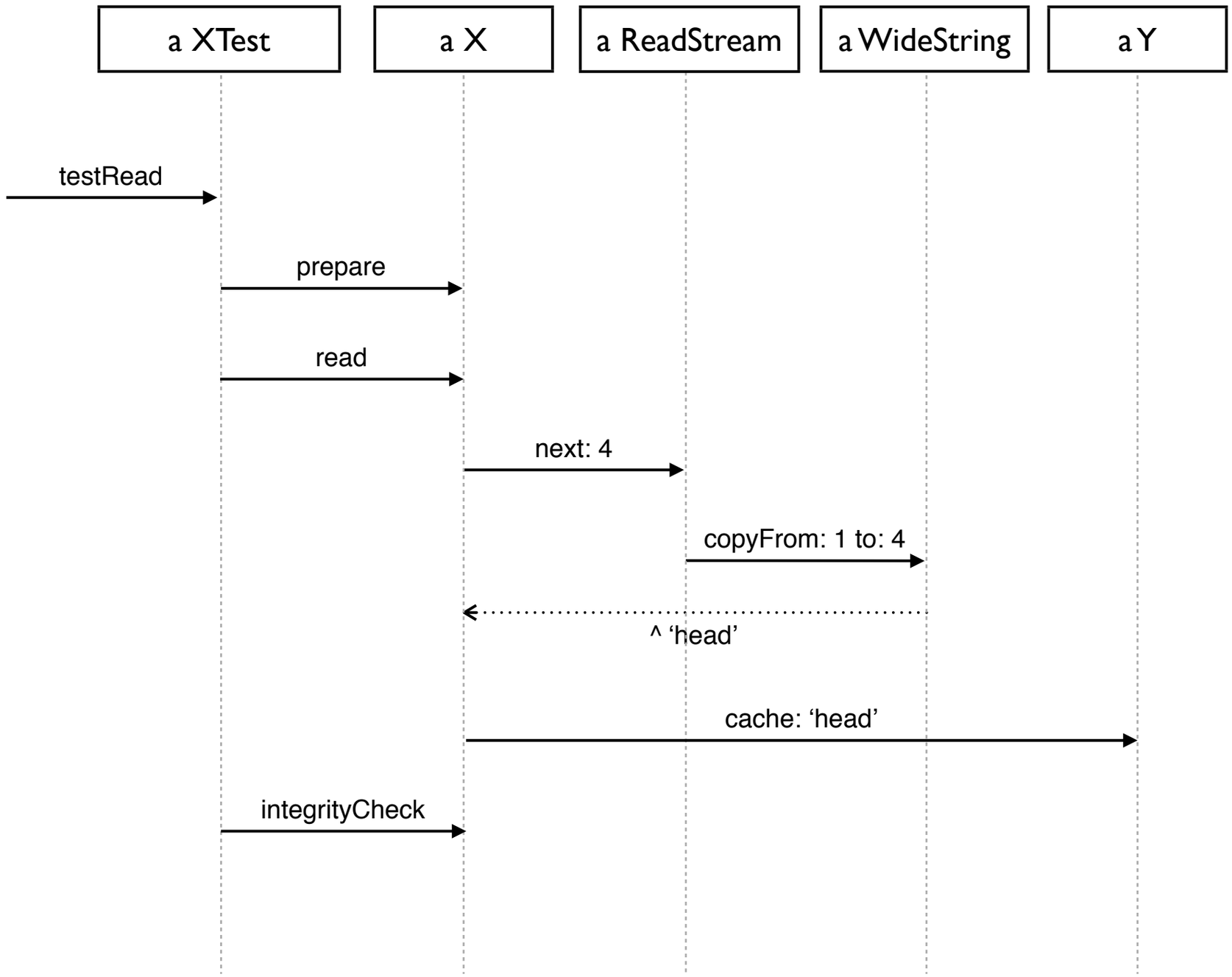
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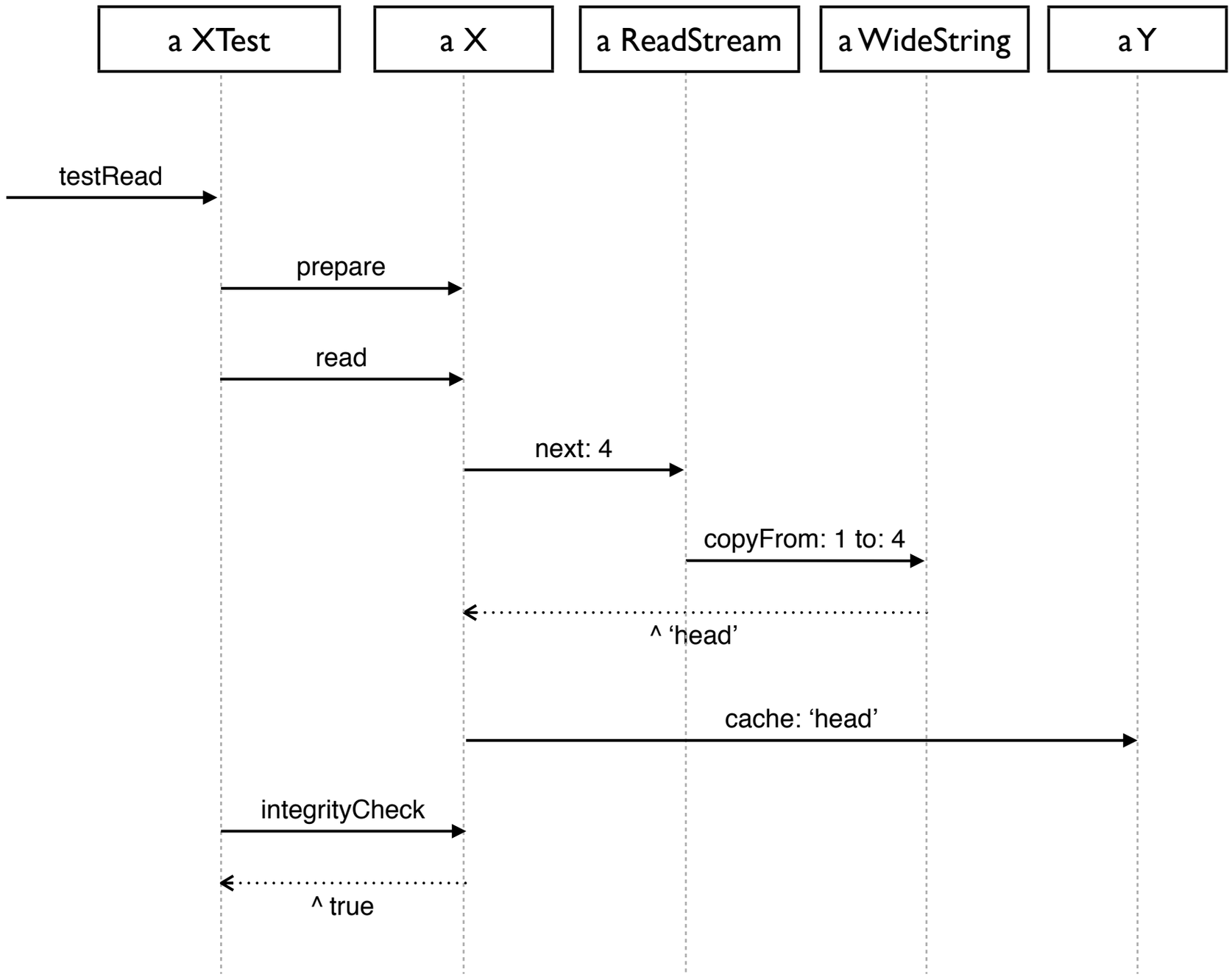
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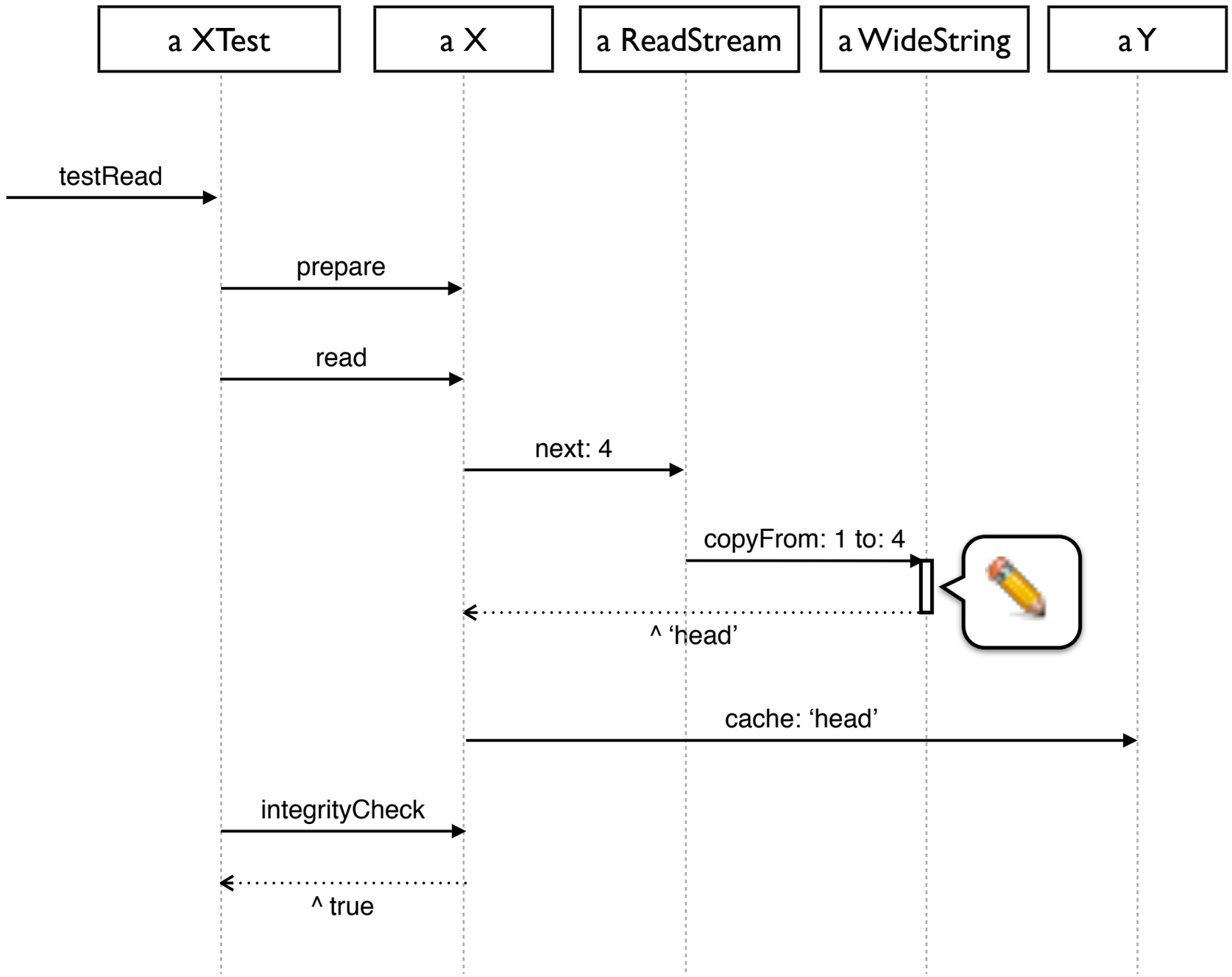
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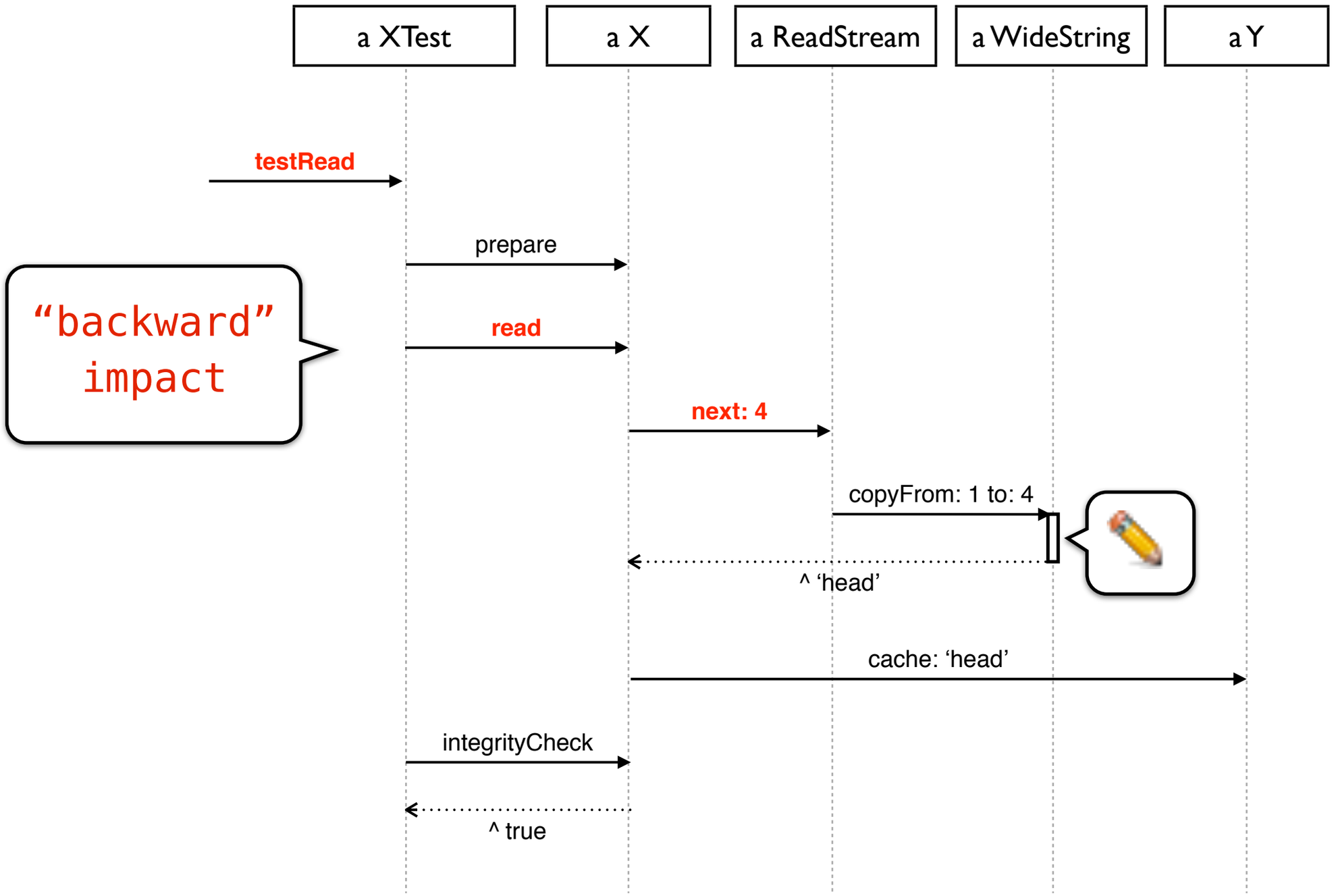
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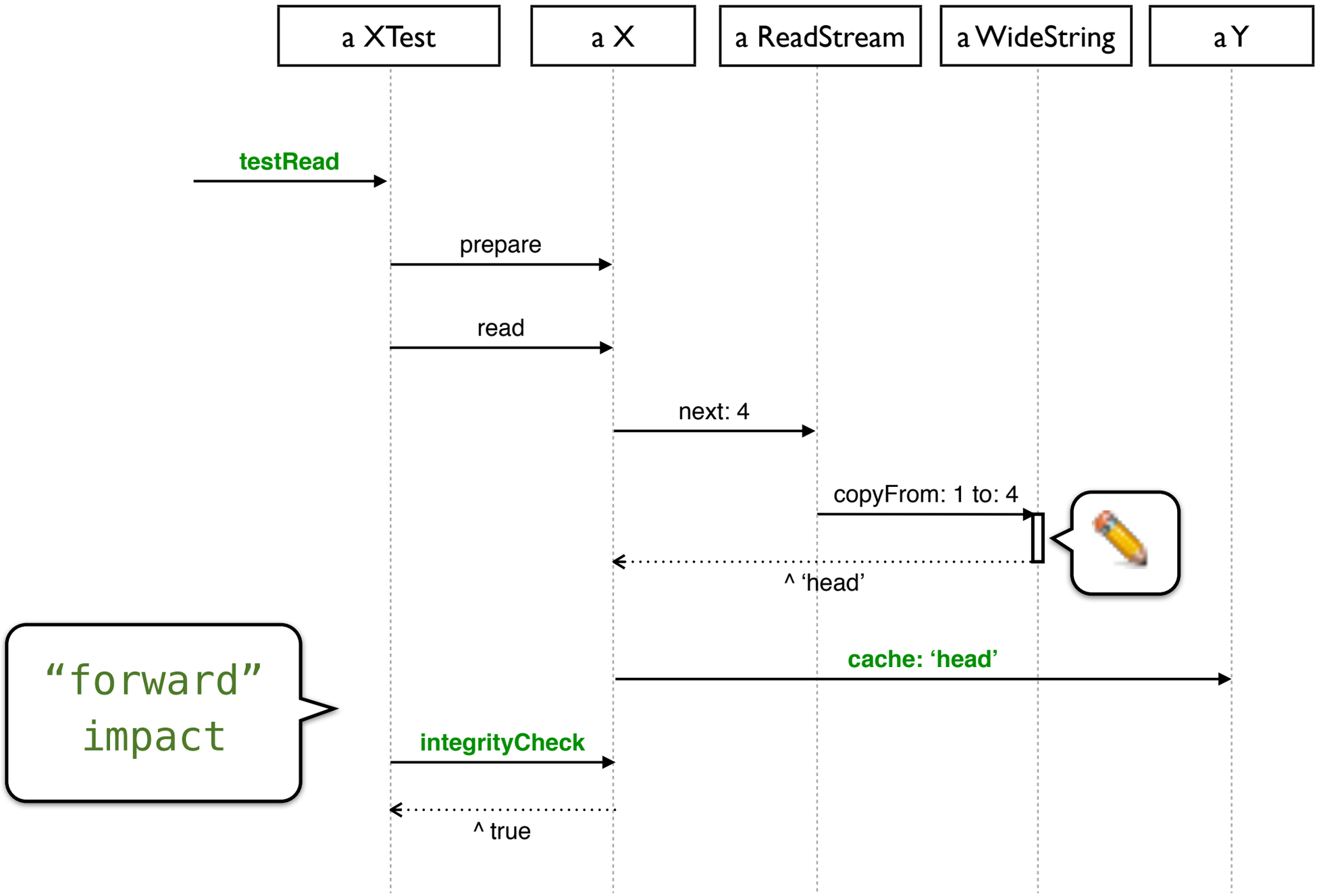
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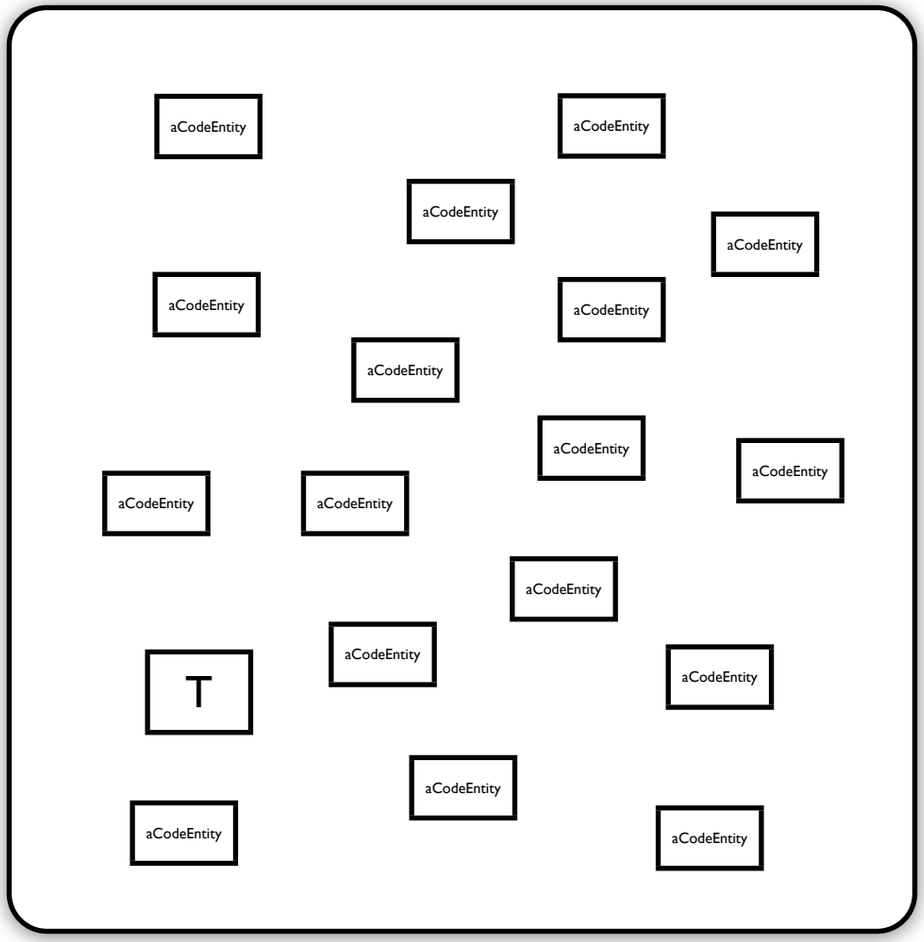
Static Analysis: Dependencies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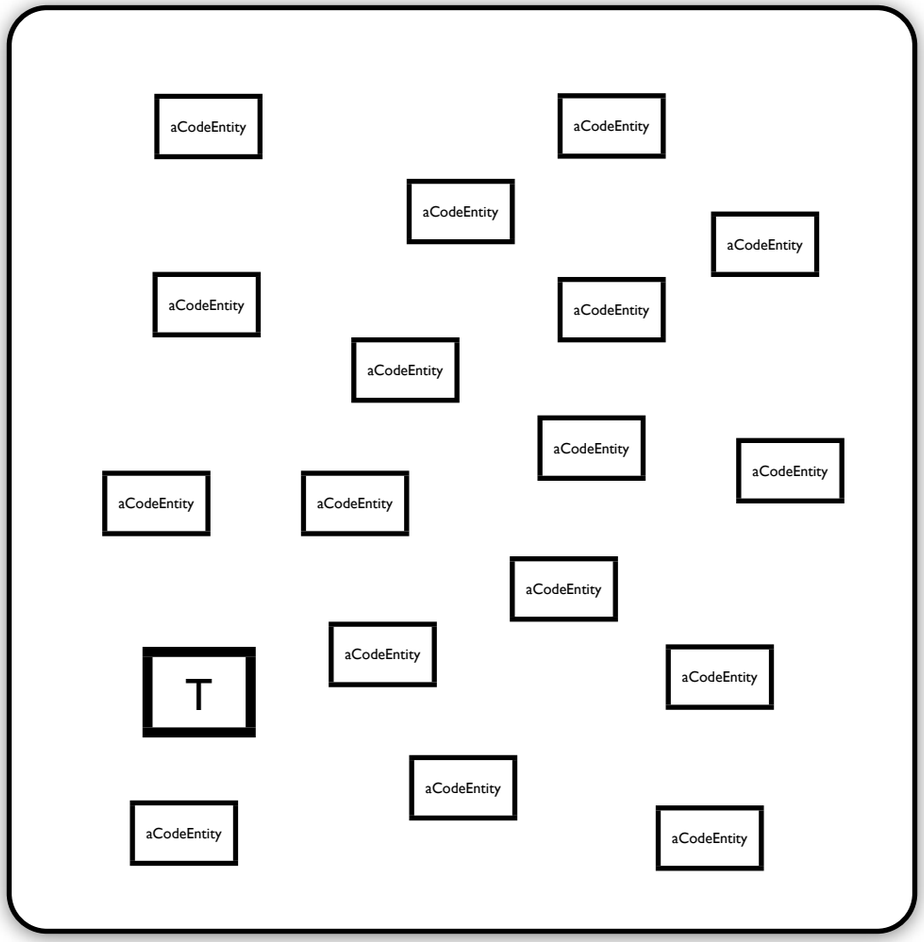
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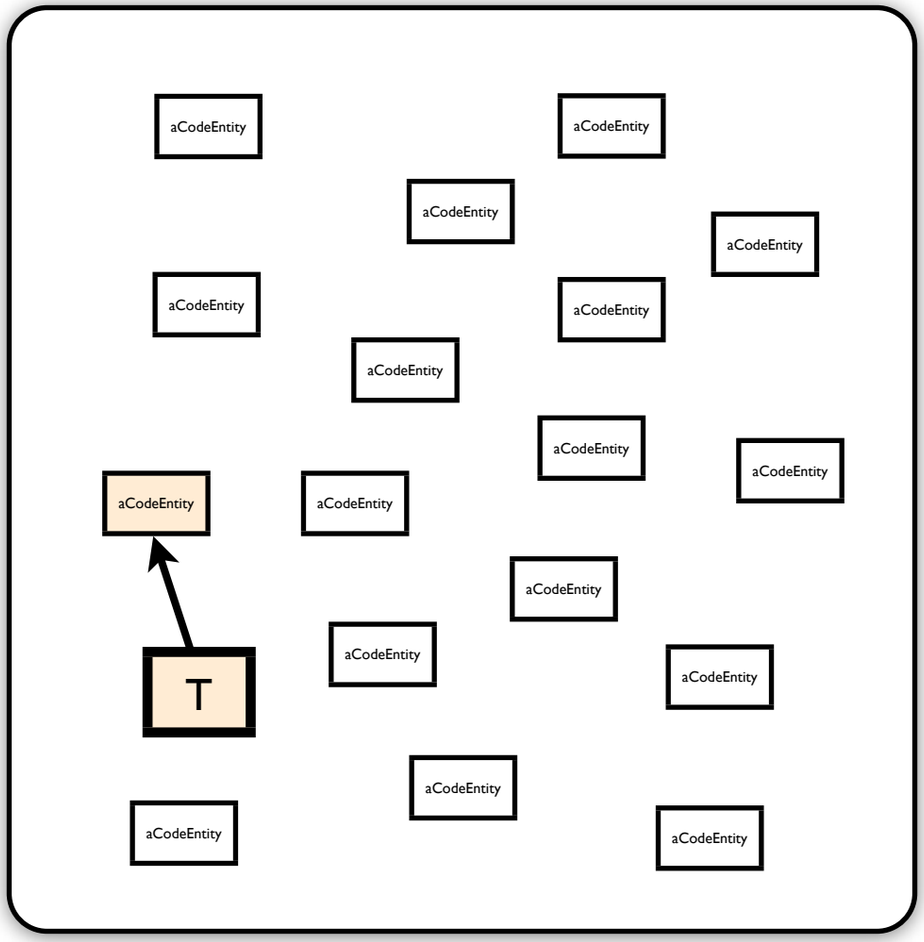
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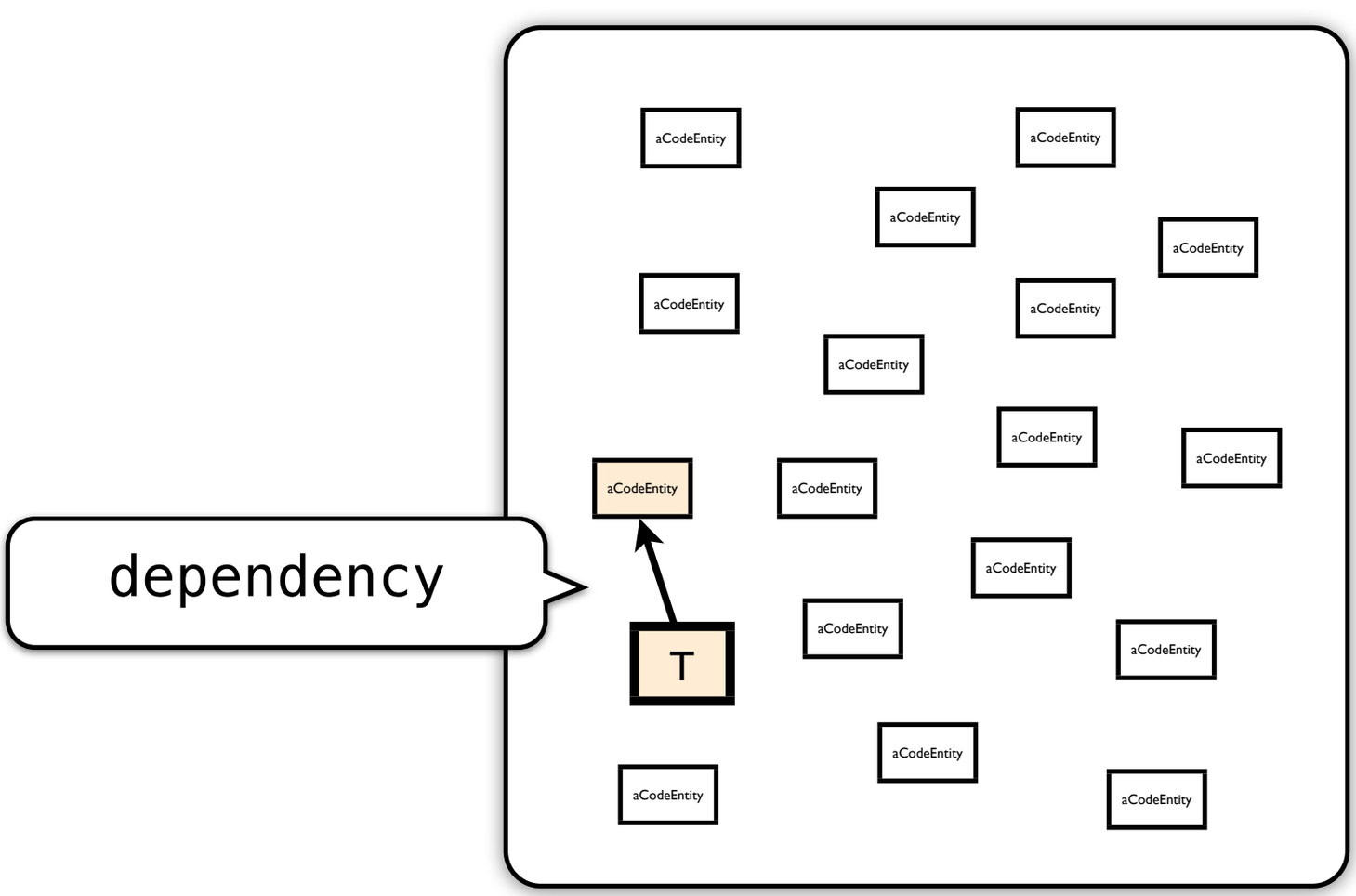
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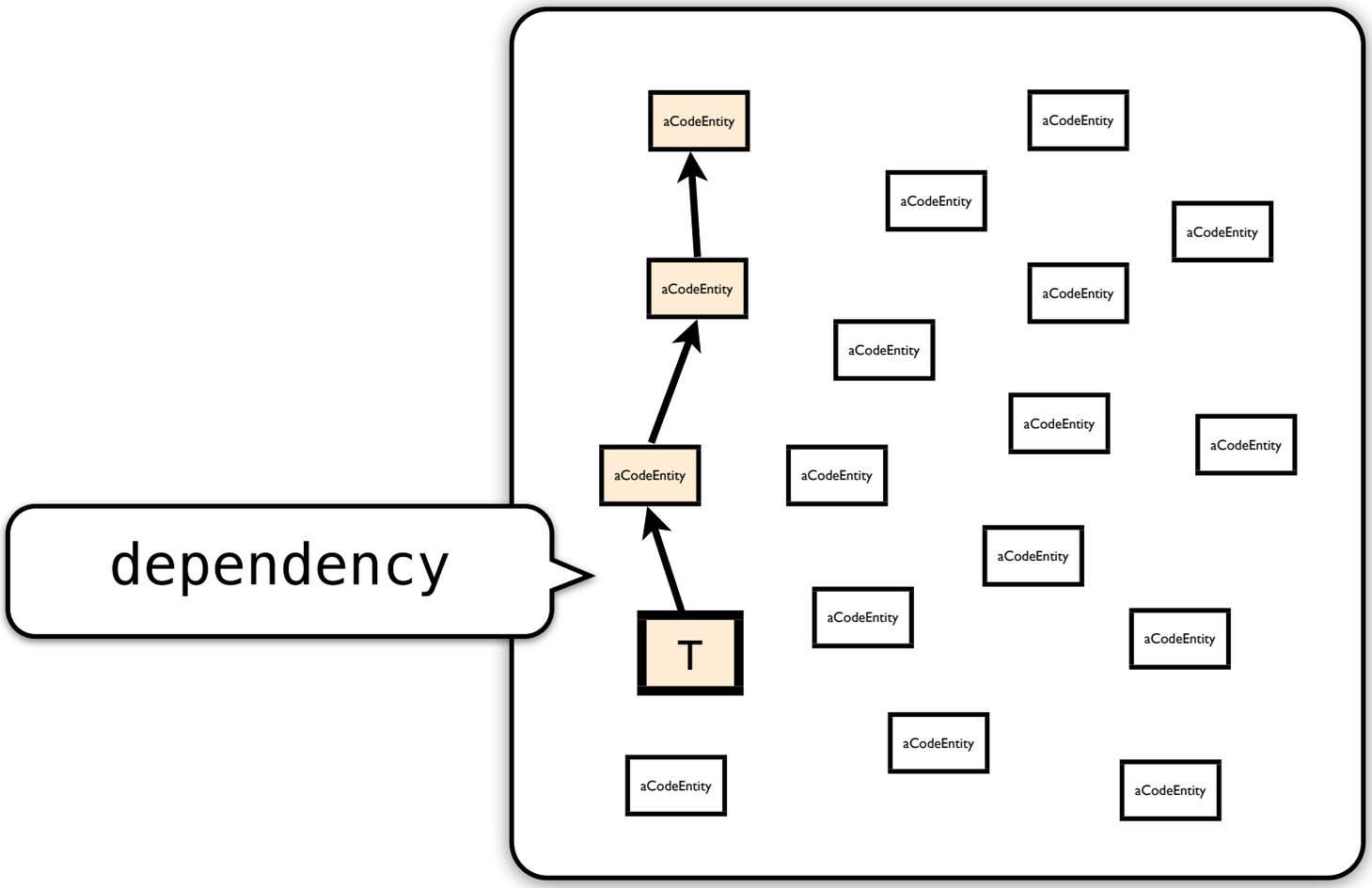
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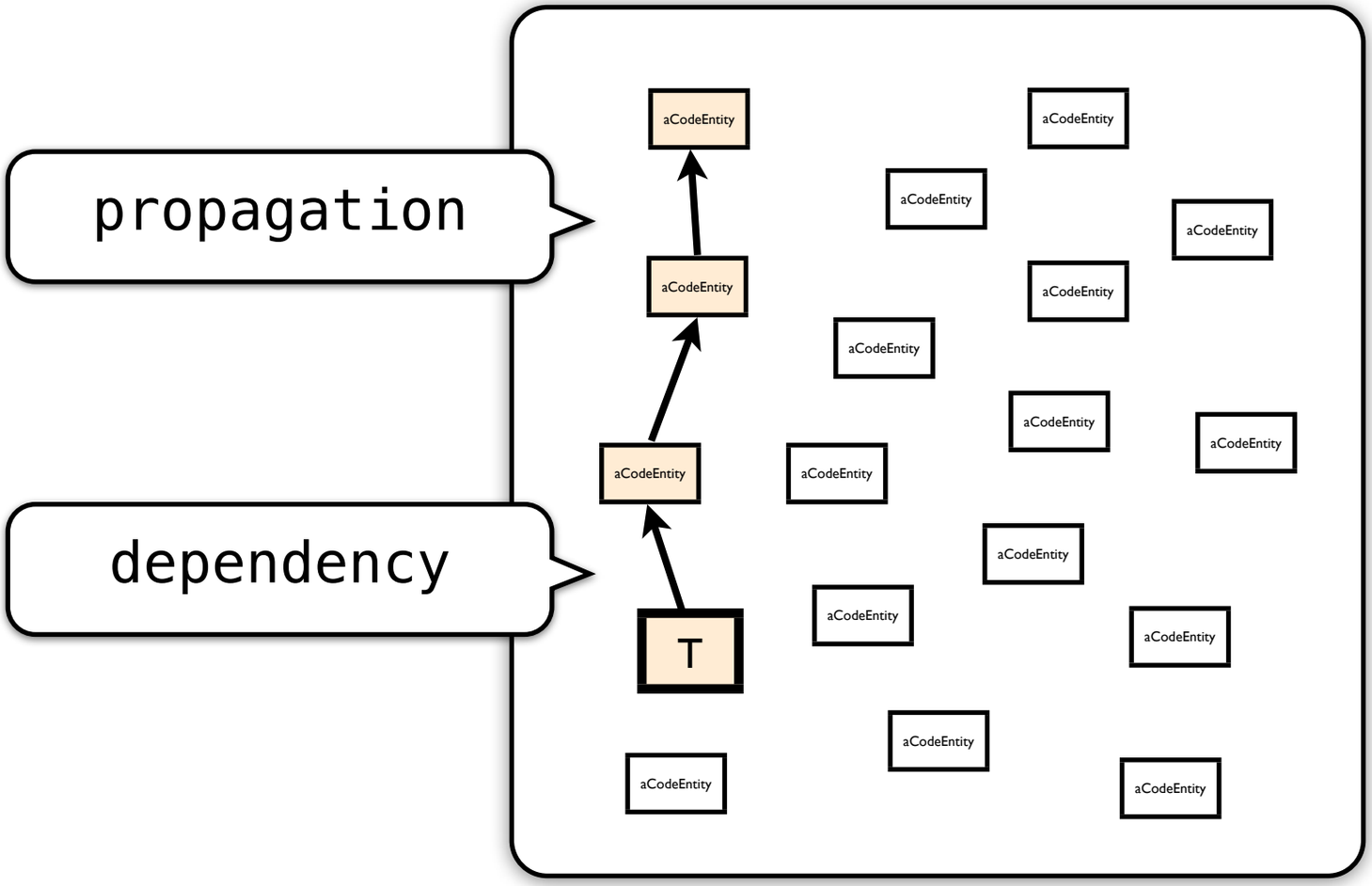
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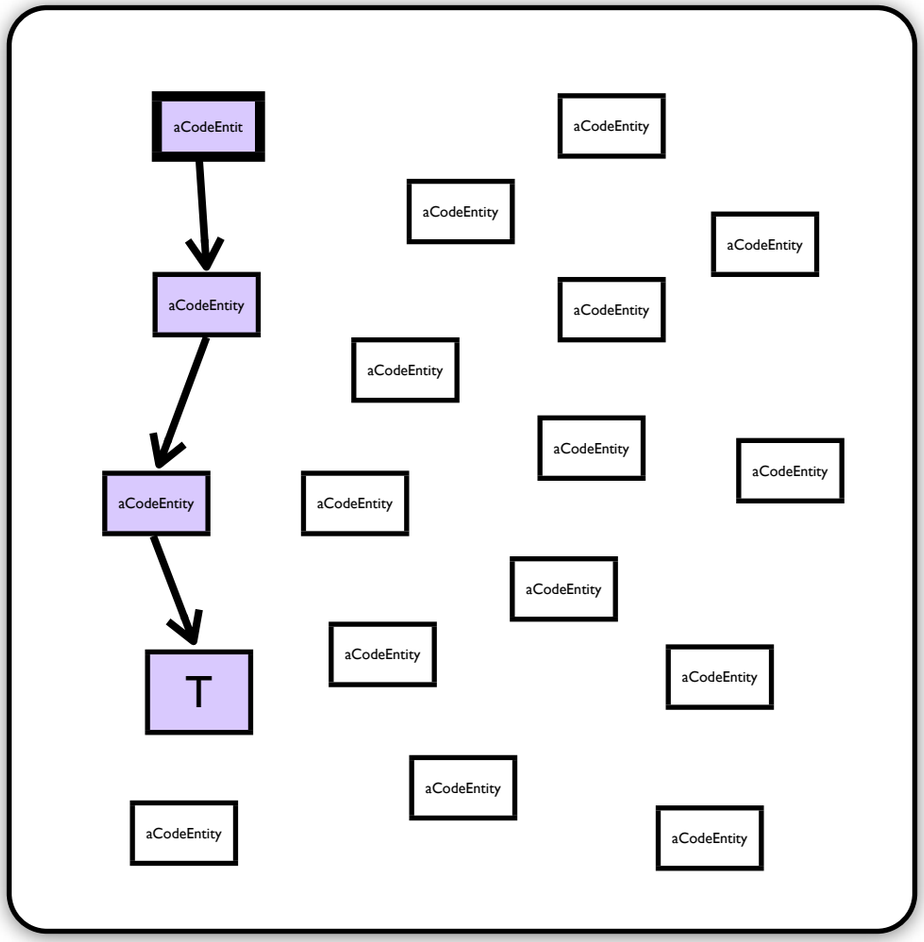
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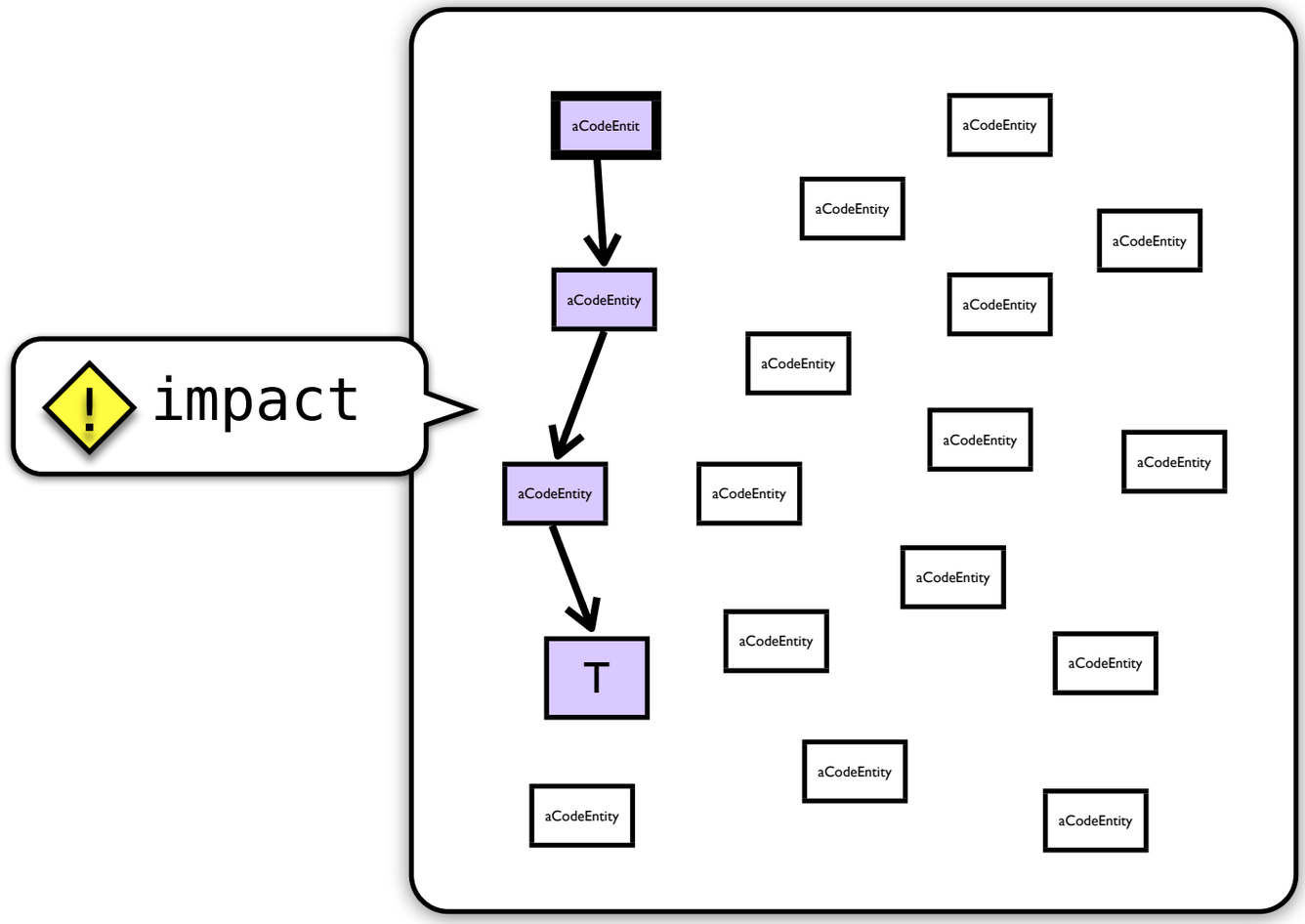
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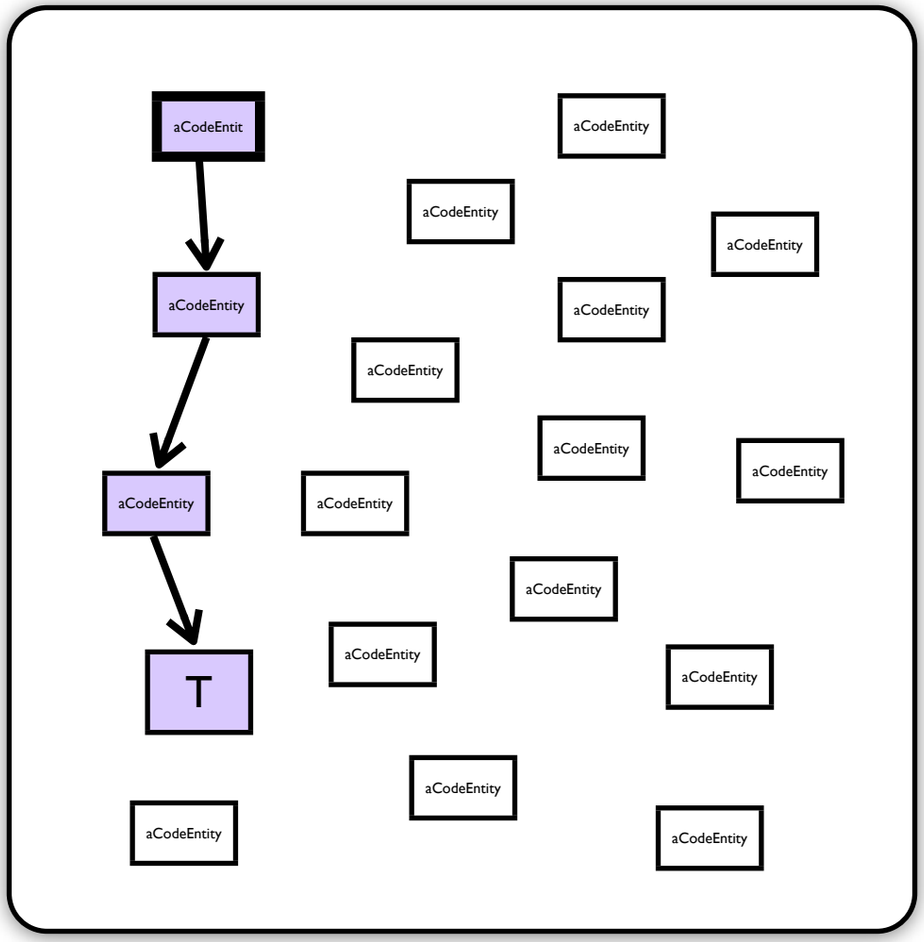
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Example (cont.)

ReadStream

```
next: anInteger
    "Answer the next anInteger elements of my collection."

    | answer endPosition |

    endPosition := position + anInteger min: readLimit.
    answer := collection copyFrom: position+1 to: endPosition.
    position := endPosition.

    ^answer
```

ReadStream

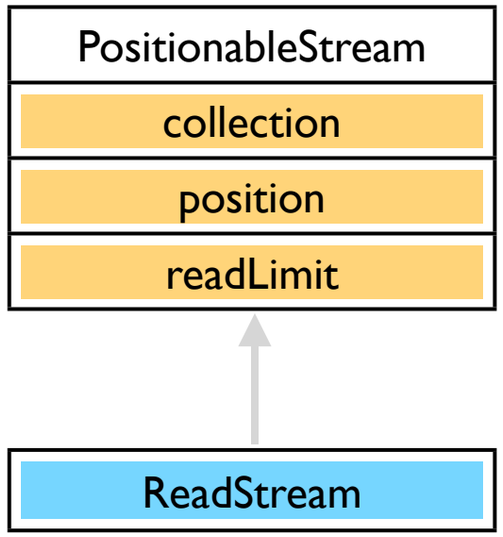
ReadStream

```
next: anInteger
    "Answer the next anInteger elements of my collection."

    | answer endPosition |

    endPosition := position + anInteger min: readLimit.
    answer := collection copyFrom: position+1 to: endPosition.
    position := endPosition.

    ^answer
```



ReadStream

```
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    "Answer the next anInteger elements of my collection."

    | answer endPosition |

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    position := endPosition.

    ^answer
```

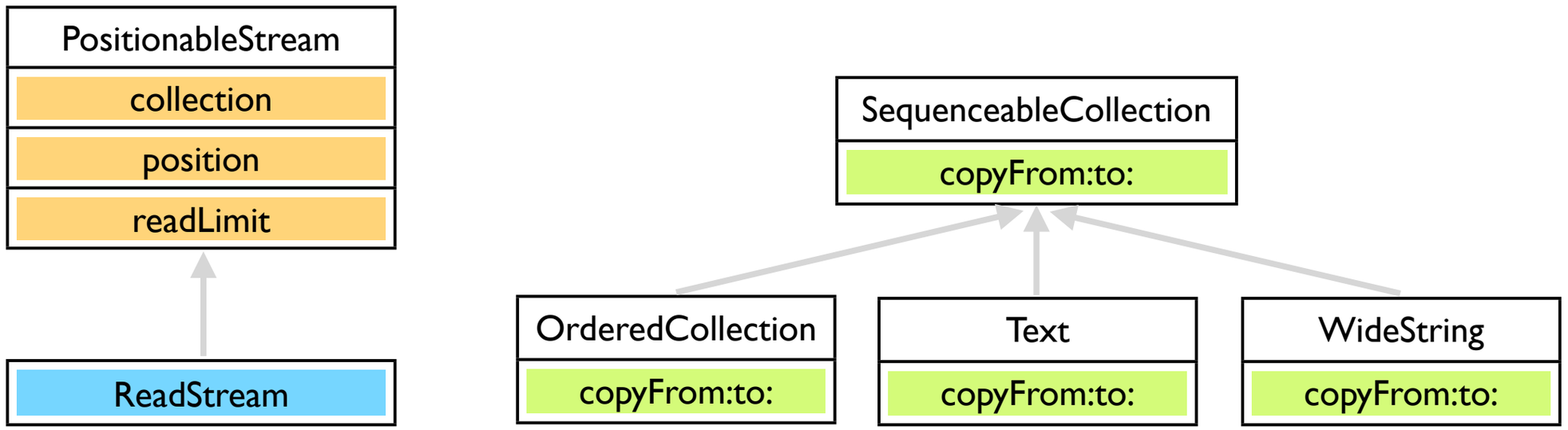

ReadStream

```
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    | answer endPosition |

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    ^answer
```

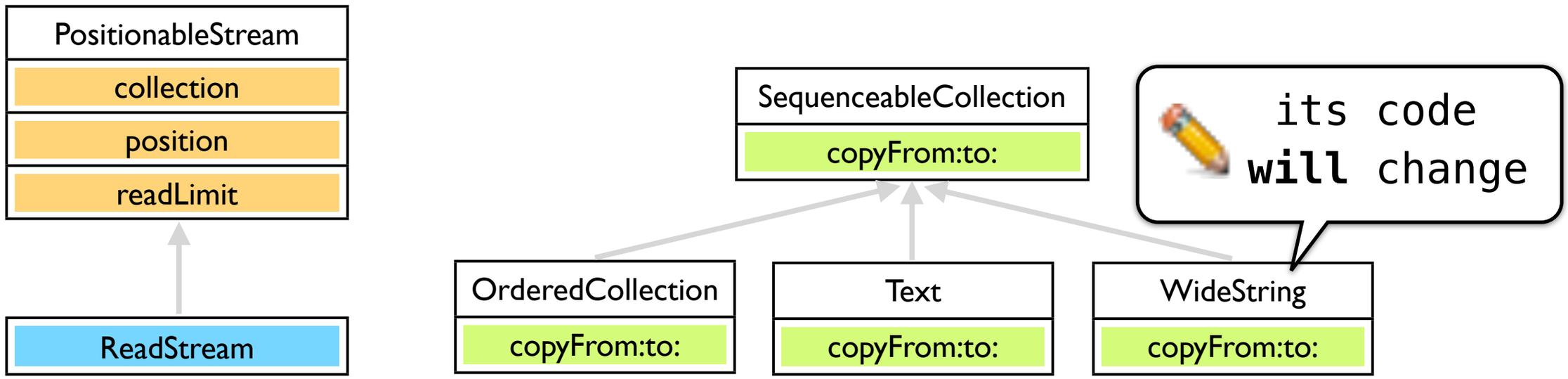

ReadStream

```
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    | answer endPosition |

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    answer := collection copyFrom: position+1 to: endPosition.
    position := endPosition.

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```
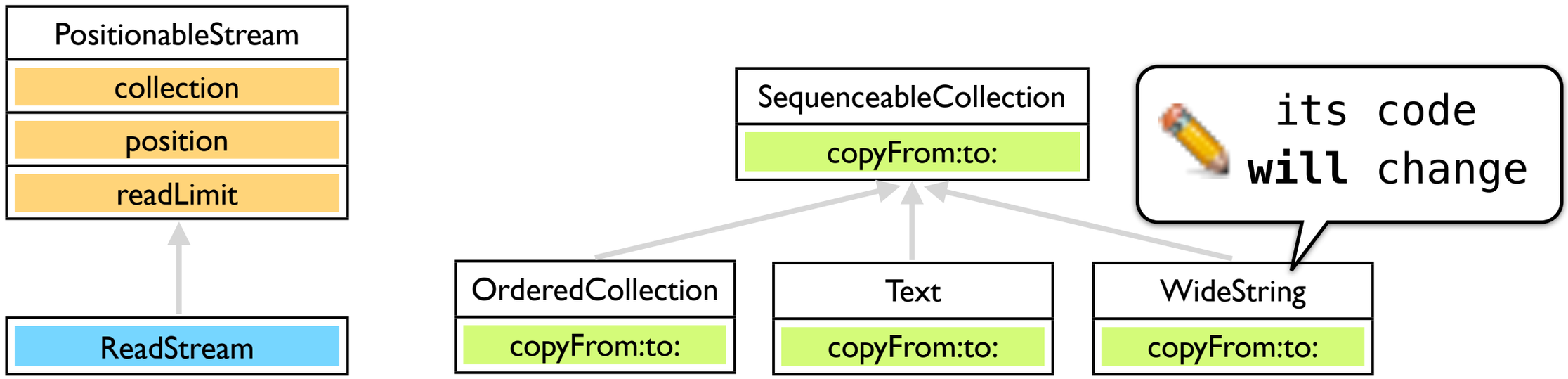
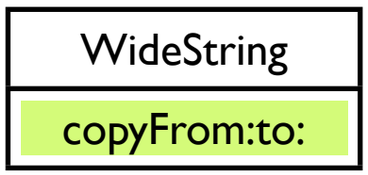



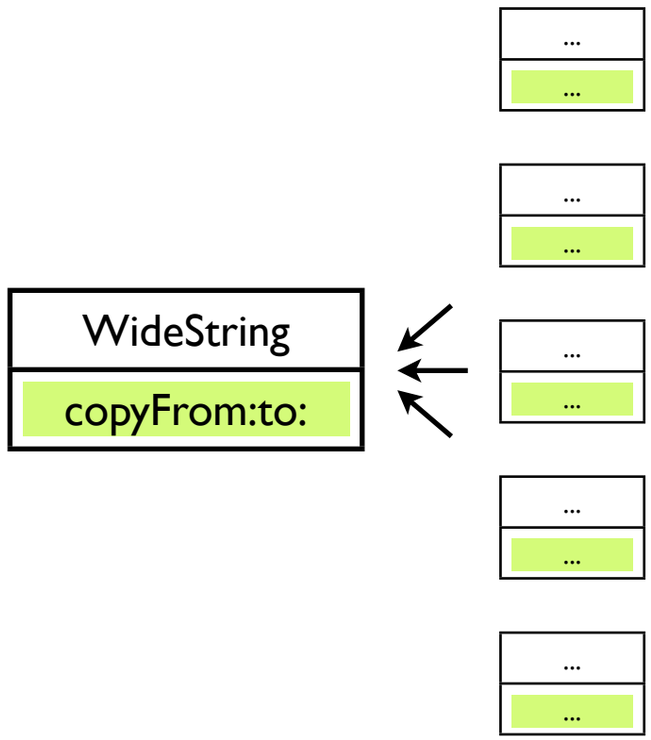
ReadStream

```
next: anInteger
    "Answer the next anInteger elements of my collection."

    | answer endPosition |

    endPosition := position + anInteger min: readLimit.
    answer := collection copyFrom: position+1 to: endPosition.
    position := endPosition.

    ^answer
```

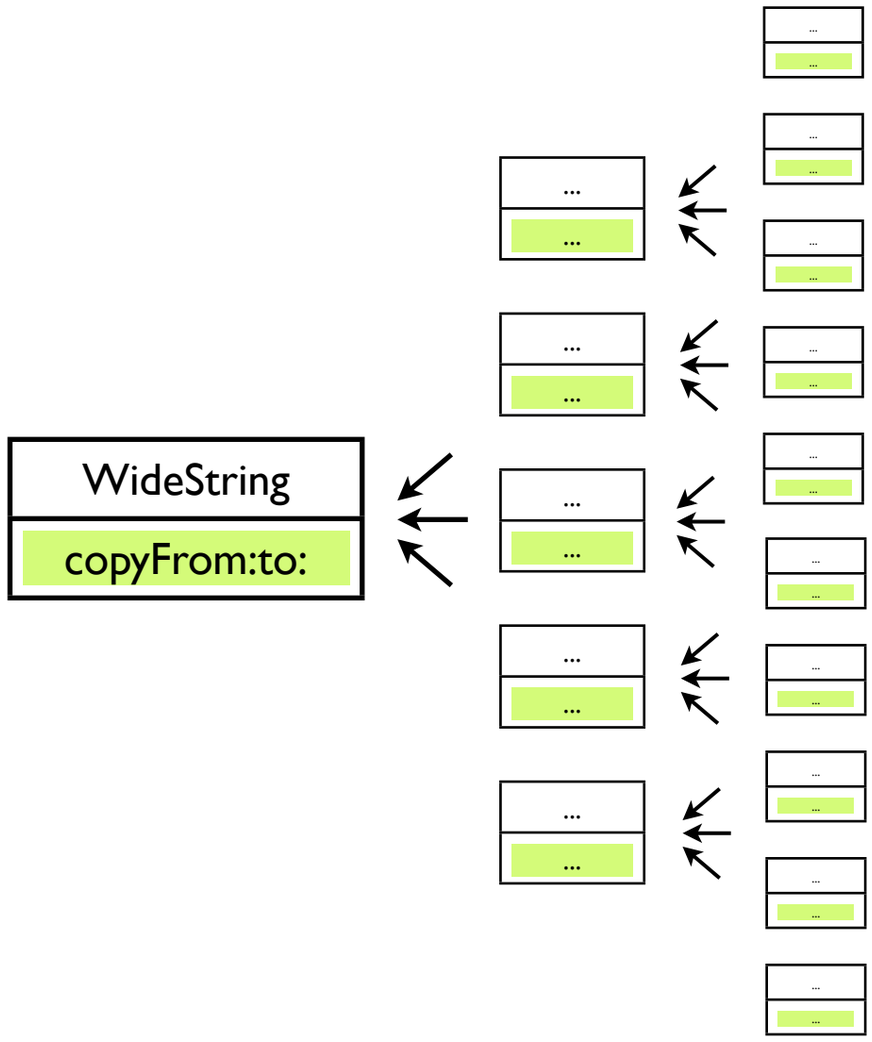
Transitive Senders



Transitive Senders



Transitive Senders



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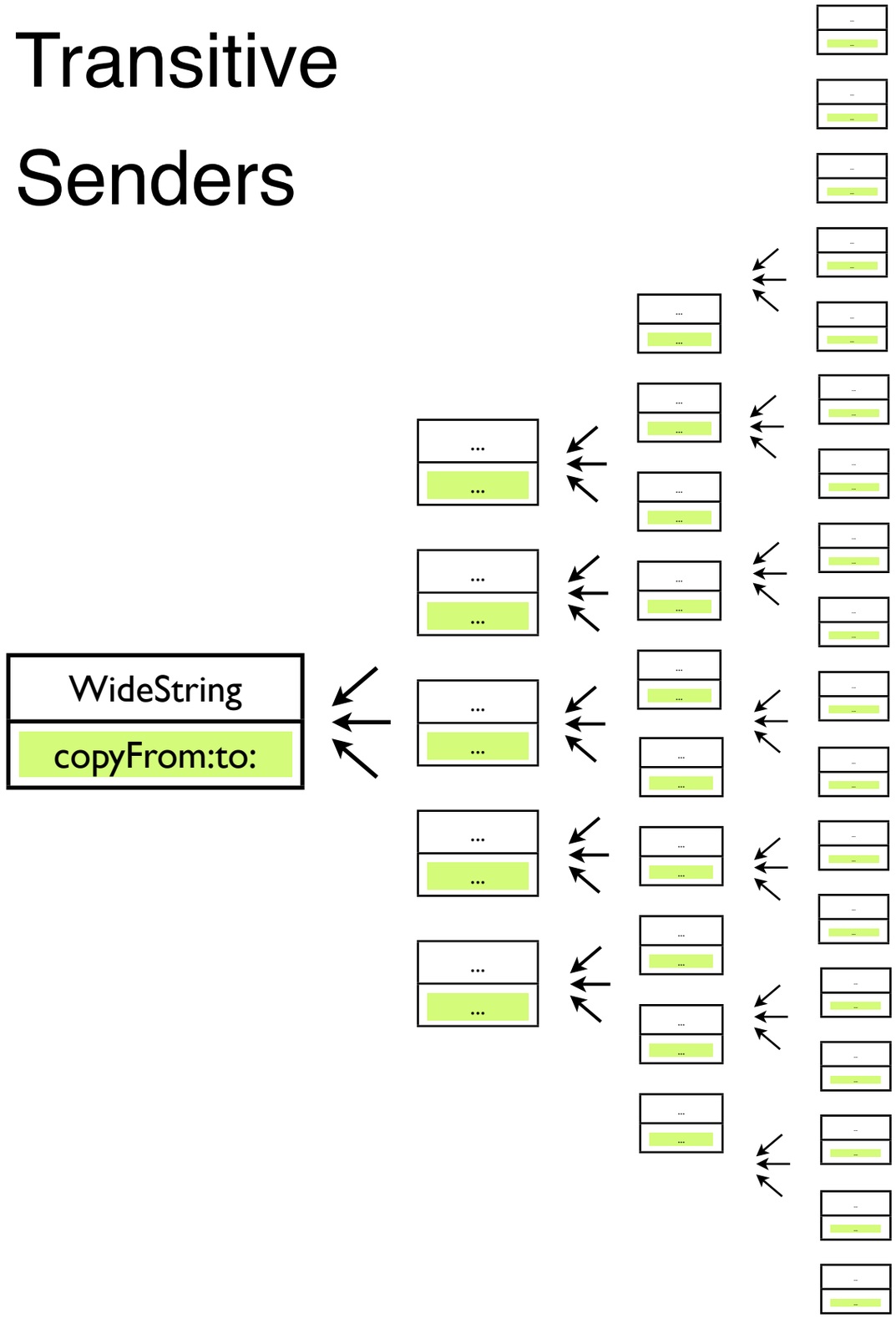
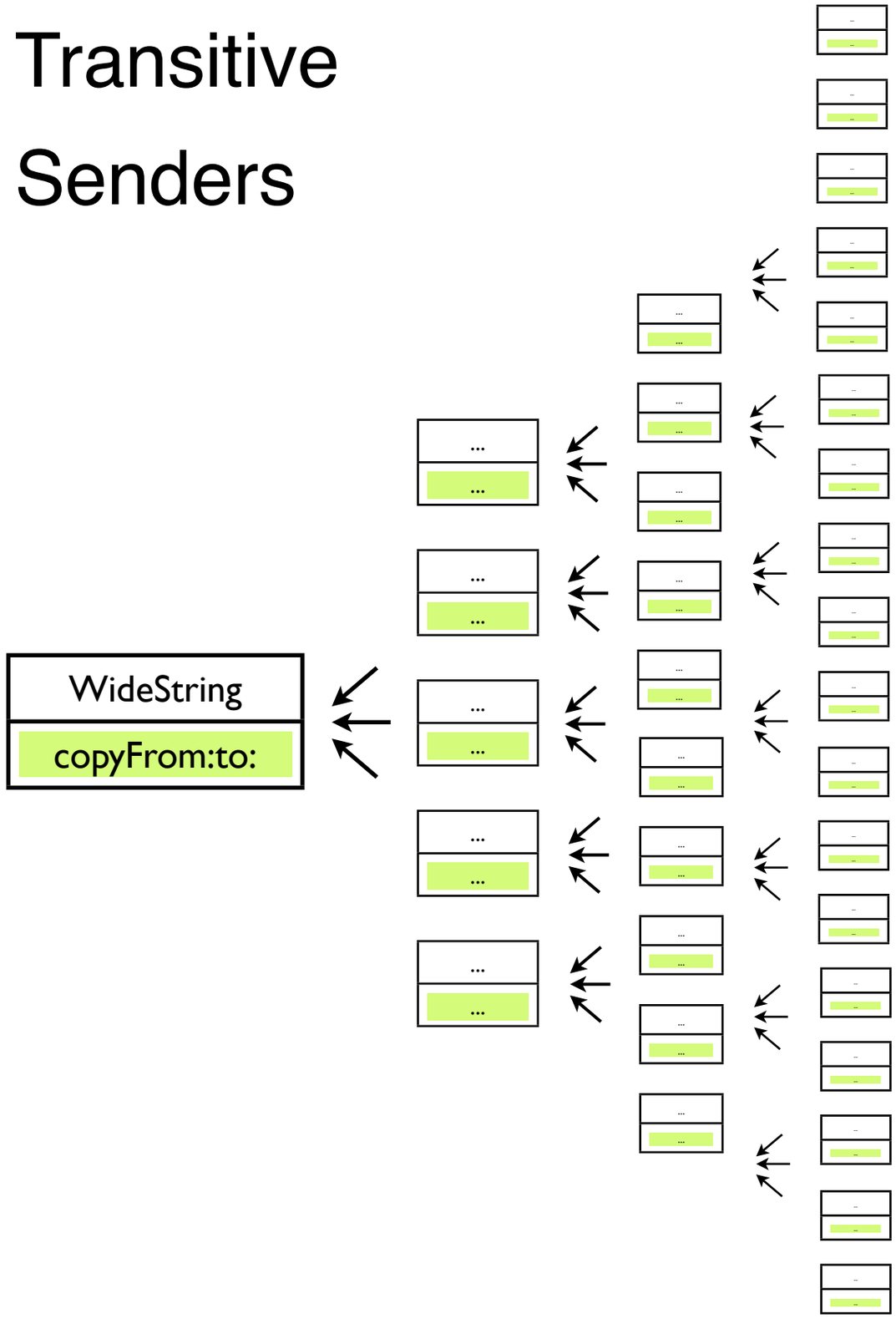
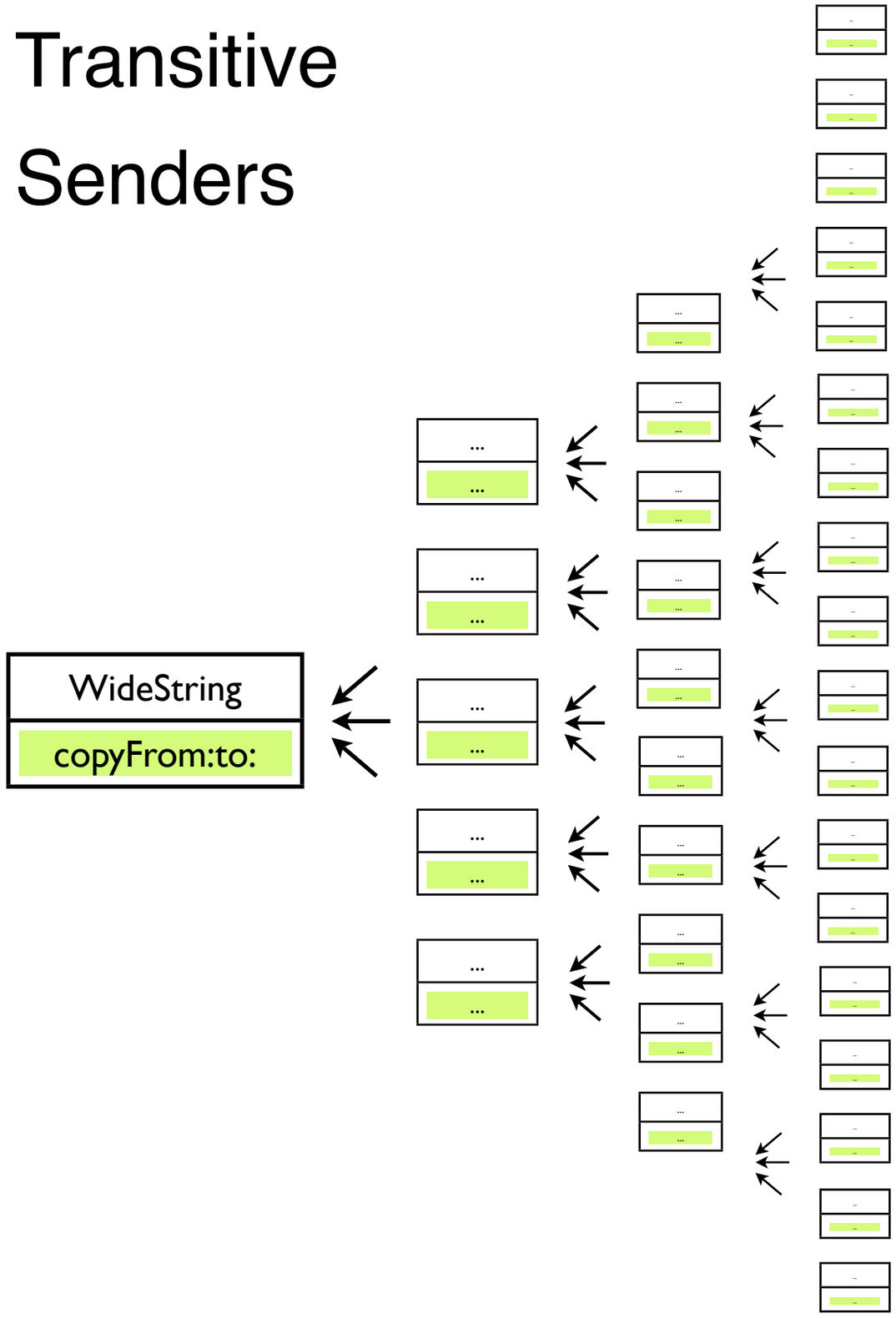


Transitive Senders



8155 tests

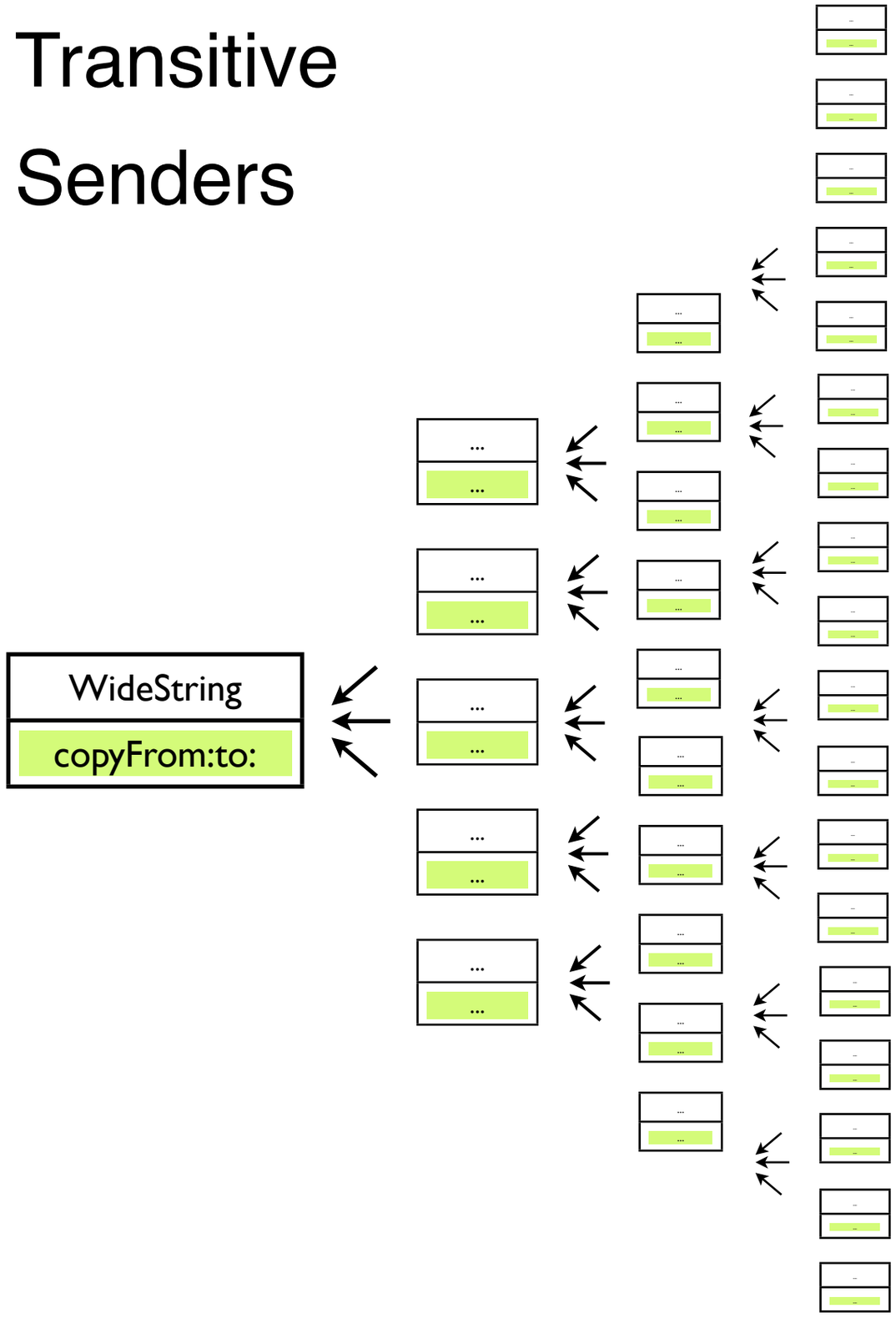
Transitive Senders



8155 tests

8203 tests total

Transitive Senders

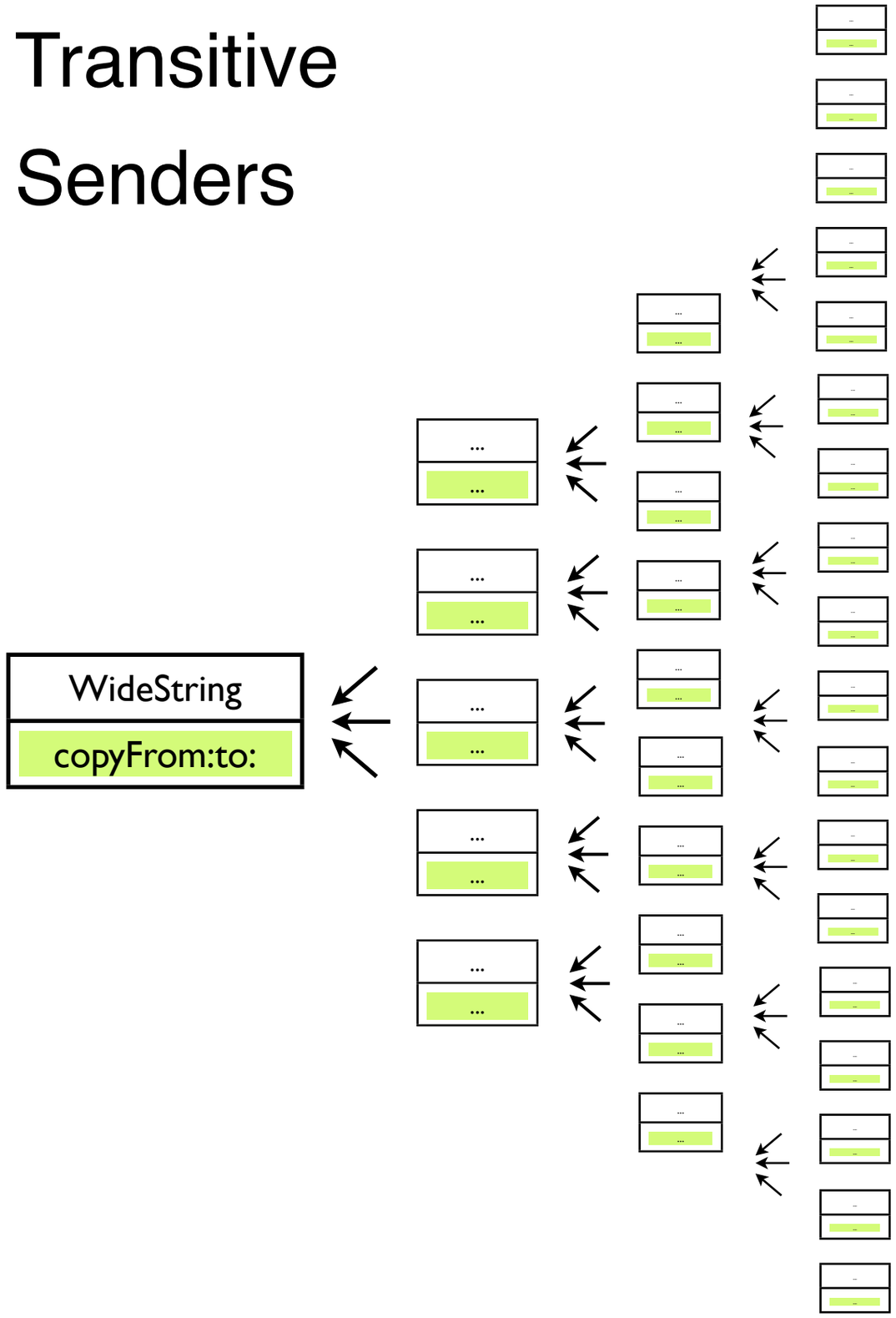


8155 tests

8203 tests total

⇒

Transitive Senders



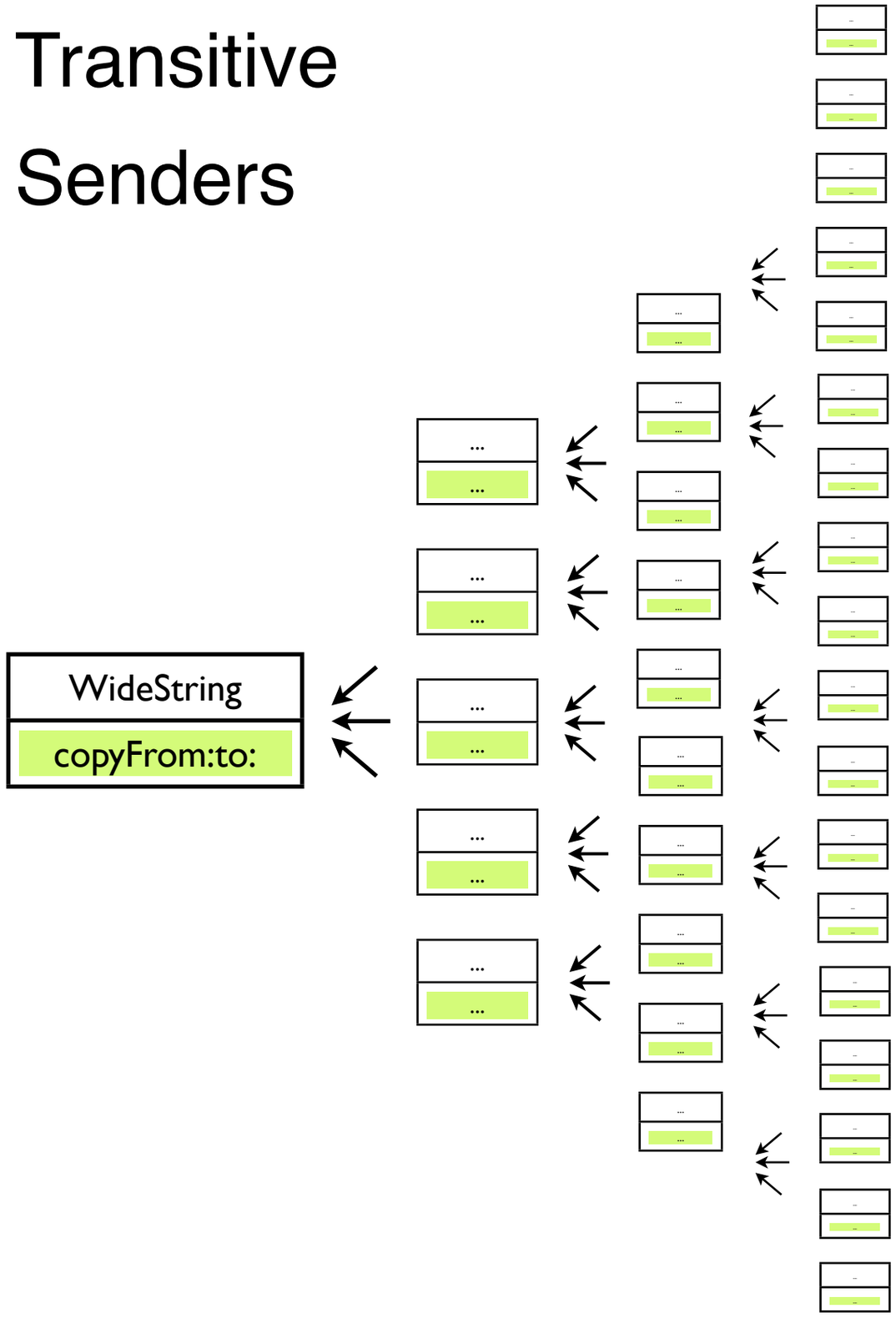
8155 tests

8203 tests total

⇒

99.4% tests impacted

Transitive Senders



8155 tests

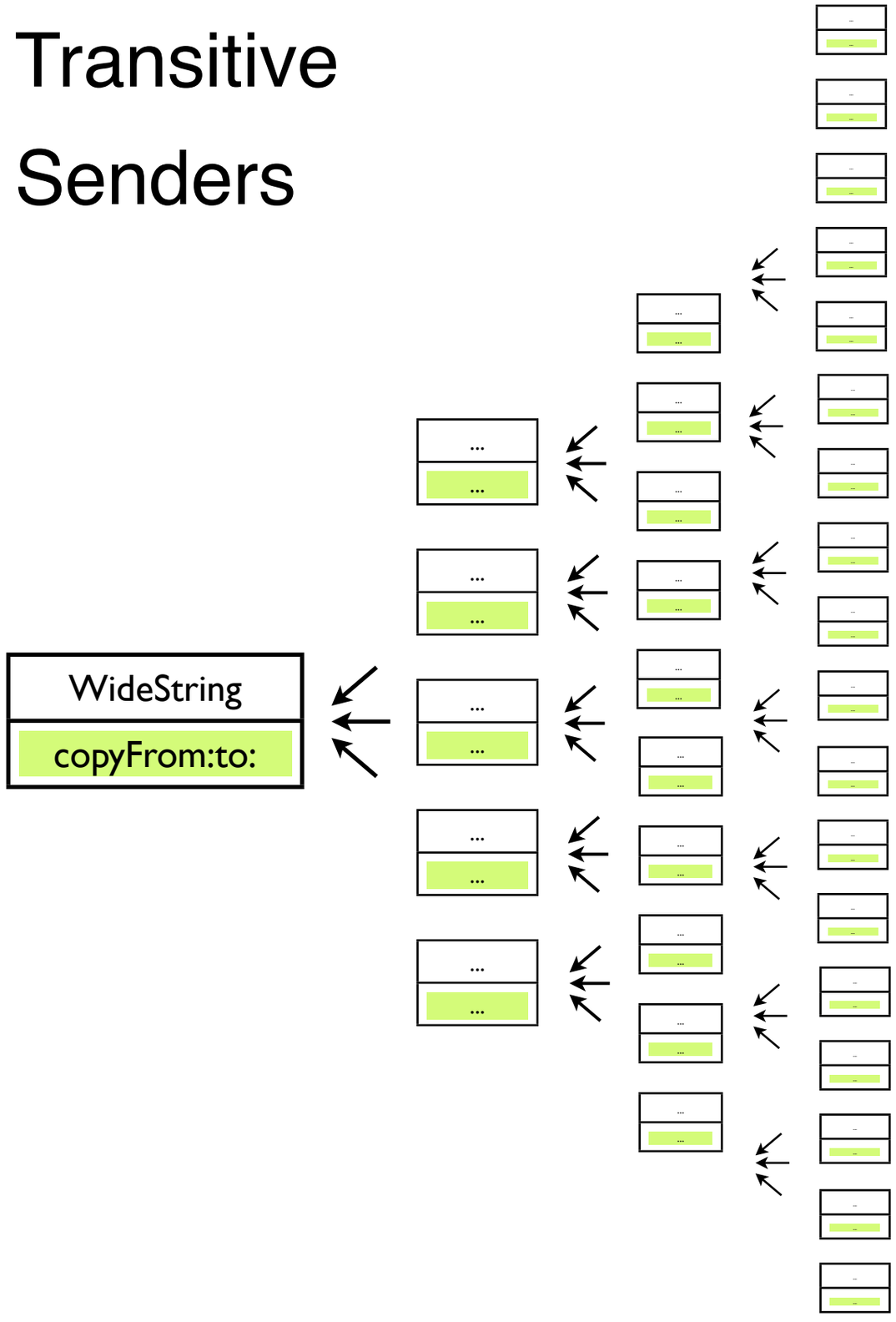
8203 tests total

⇒

99.4% tests impacted

59875 methods

Transitive Senders



8155 tests

8203 tests total

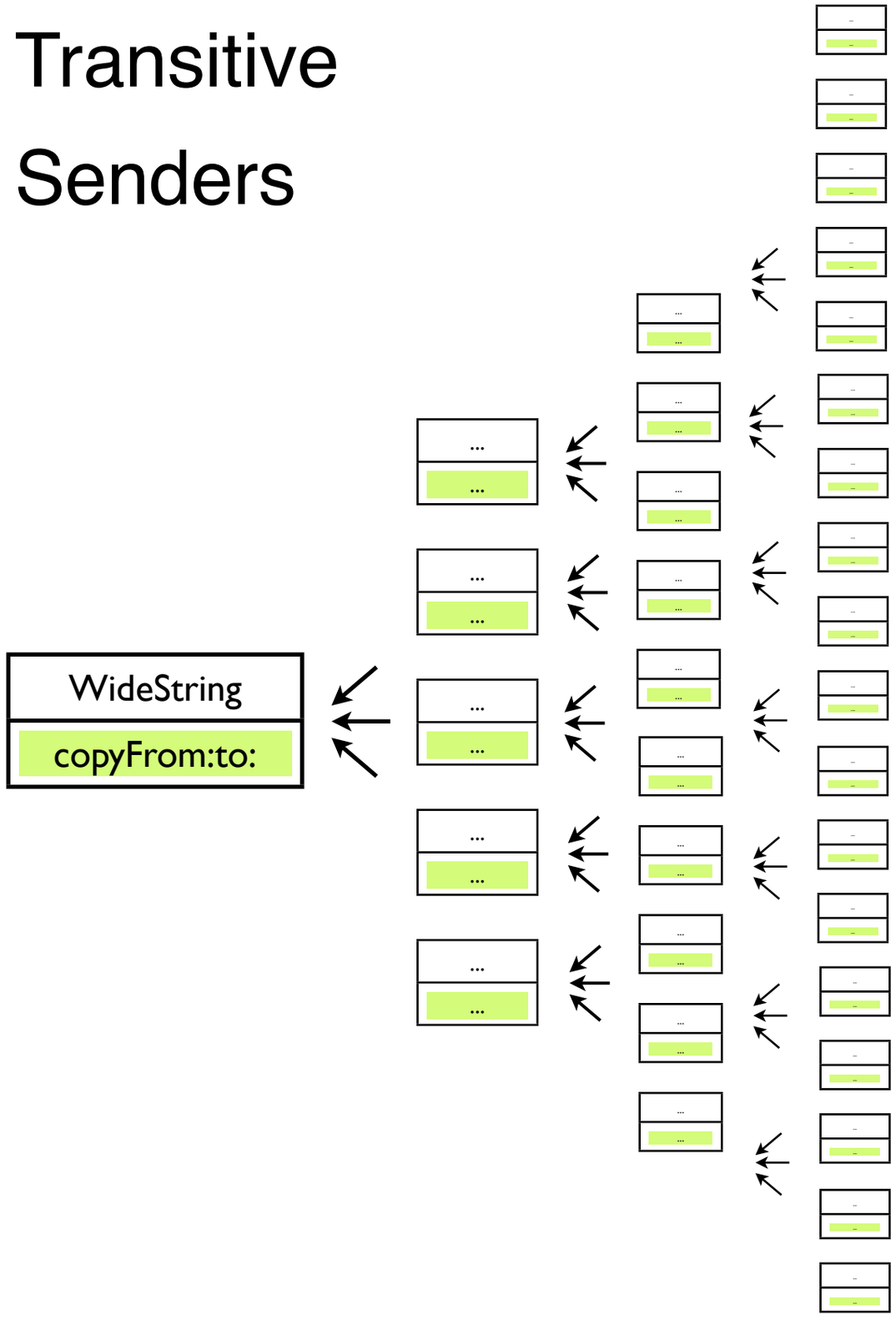
⇒

99.4% tests impacted

59875 methods

74697 methods total

Transitive Senders



8155 tests

8203 tests total

⇒

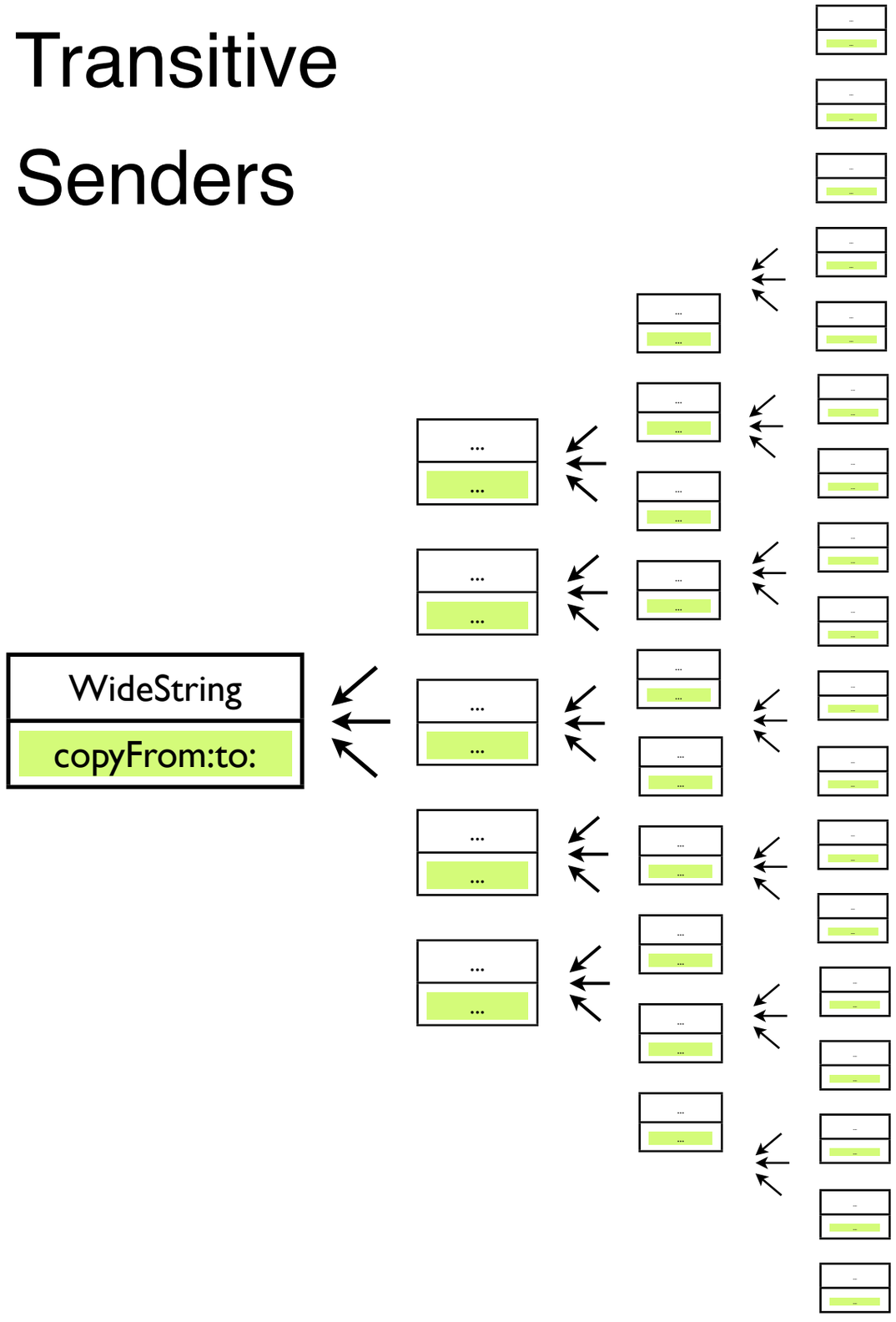
99.4% tests impacted

59875 methods

74697 methods total

⇒

Transitive Senders



8155 tests

8203 tests total

⇒

99.4% tests impacted

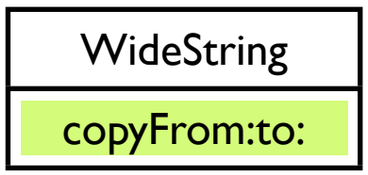
59875 methods

74697 methods total

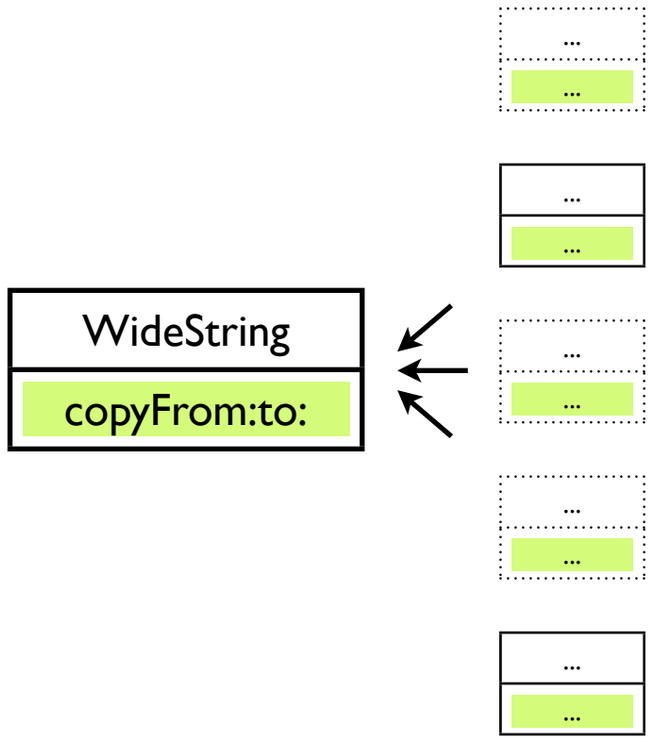
⇒

80.1% methods impacted

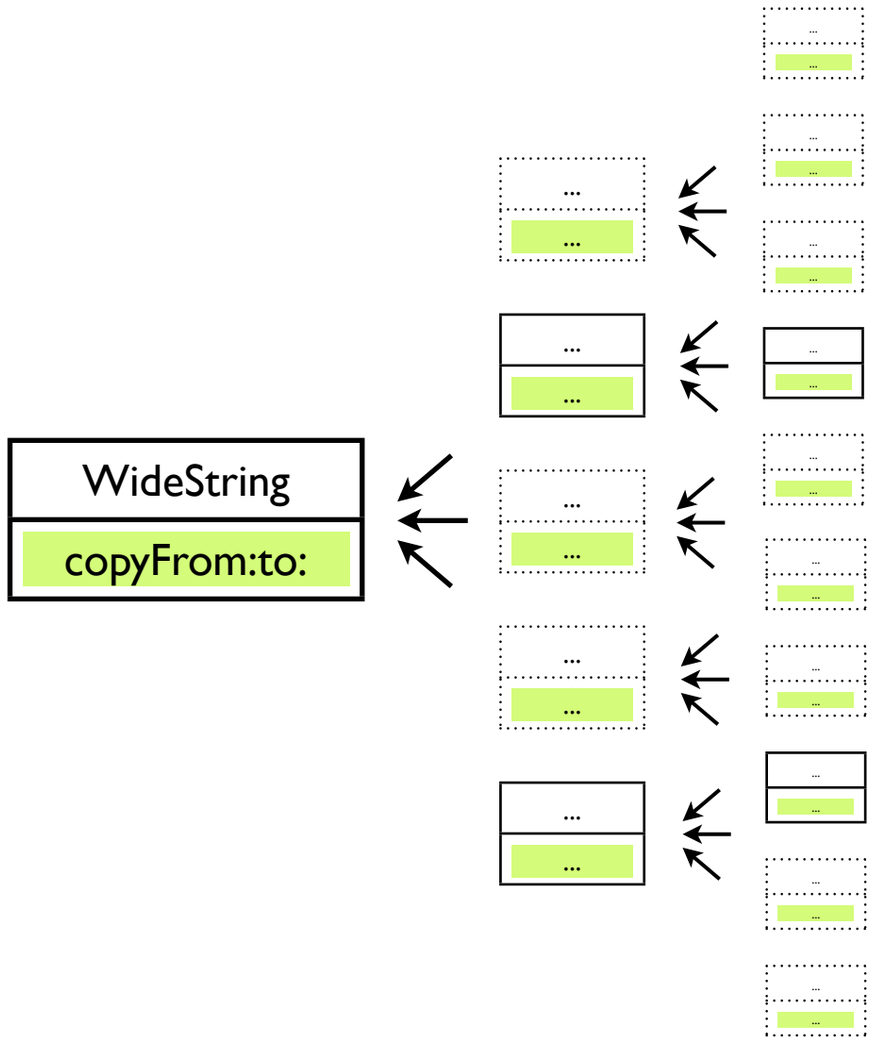
Running Tests



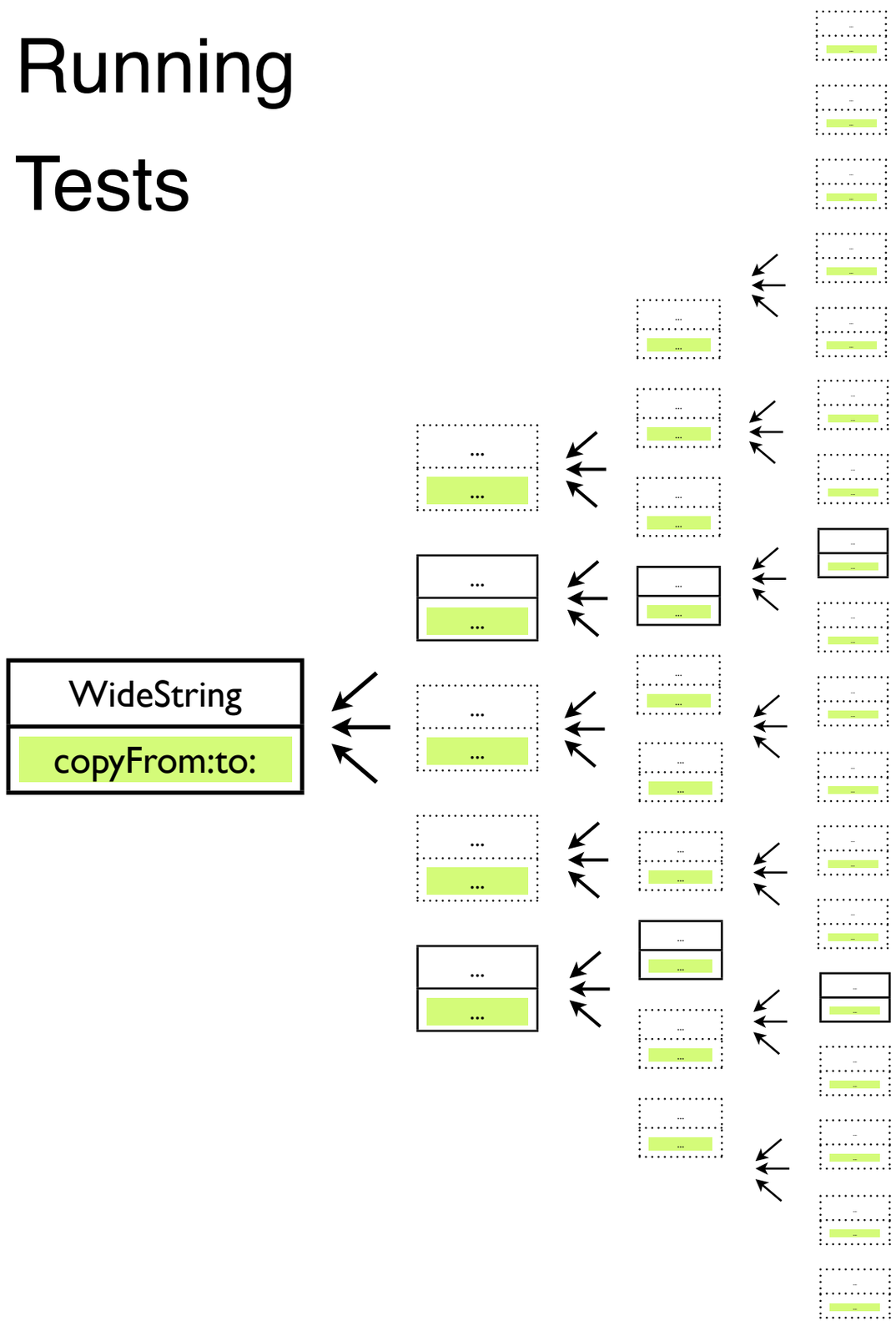
Running Tests



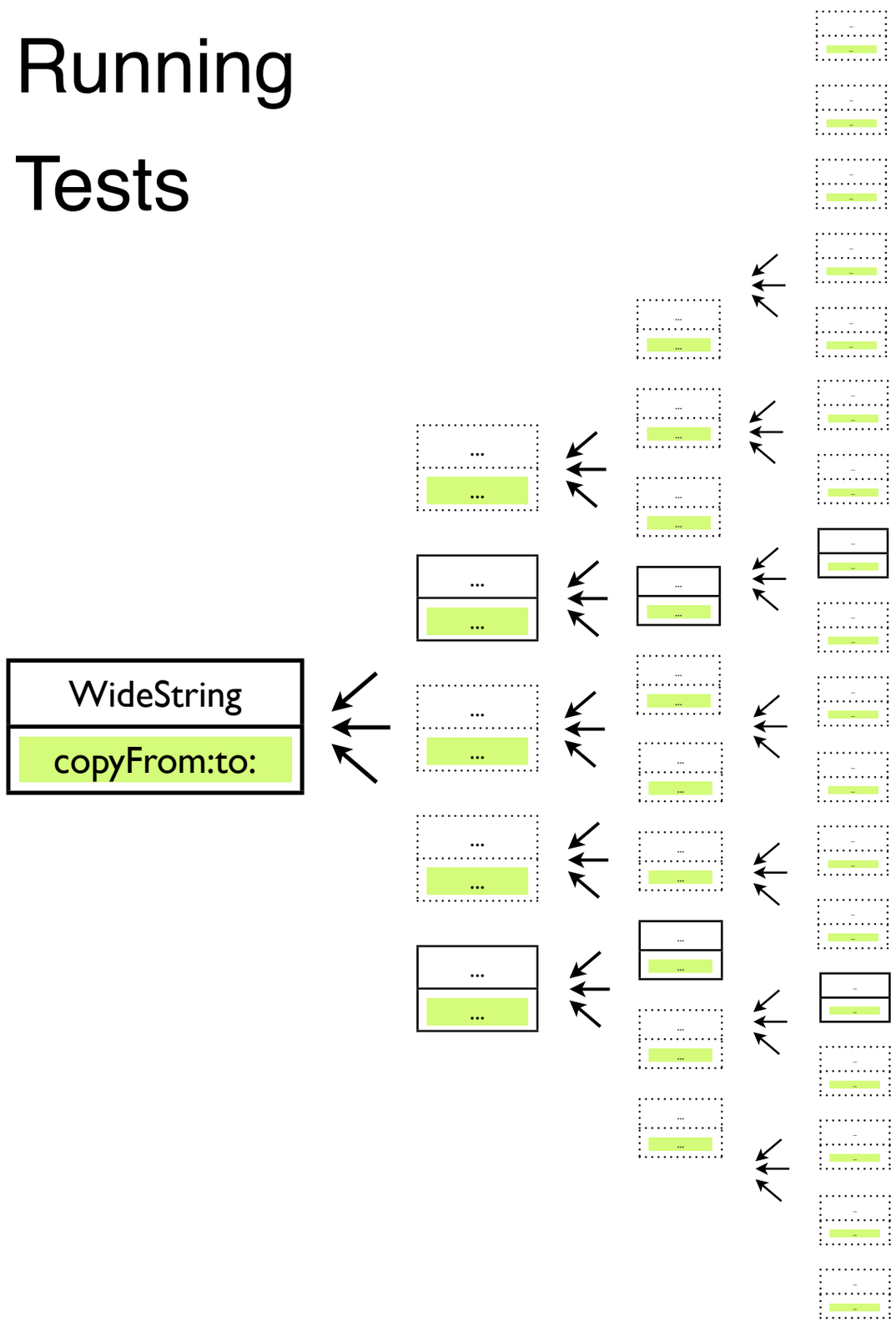
Running Tests



Running Tests

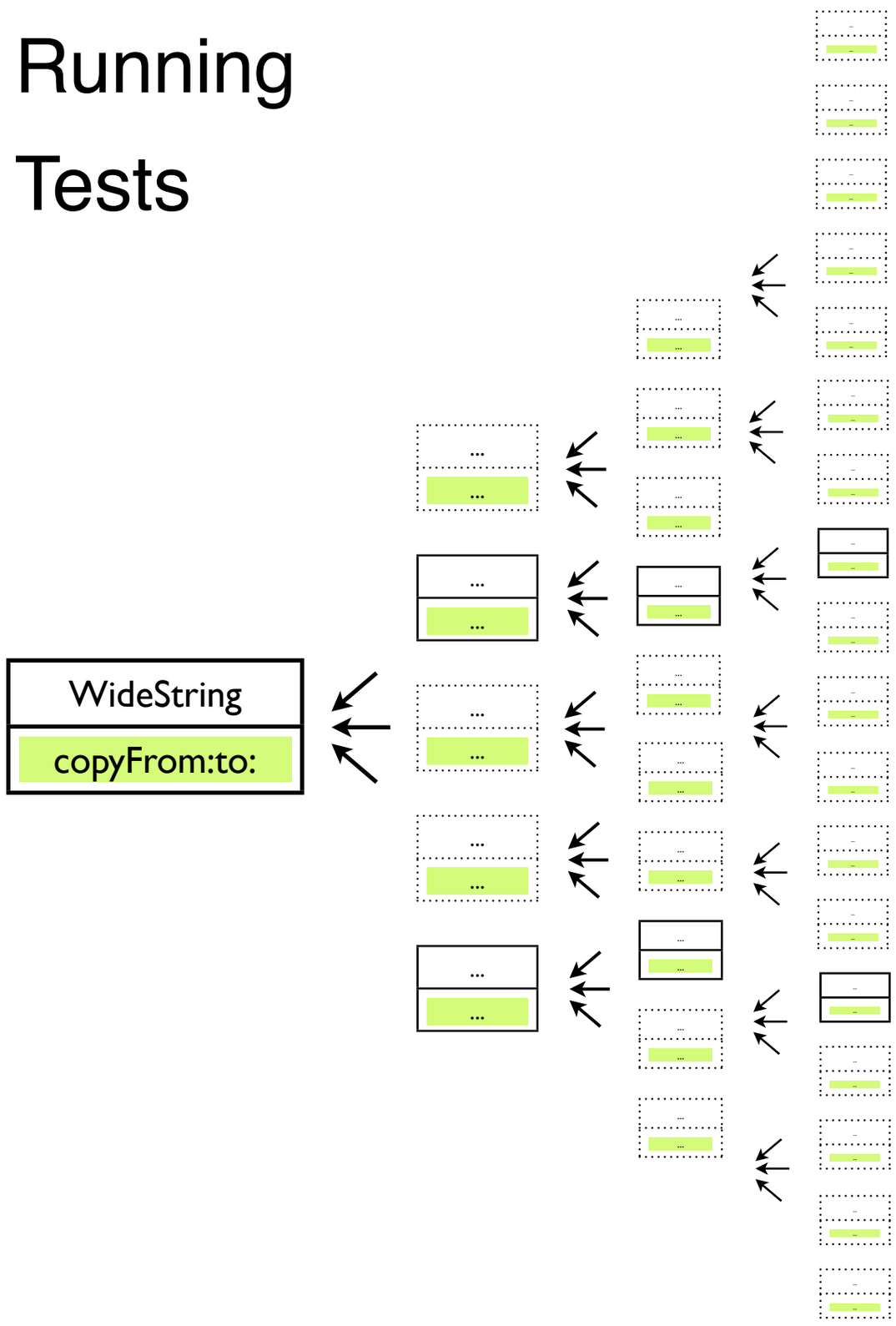


Running Tests



27 tests

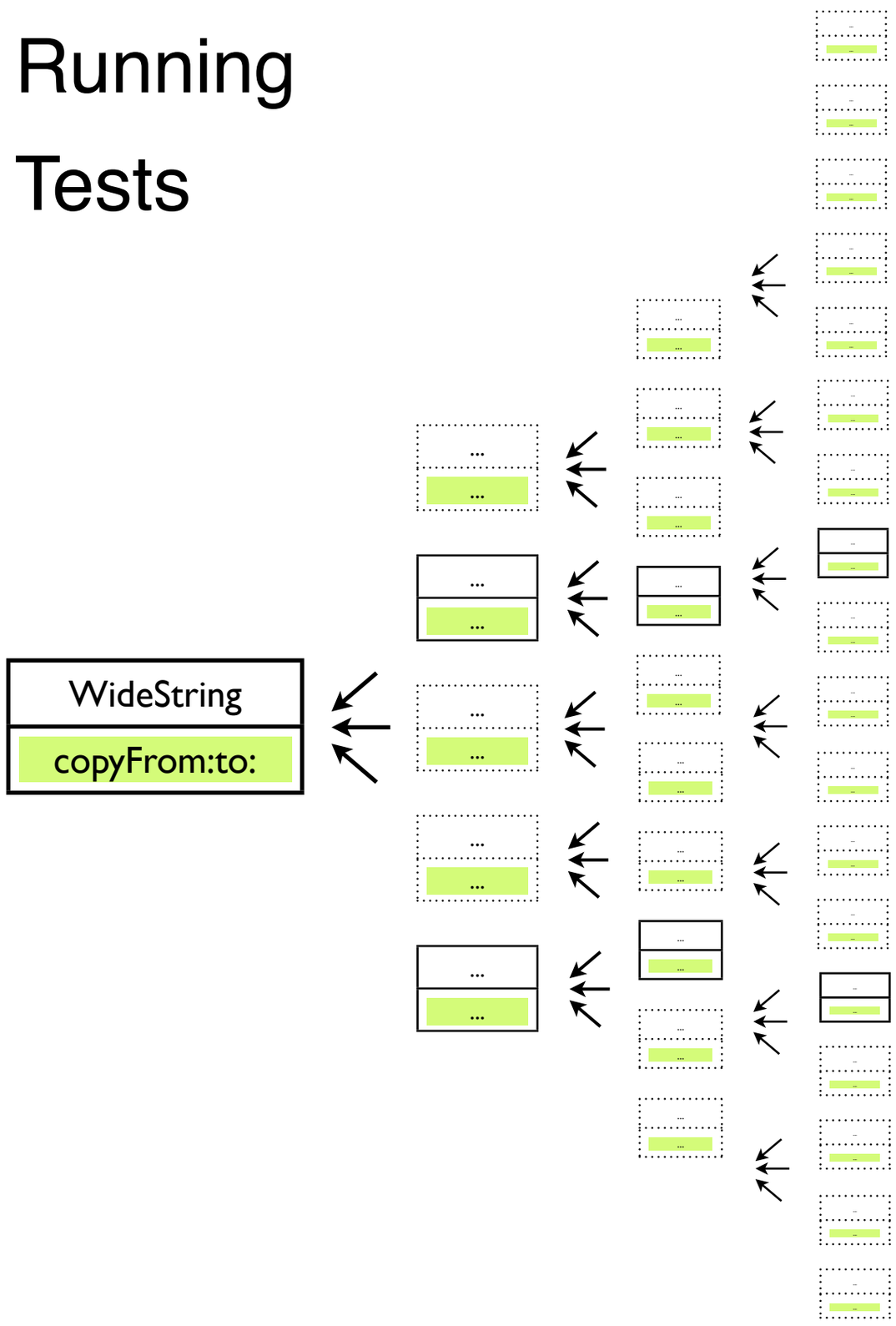
Running Tests



27 tests

8203 tests total

Running Tests

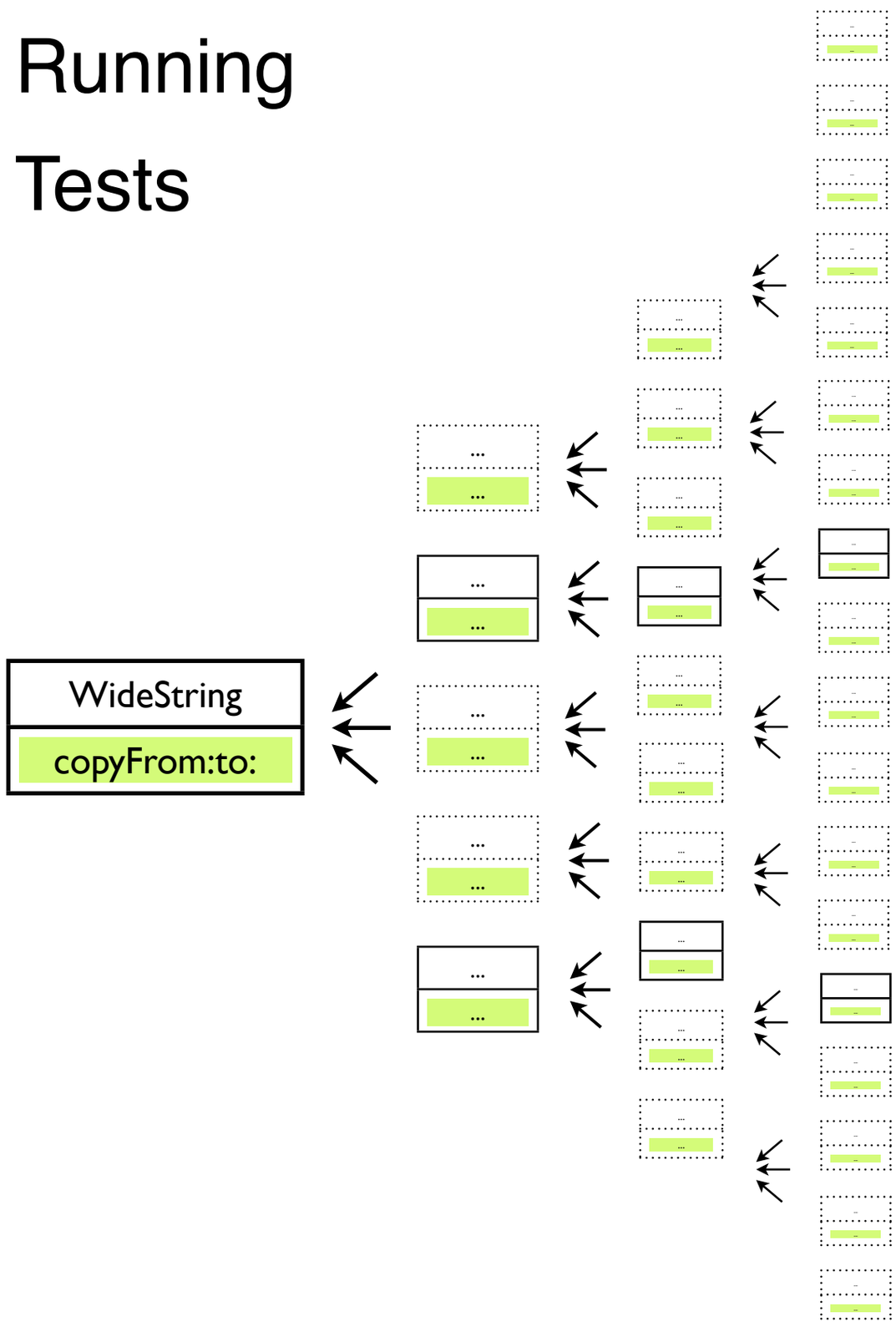


27 tests

8203 tests total

⇒

Running Tests



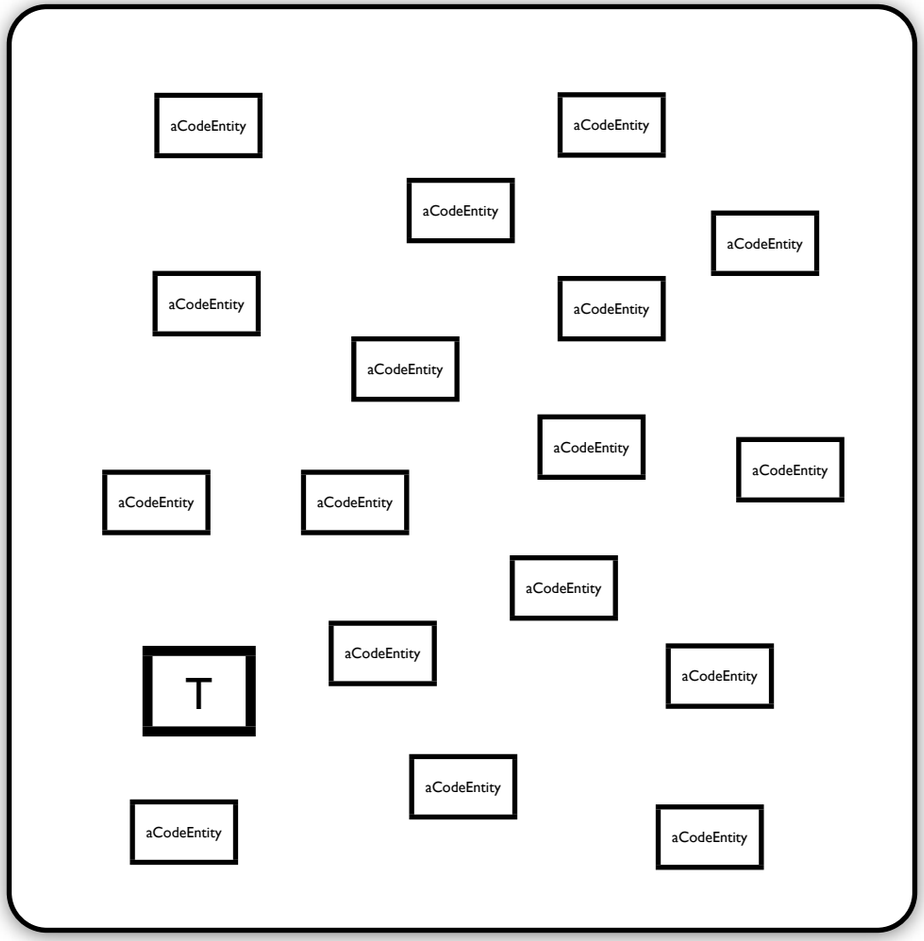
27 tests

8203 tests total

⇒

0.3% tests impacted

So, ideally...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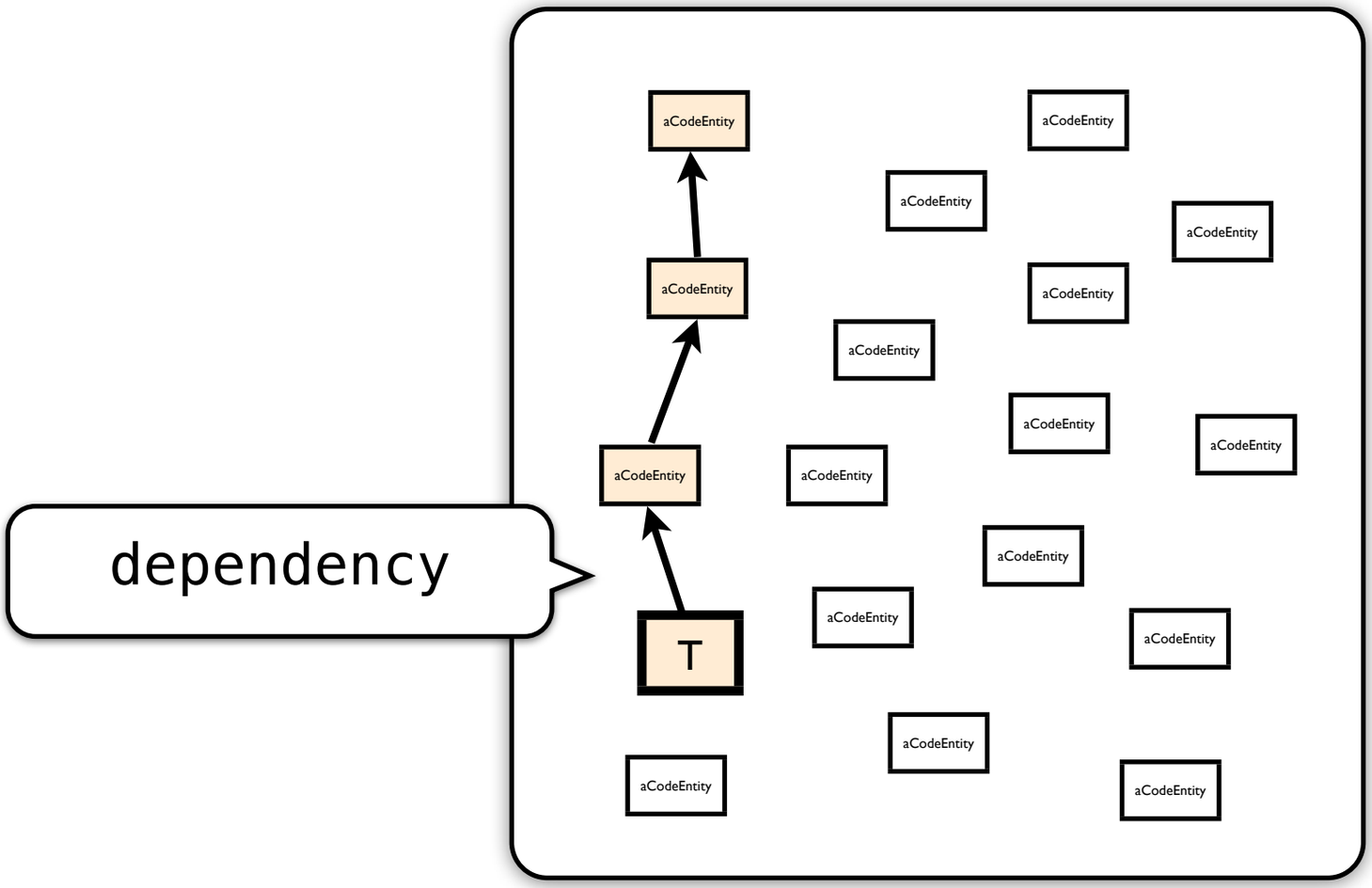
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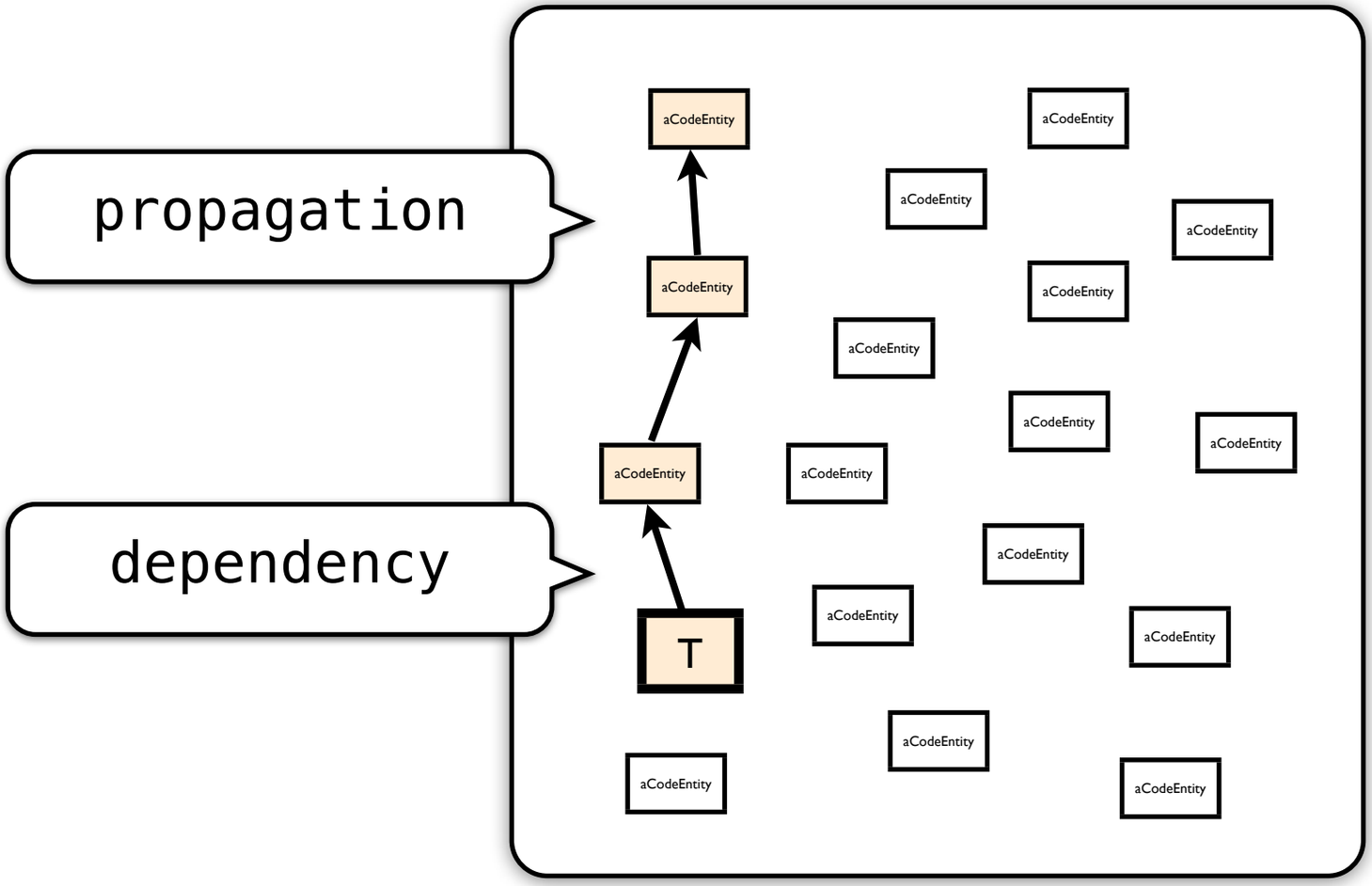
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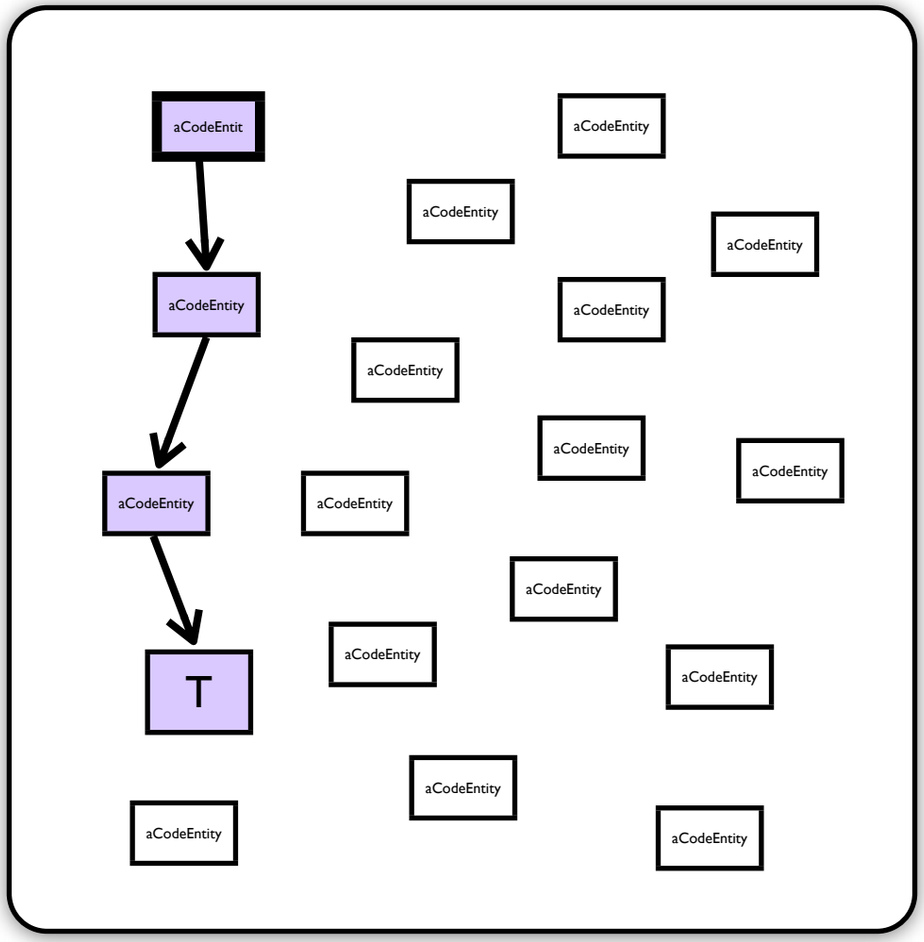
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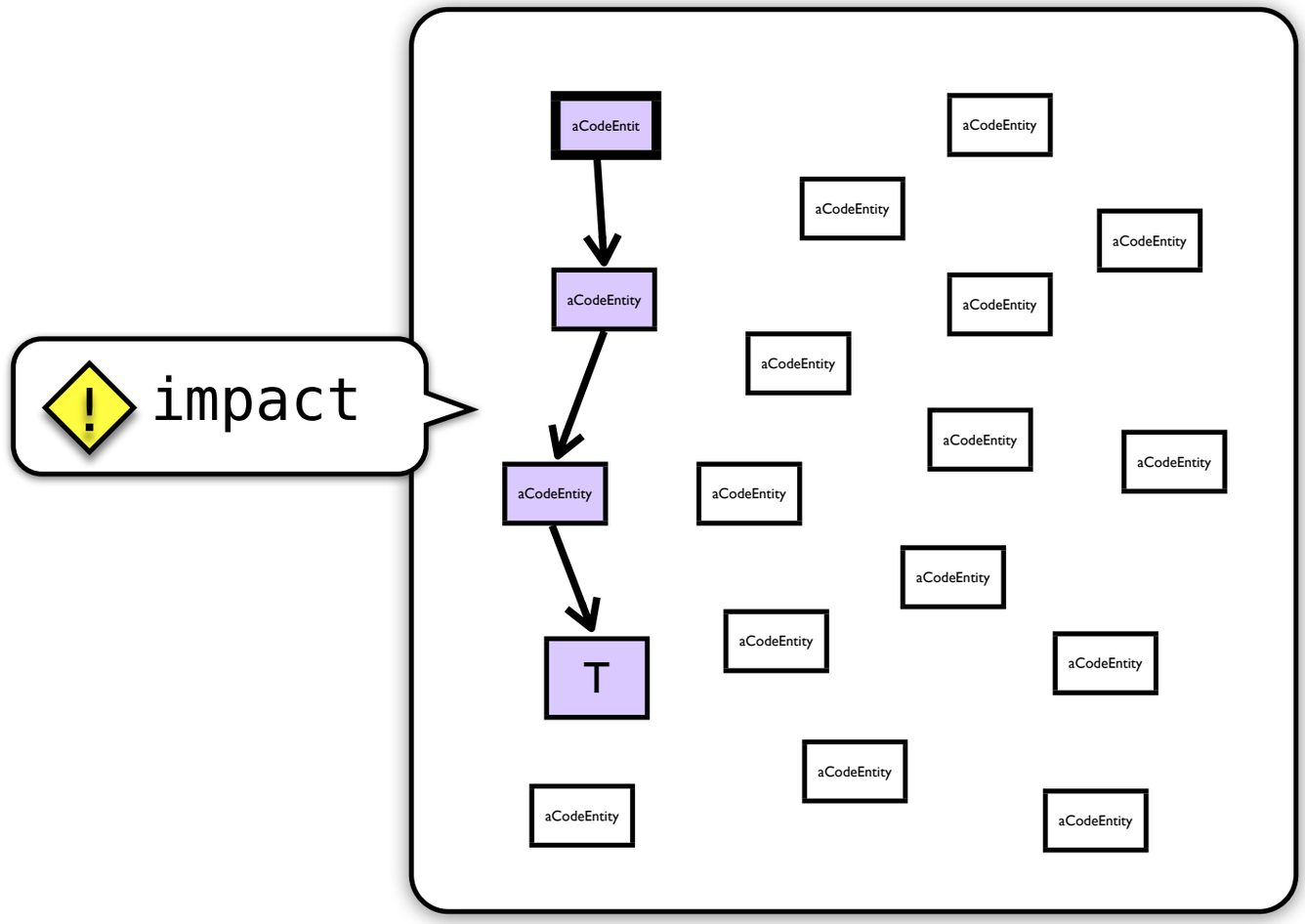
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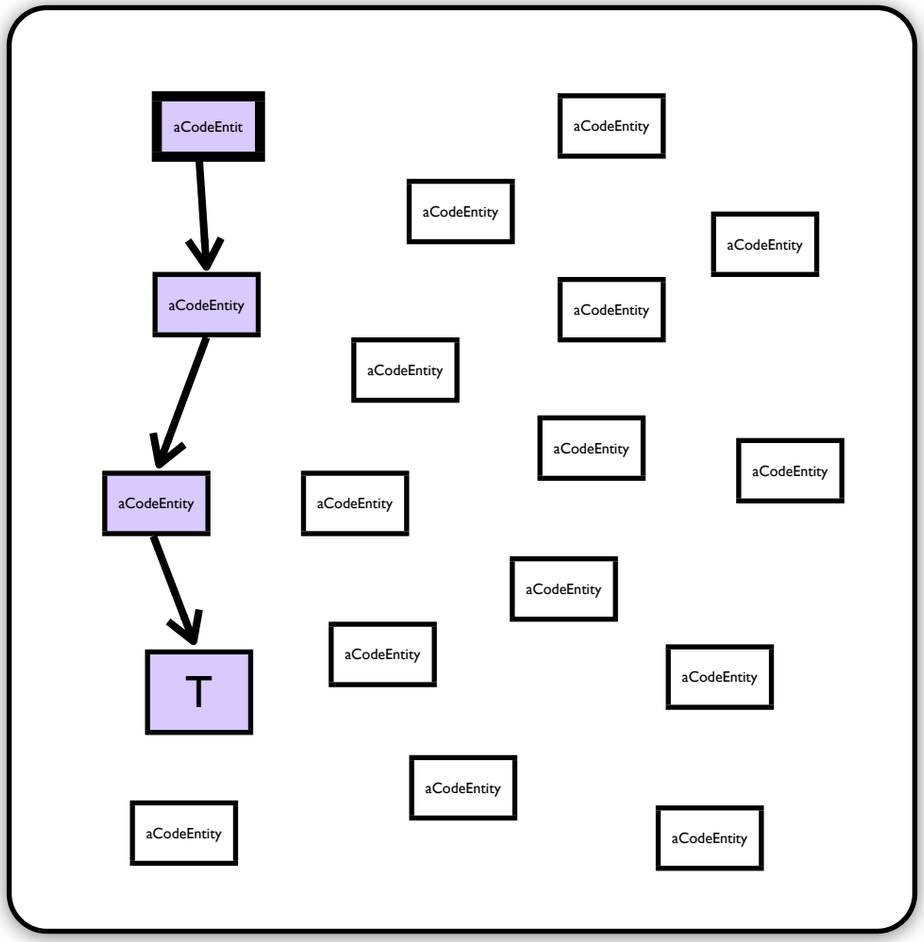
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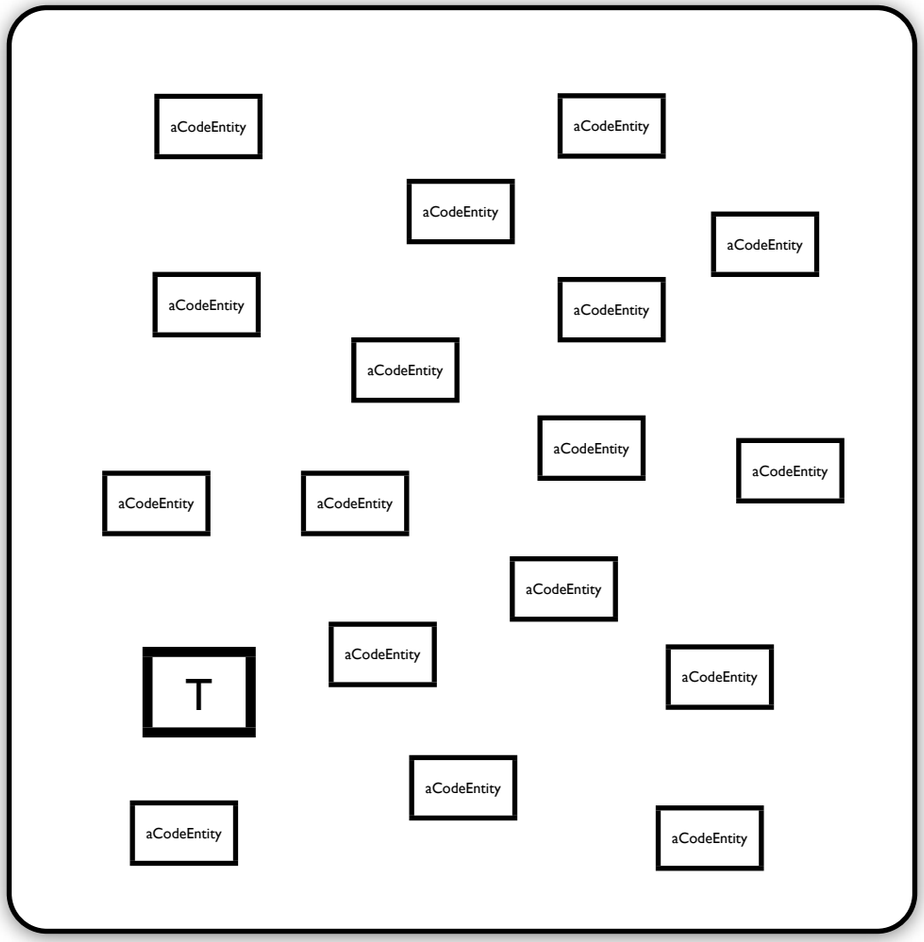
but in reality is...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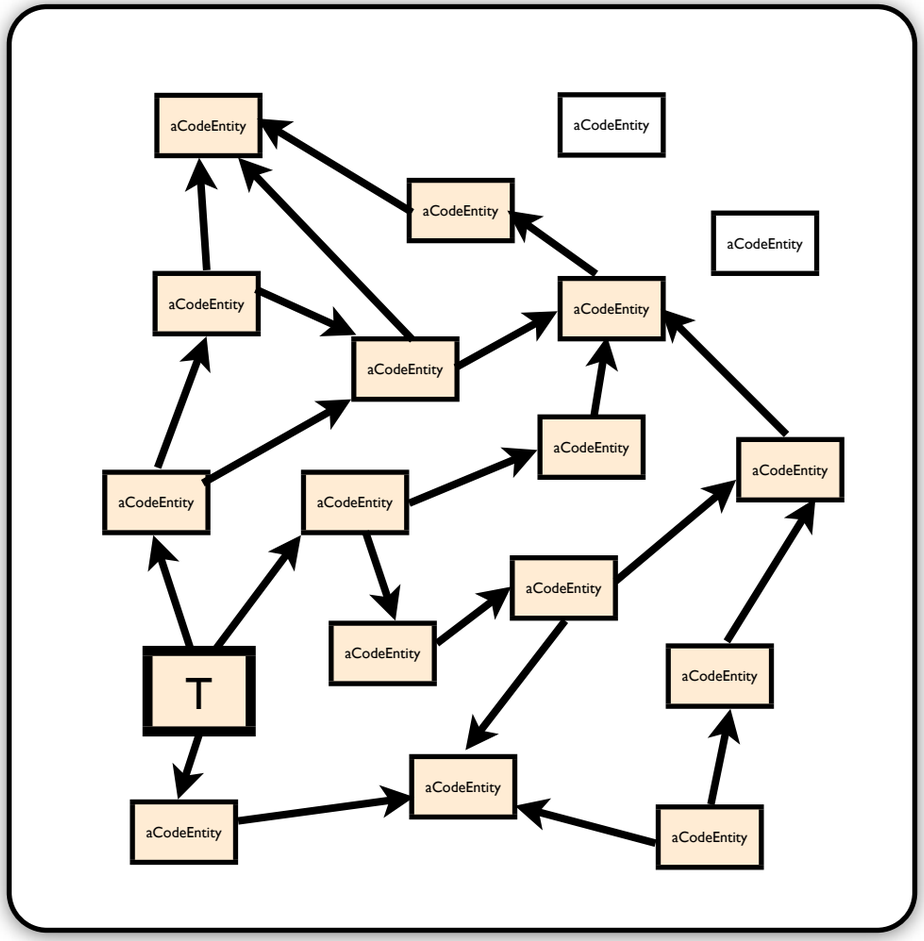
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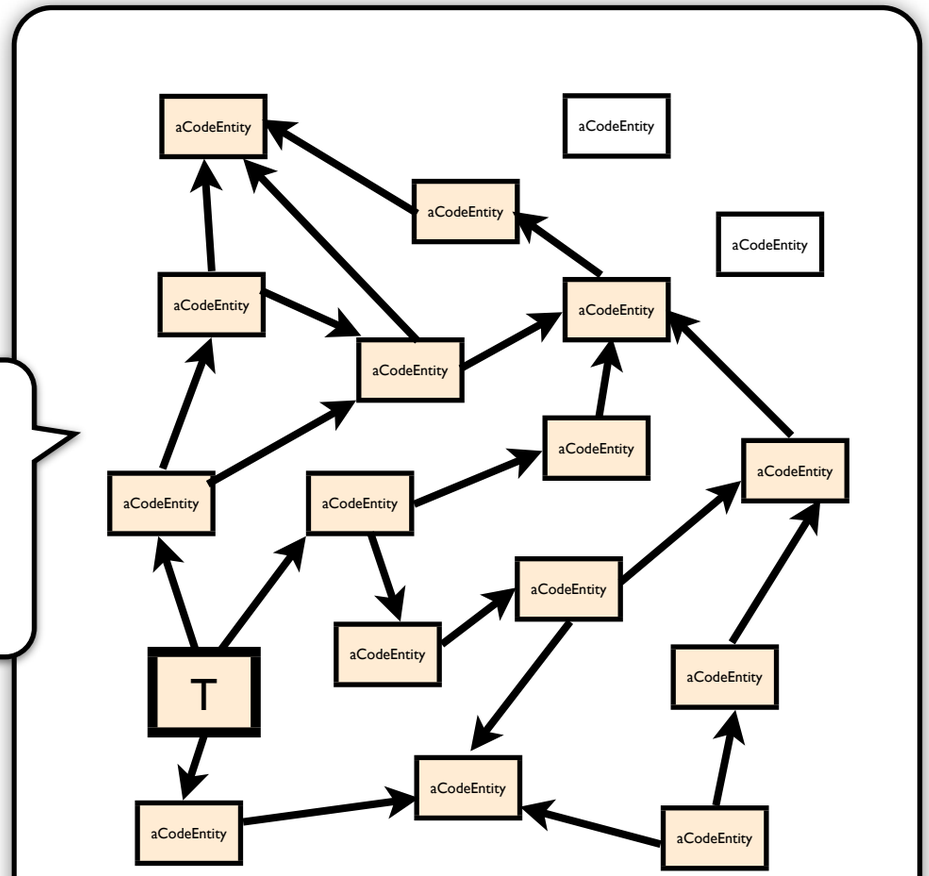
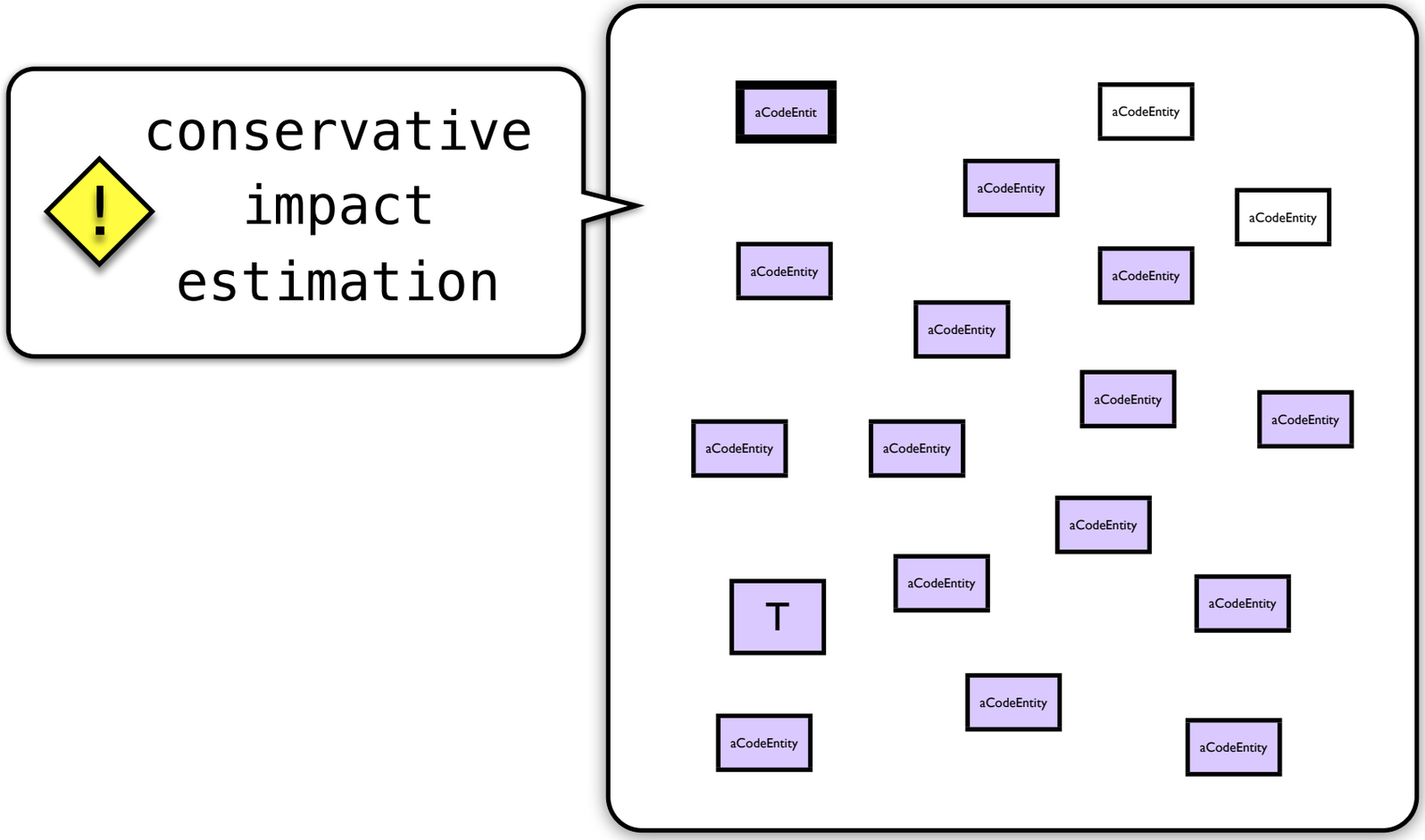
conservative dependency estimation

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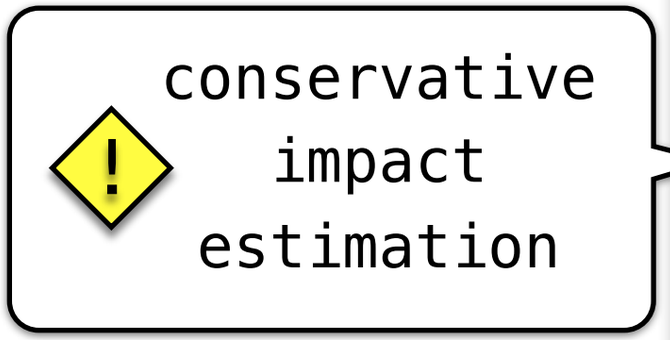
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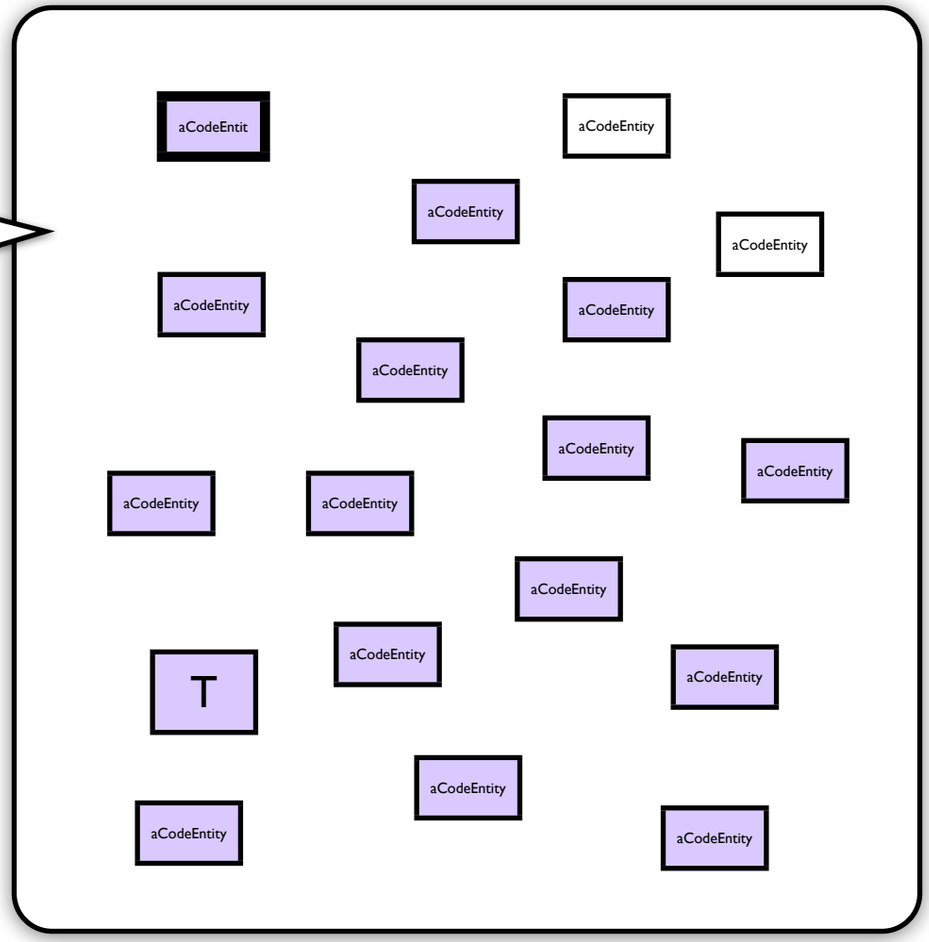
inaccuracy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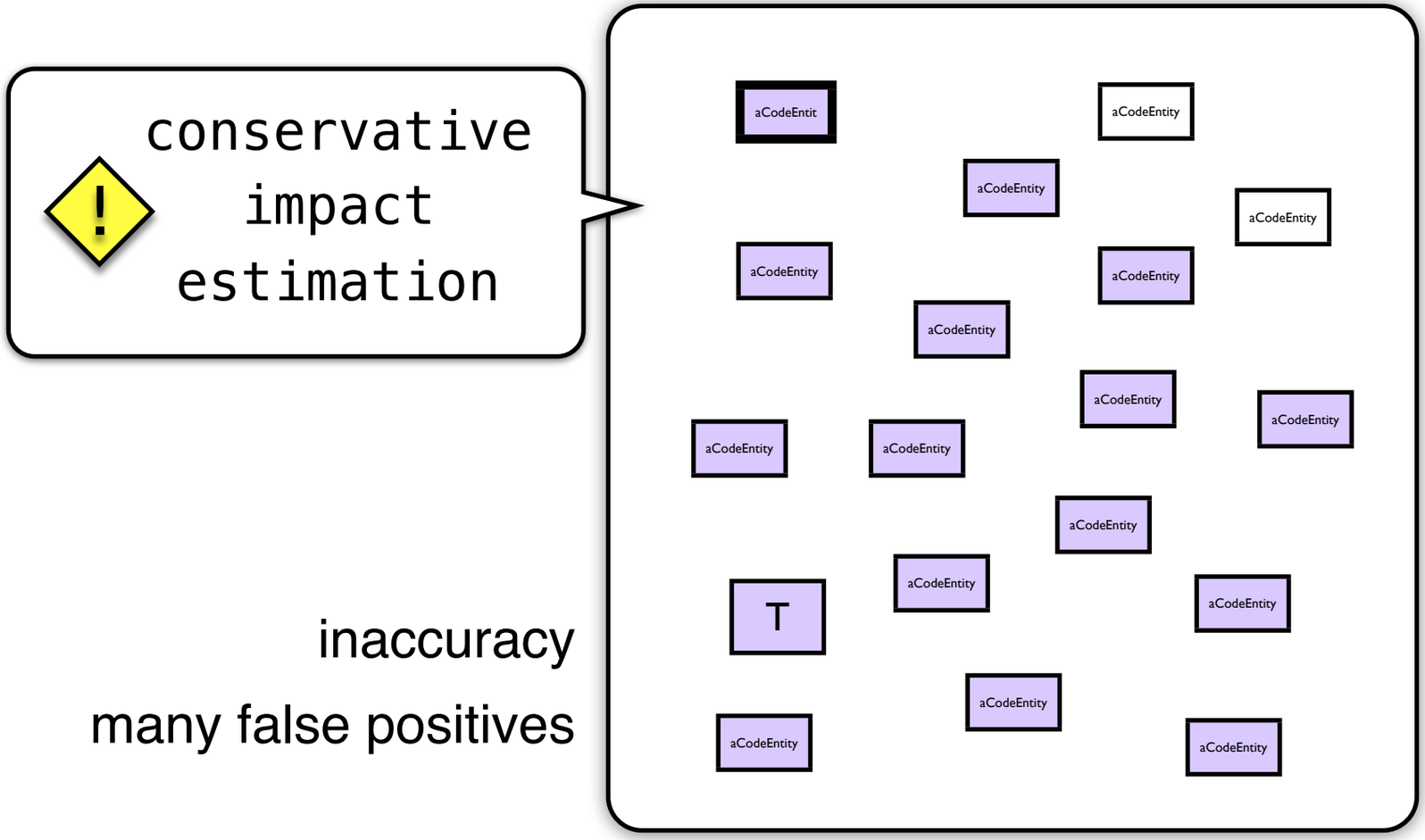
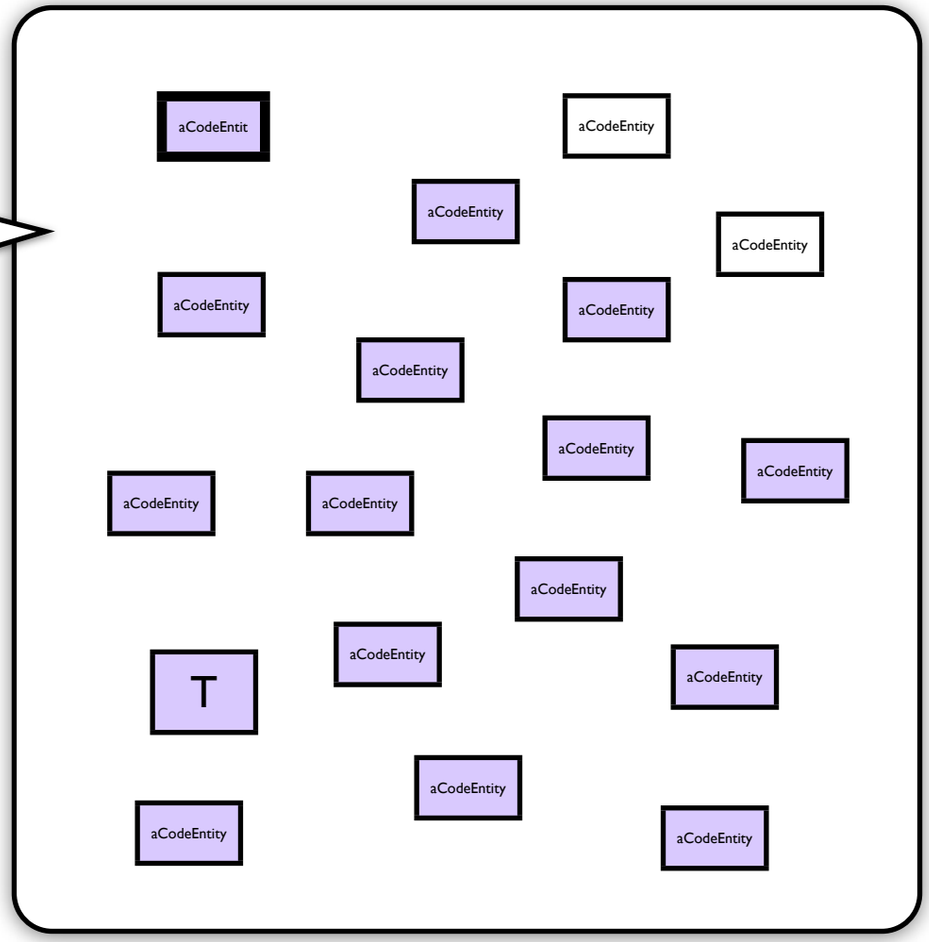


inaccuracy

many false positives

conservative impact estimation

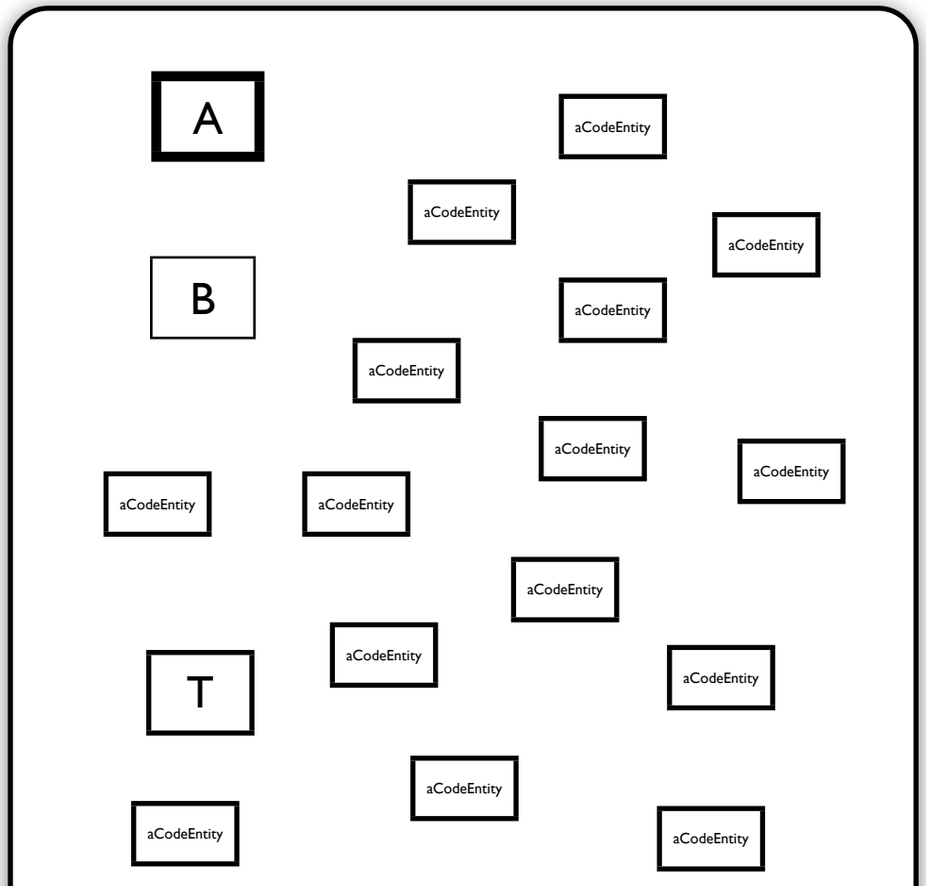


inaccuracy

many false positives

too much information

Special Scenario:
Cherry-picking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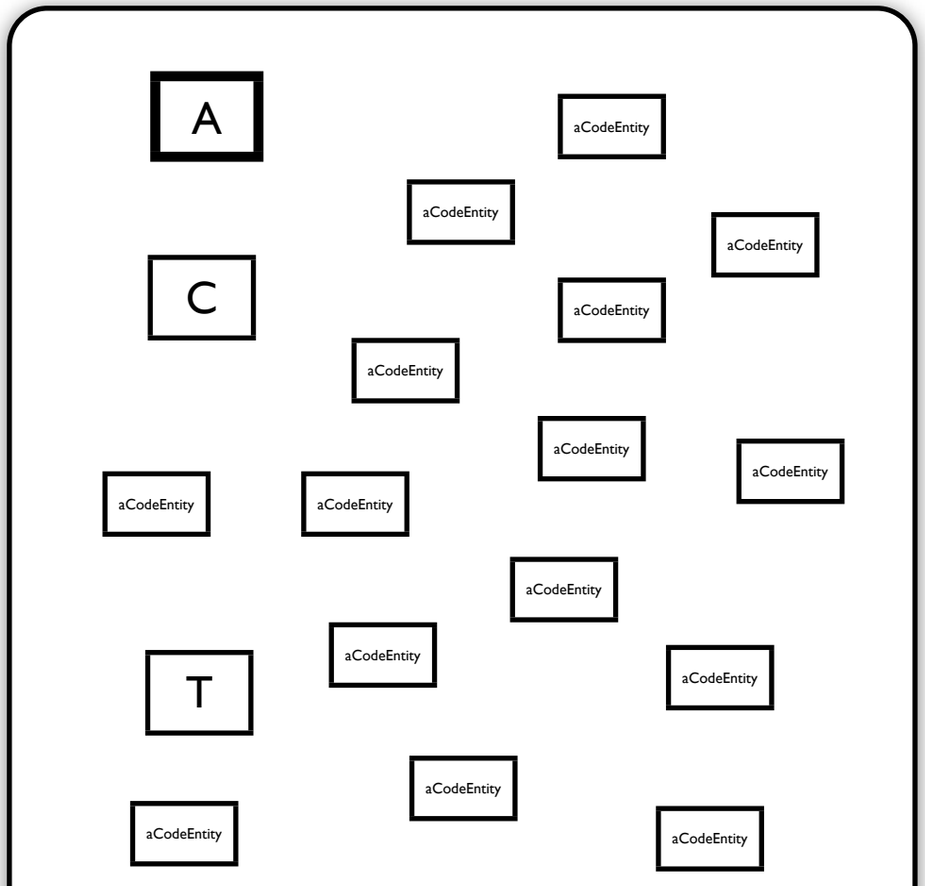
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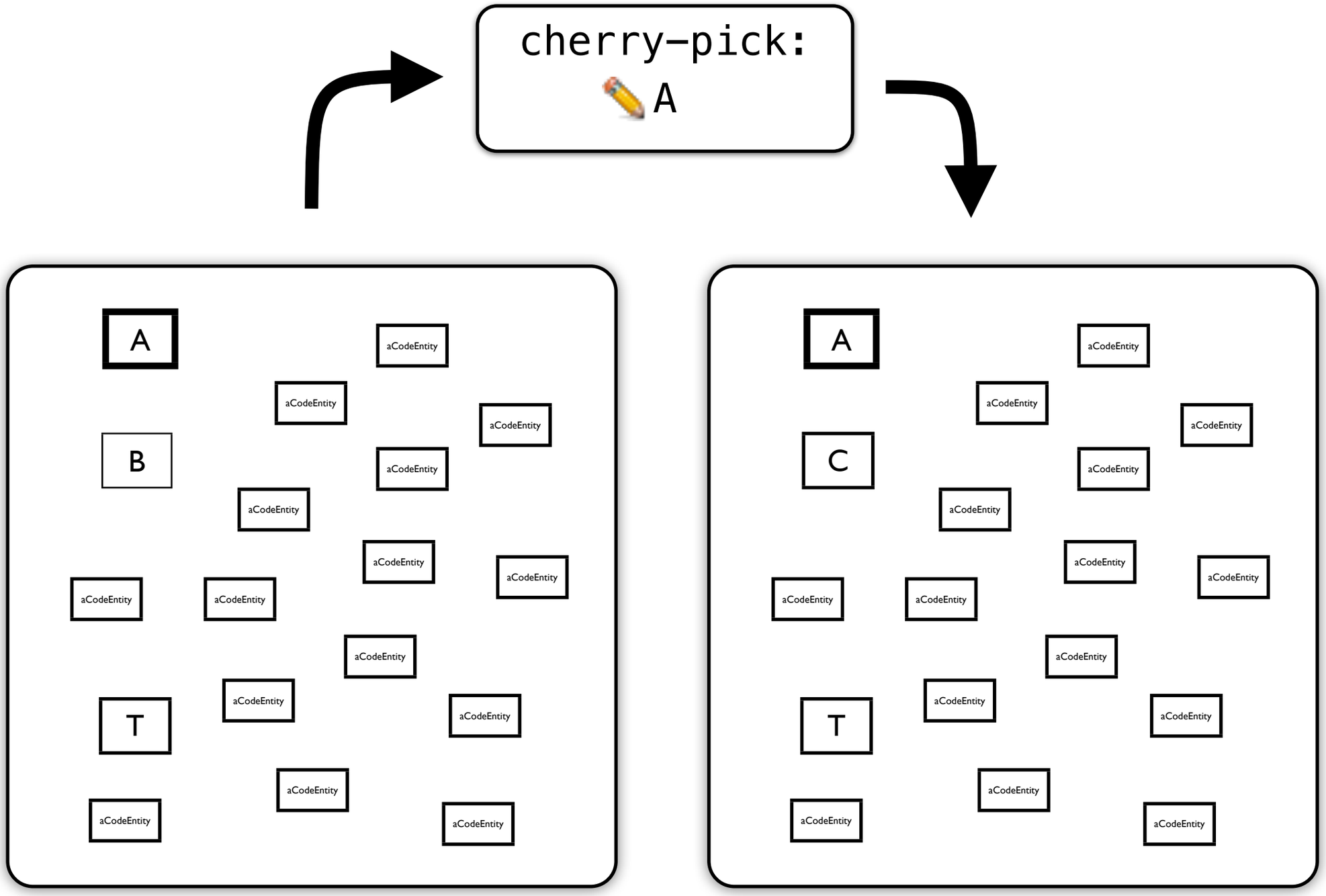
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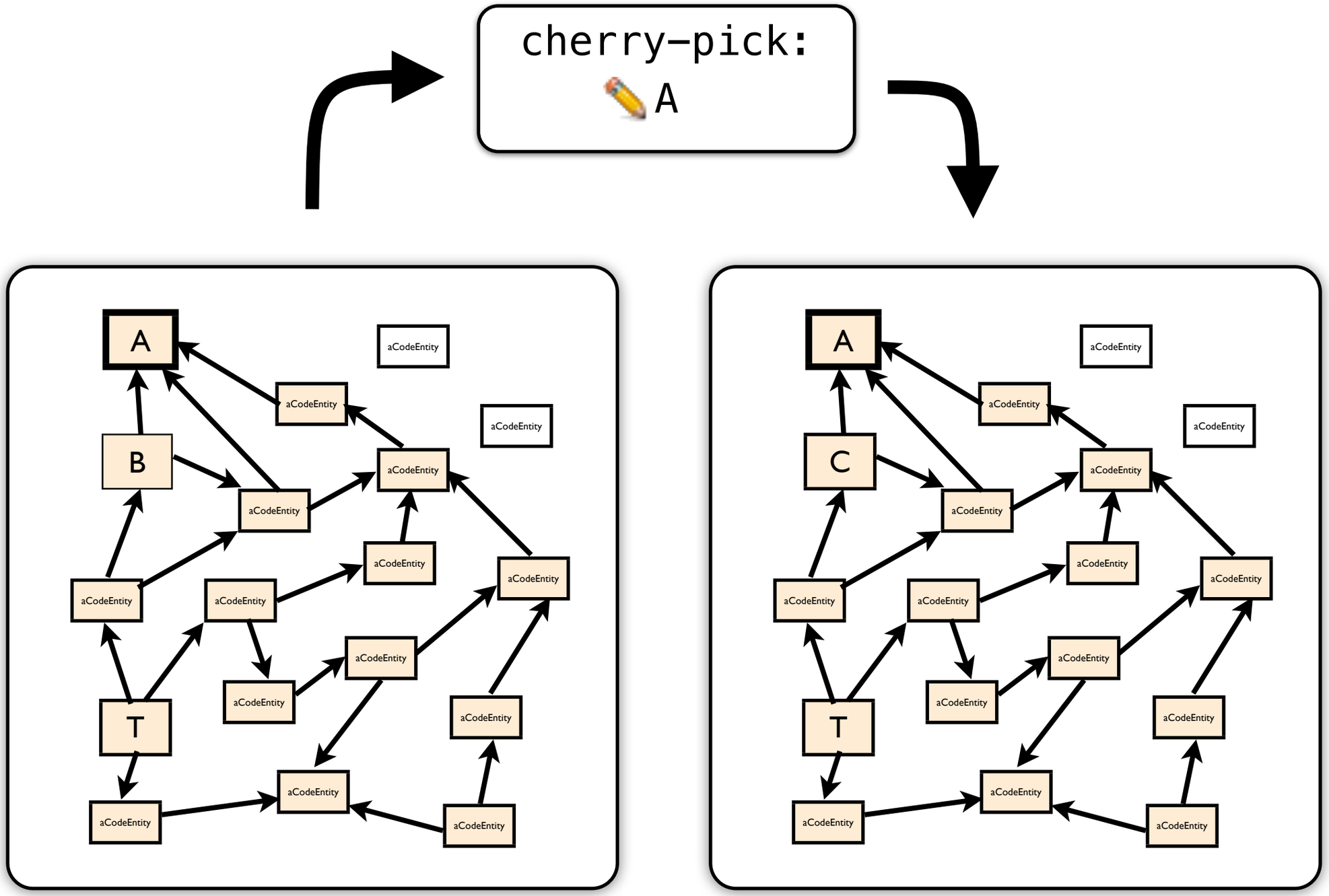
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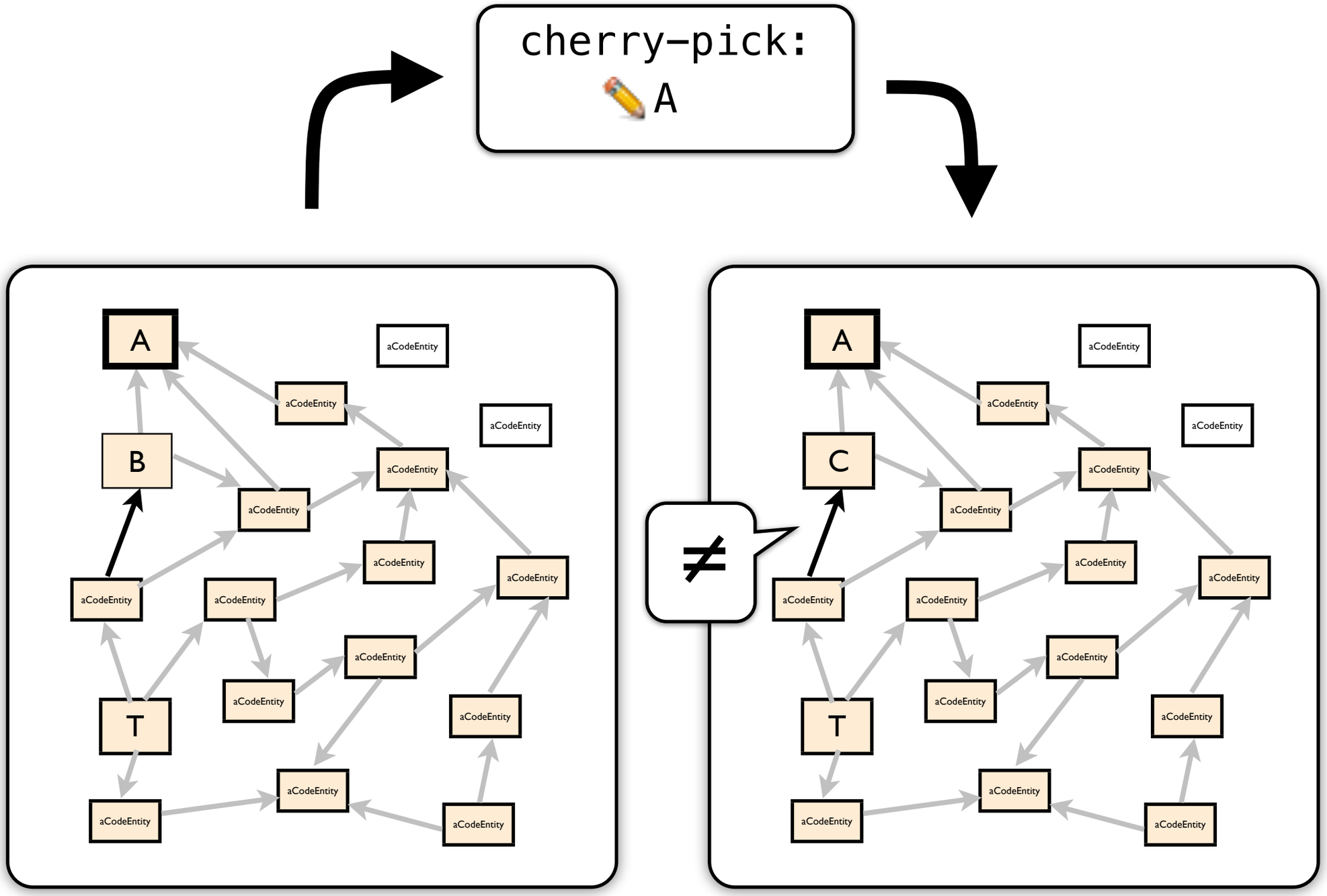
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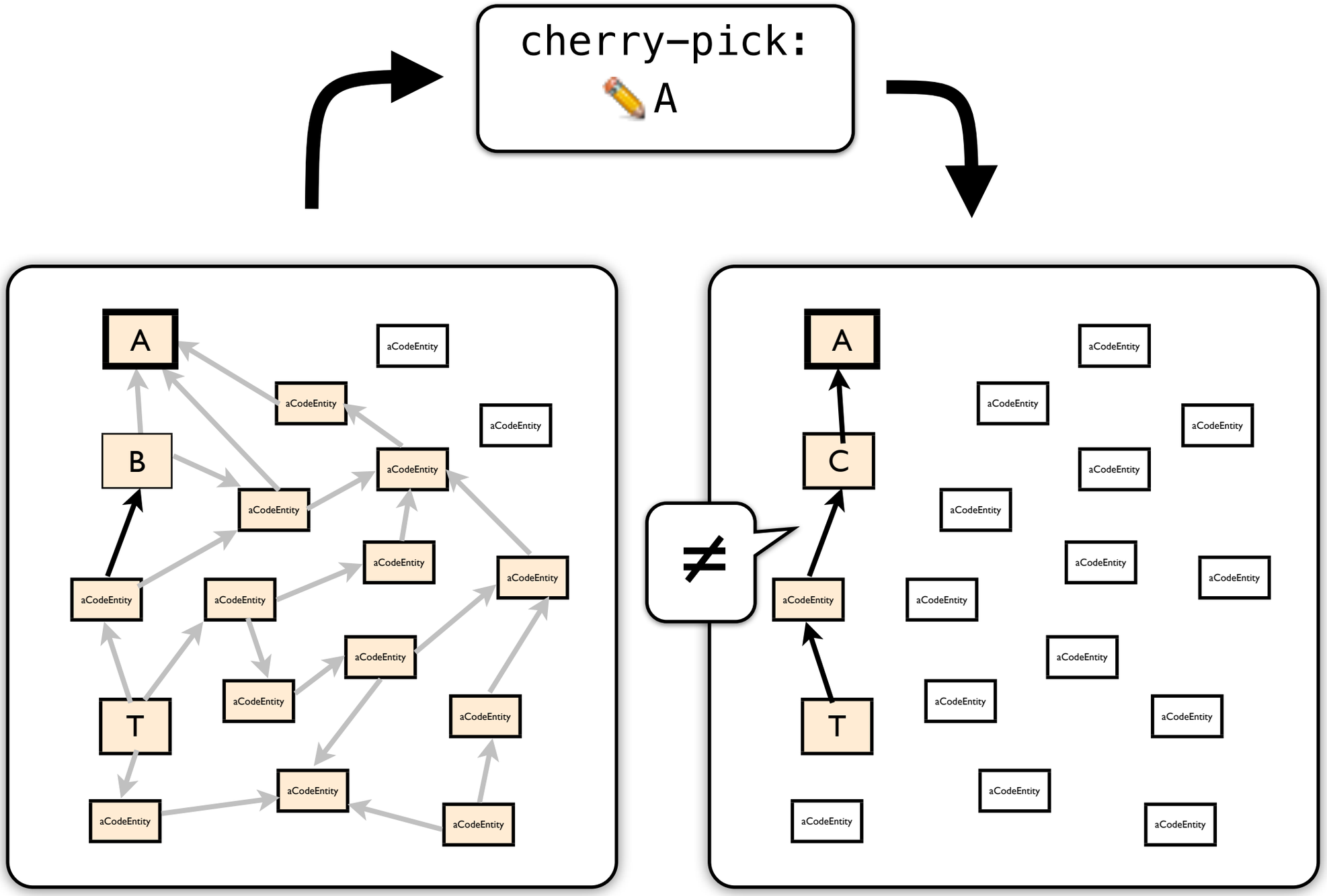
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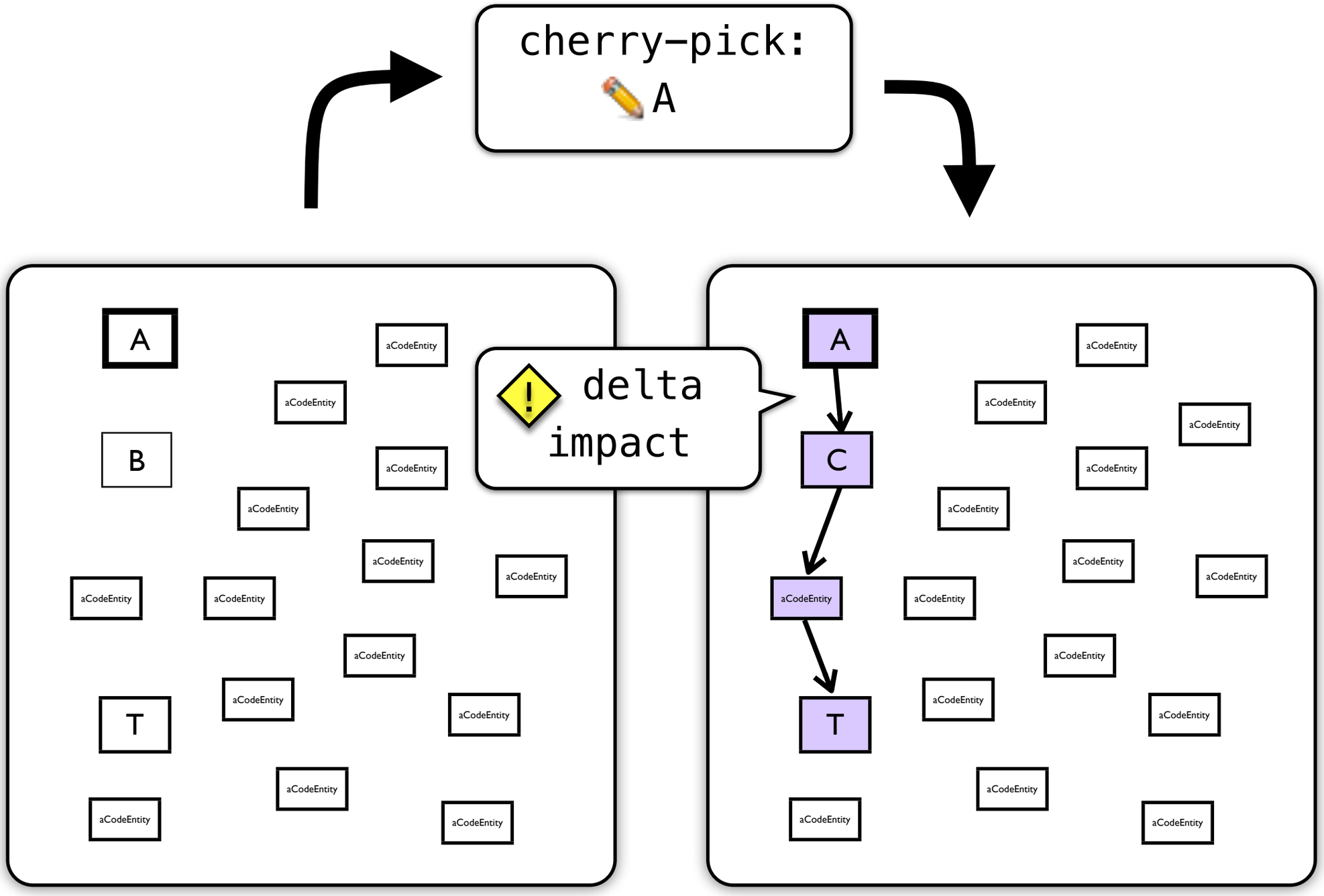
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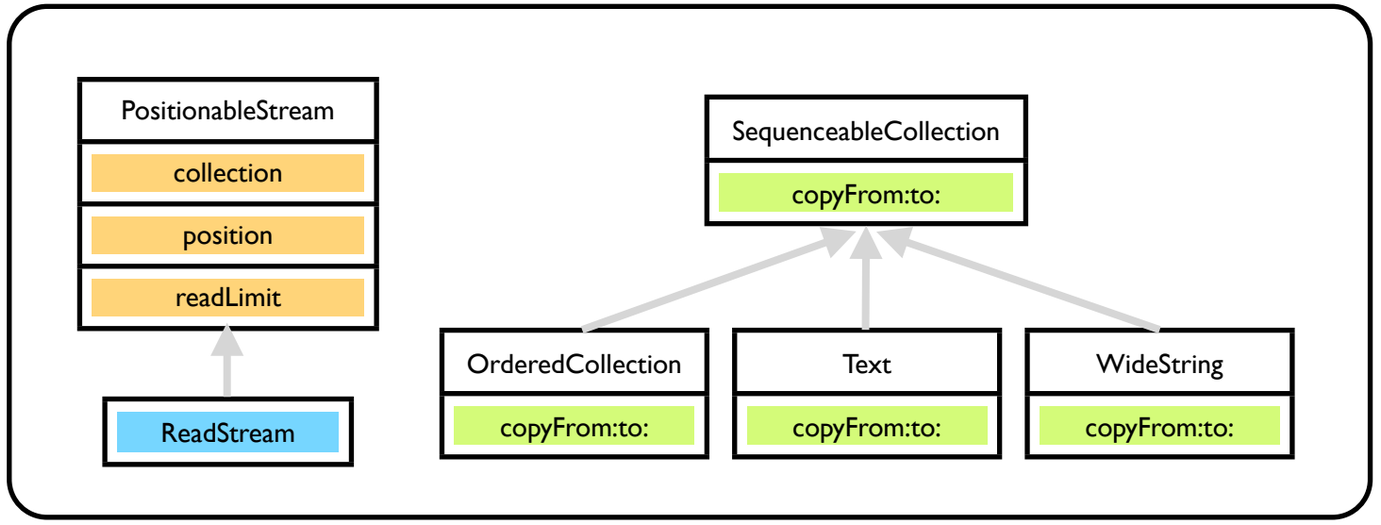
A bit more in detail



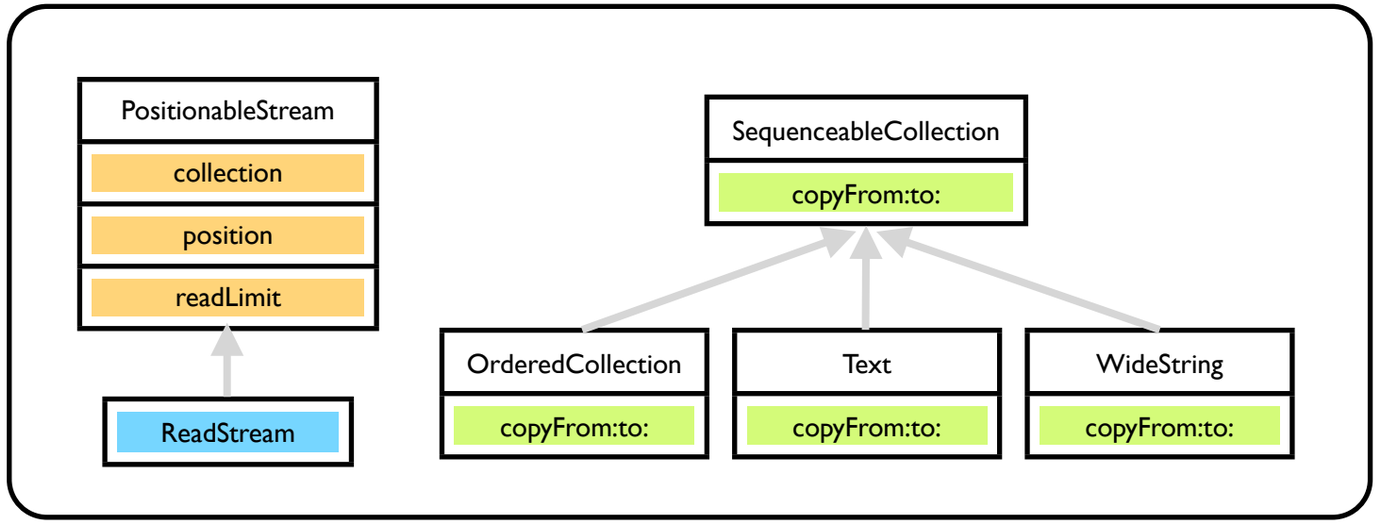
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
HostExistence
  name: #ReadStream
```

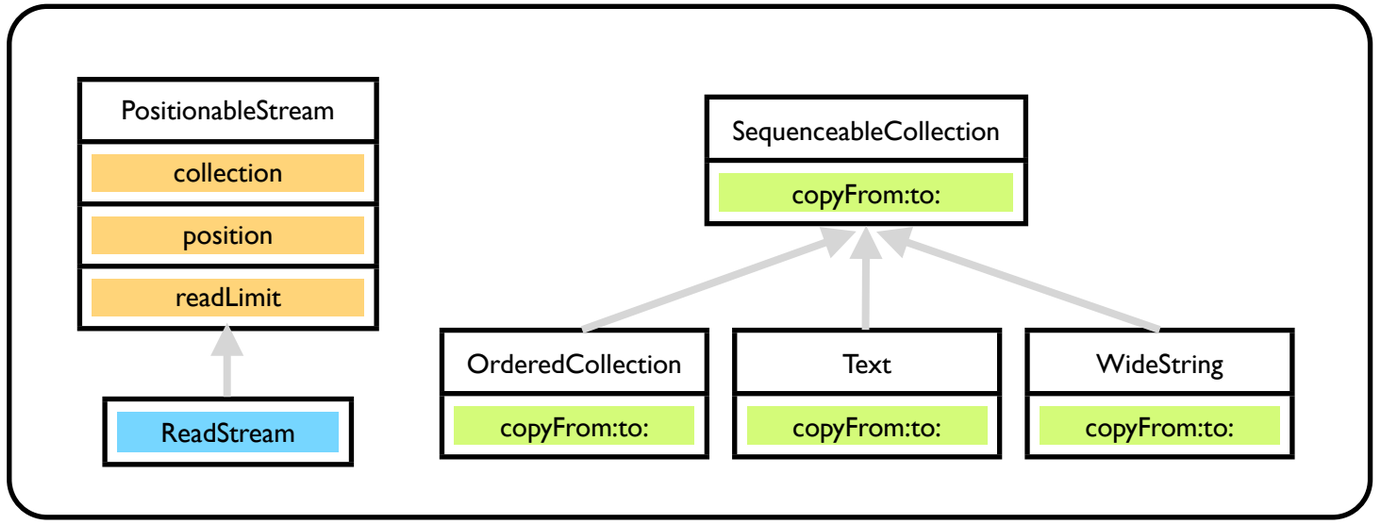
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  of: ReadStream[1]
```



```
HostExistence
  name: #ReadStream
```

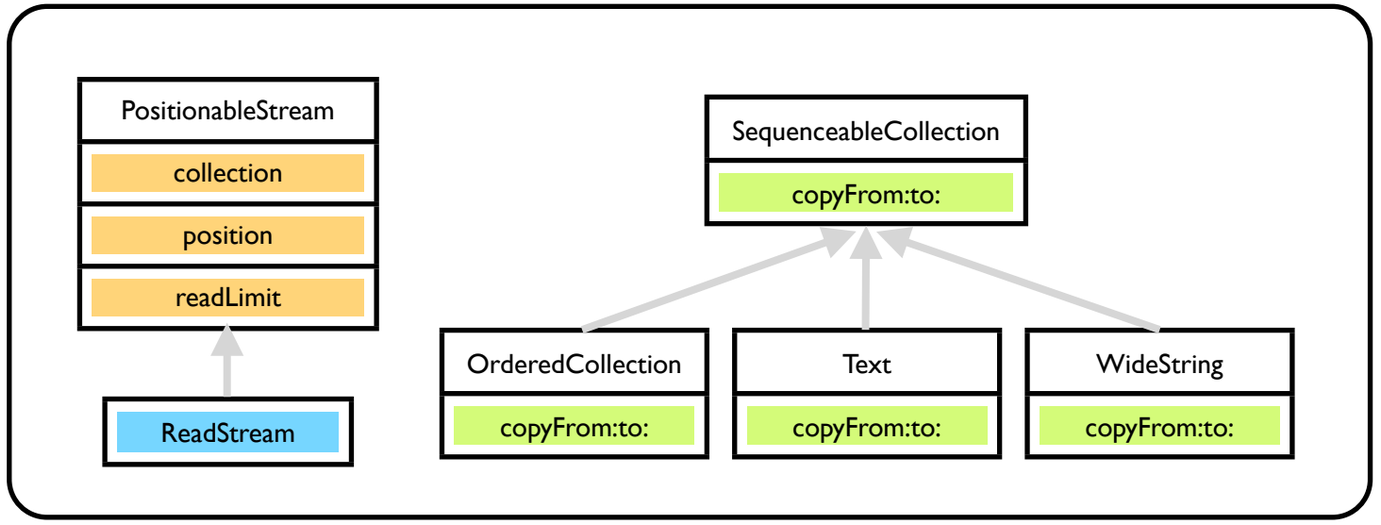
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  of: ReadStream[2]
```



```
HostExistence
  name: #ReadStream
```

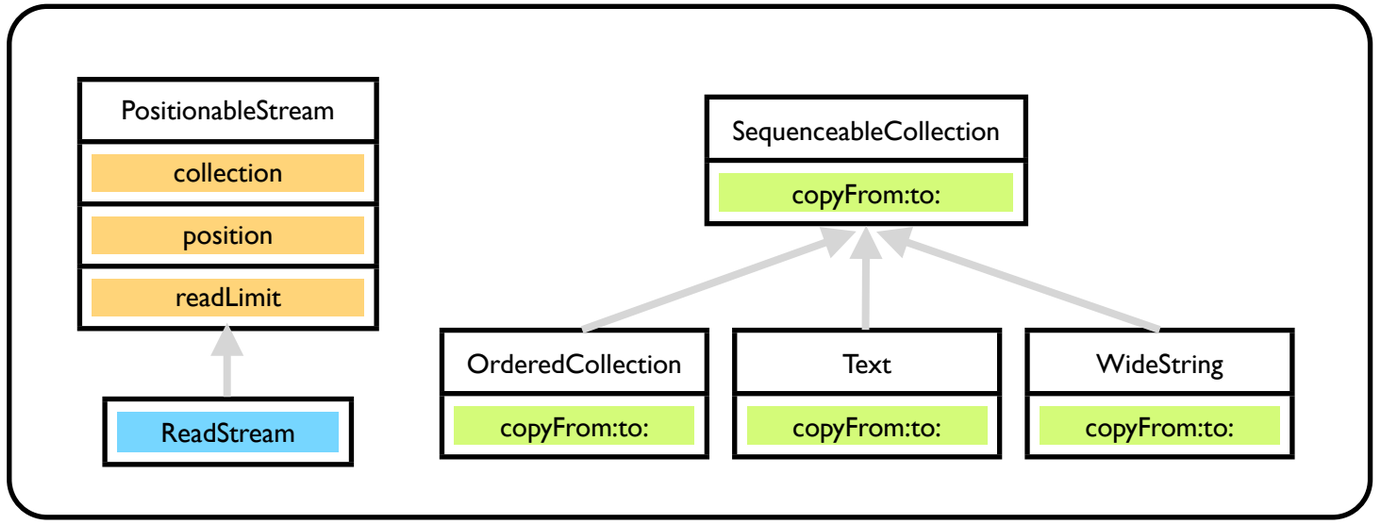
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  undeclared
```



```
HostExistence
  name: #ReadStream
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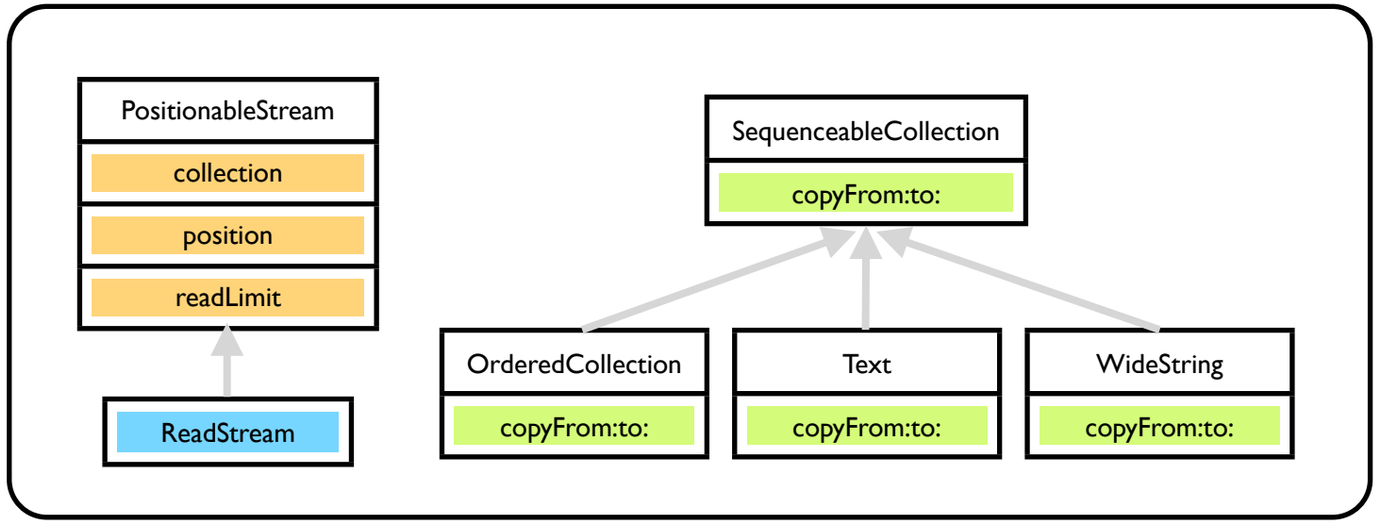
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  undeclared
```



```
HostExistence
  name: #ReadStream
```

```
VariableAccess
  name: #collection
```

ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

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      endPosition := position + anInteger min: readLimit.
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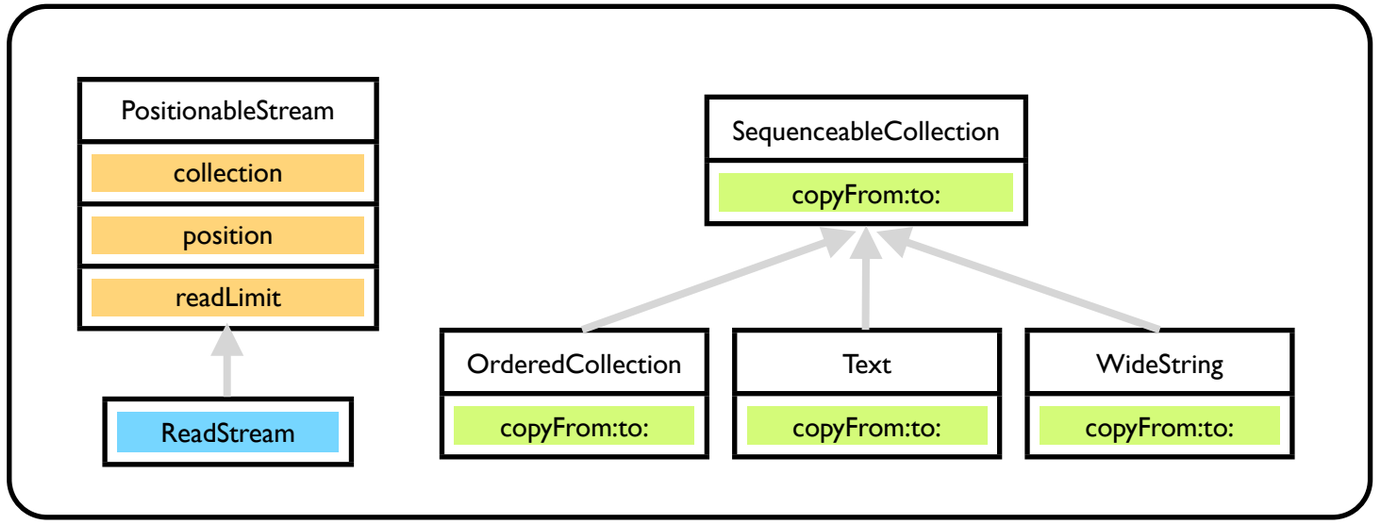
```




```
ClassExistence
  undeclared
```

```
VariableBinding to:
  (PositionableStream[1]=>#collection)
```

```
HostExistence
  name: #ReadStream
```

```
VariableAccess
  name: #collection
```

ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

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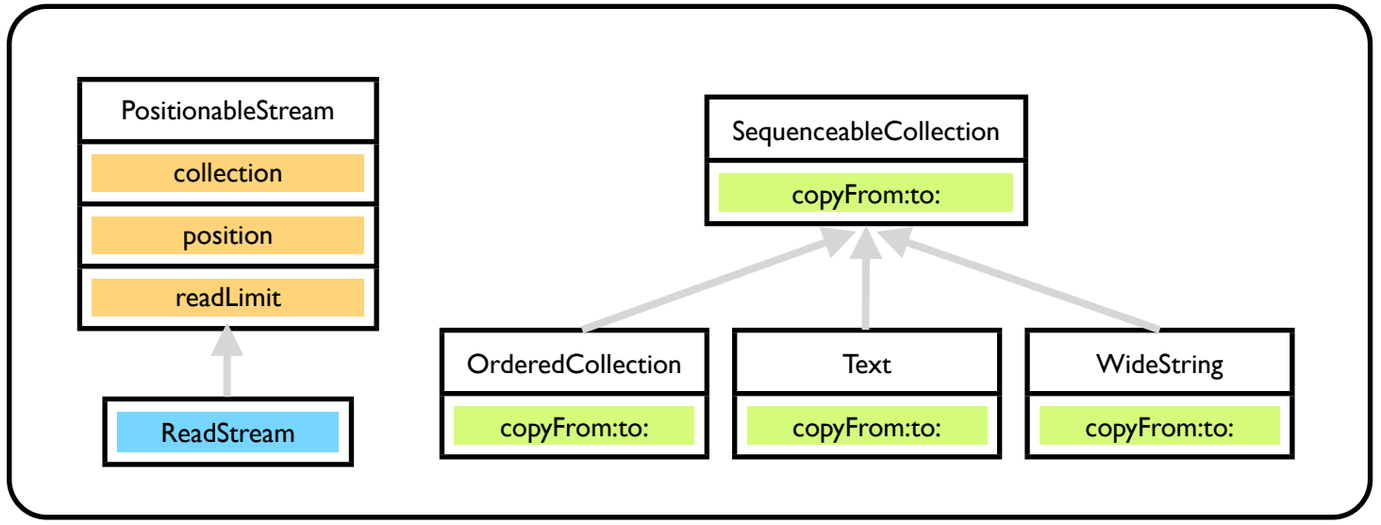
      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  undeclared
```

```
VariableBinding to:
  (ReadStream[1]=>#collection)
```

```
HostExistence
  name: #ReadStream
```

```
VariableAccess
  name: #collection
```

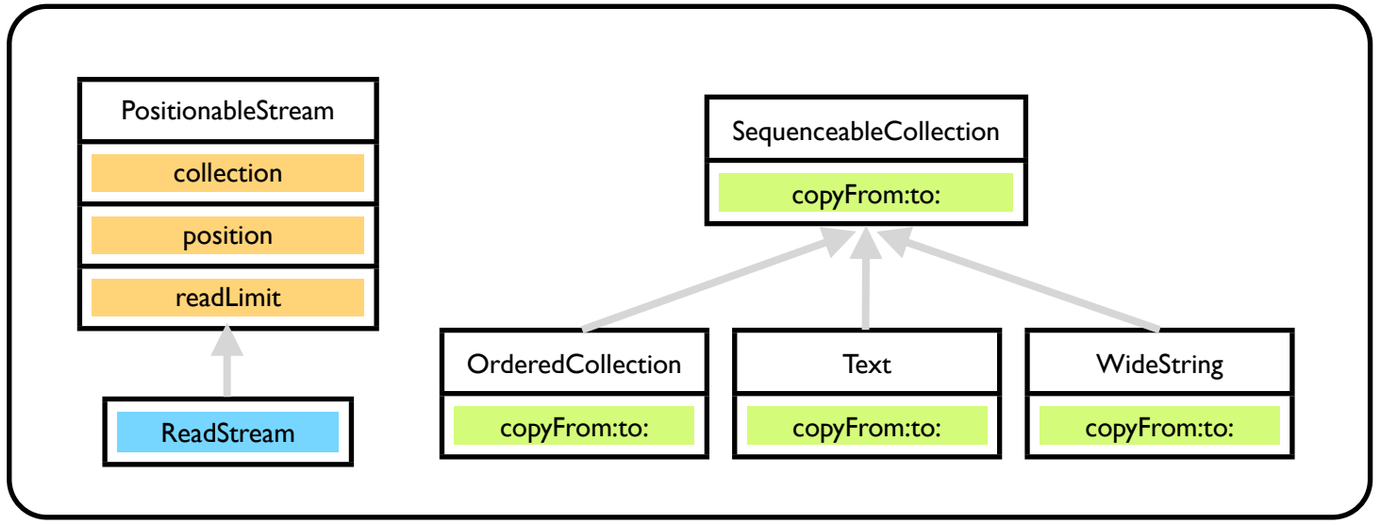
ReadStream

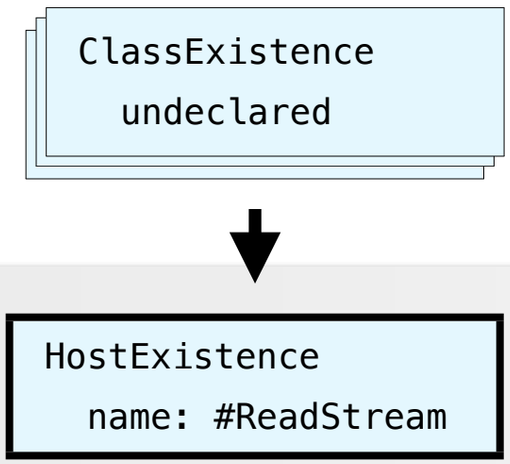
```
next: anInteger
      "Answer the next anInteger elements of my collection."

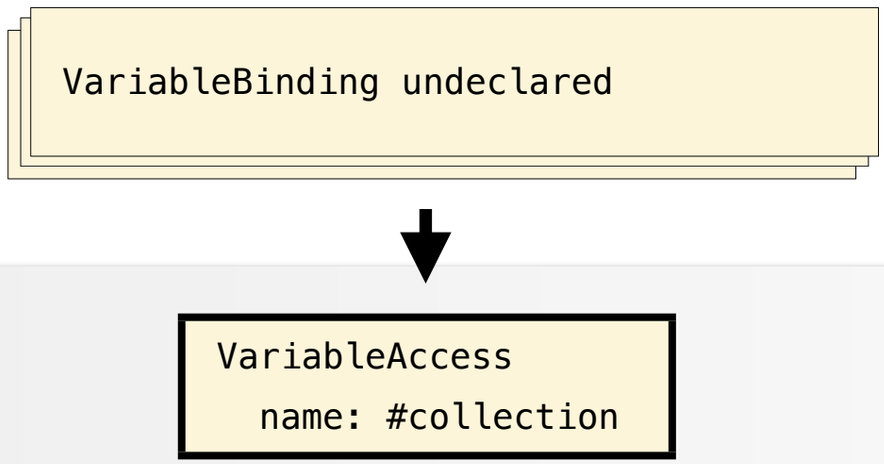
      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```







ReadStream

```
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      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
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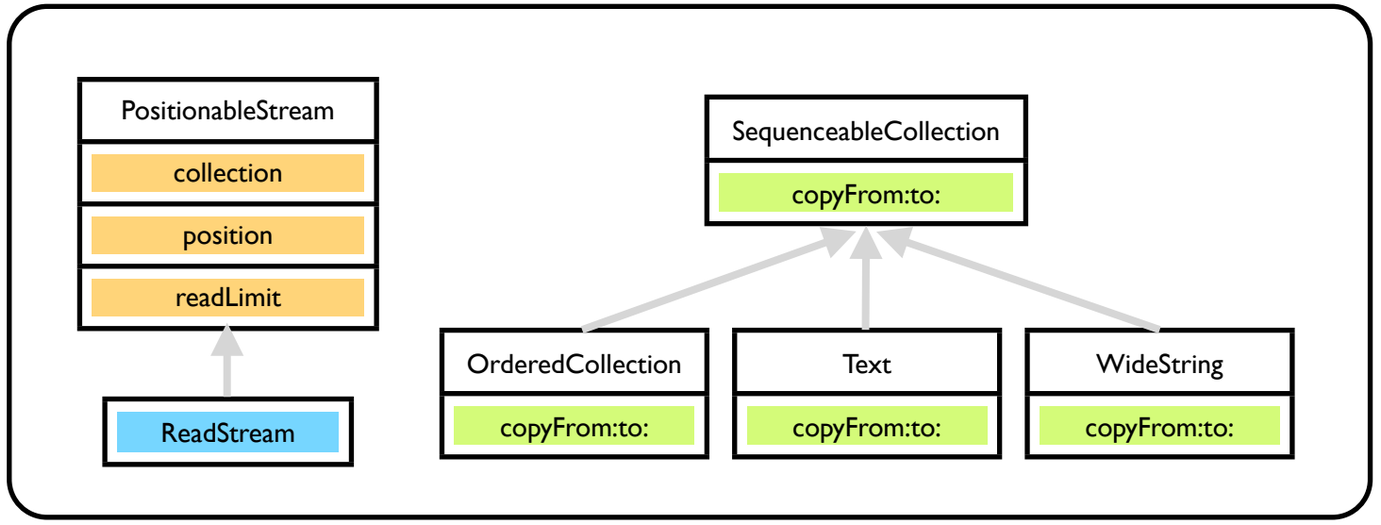
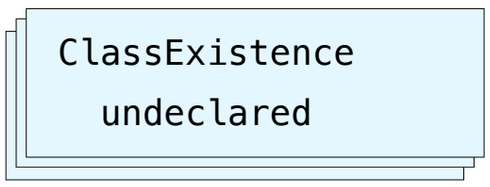
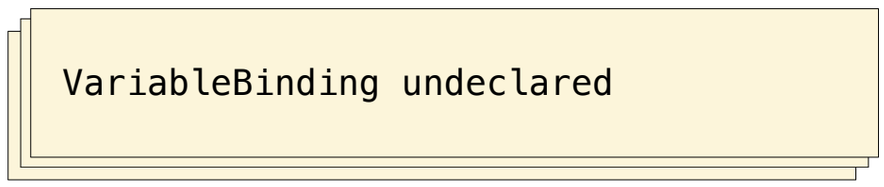
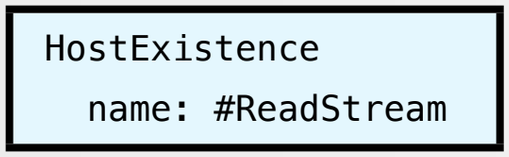
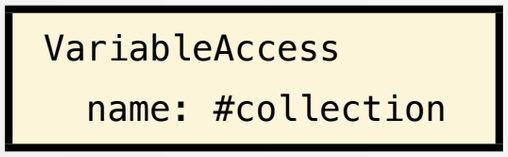
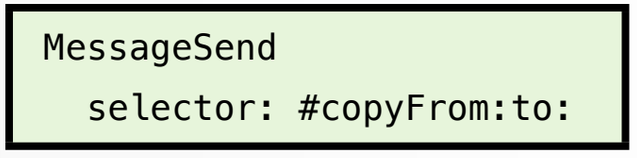












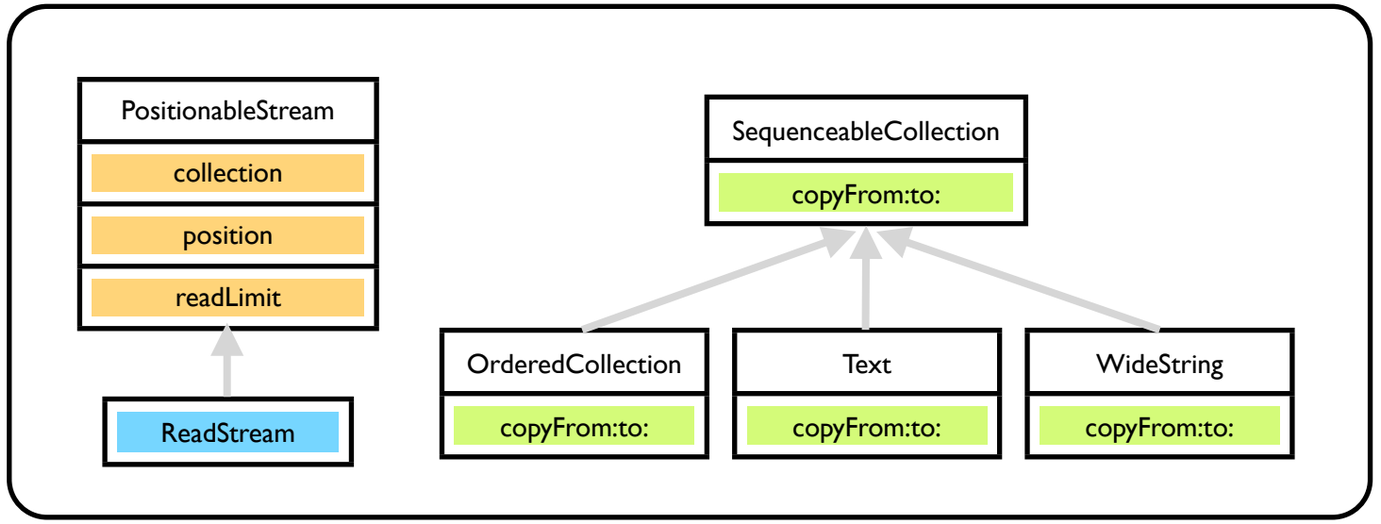
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  undeclared
```

```
VariableBinding undeclared
```

```
PossibleMethodInvocation to:
  (SequenceableColl>>copyFrom:to:[1]),
  (OrderedCollection>>copyFrom:to:[1]),
  (Text>>copyFrom:to:[1]),
  (WideString>>copyFrom:to:[1])
```

```
HostExistence
  name: #ReadStream
```

```
VariableAccess
  name: #collection
```

```
MessageSend
  selector: #copyFrom:to:
```

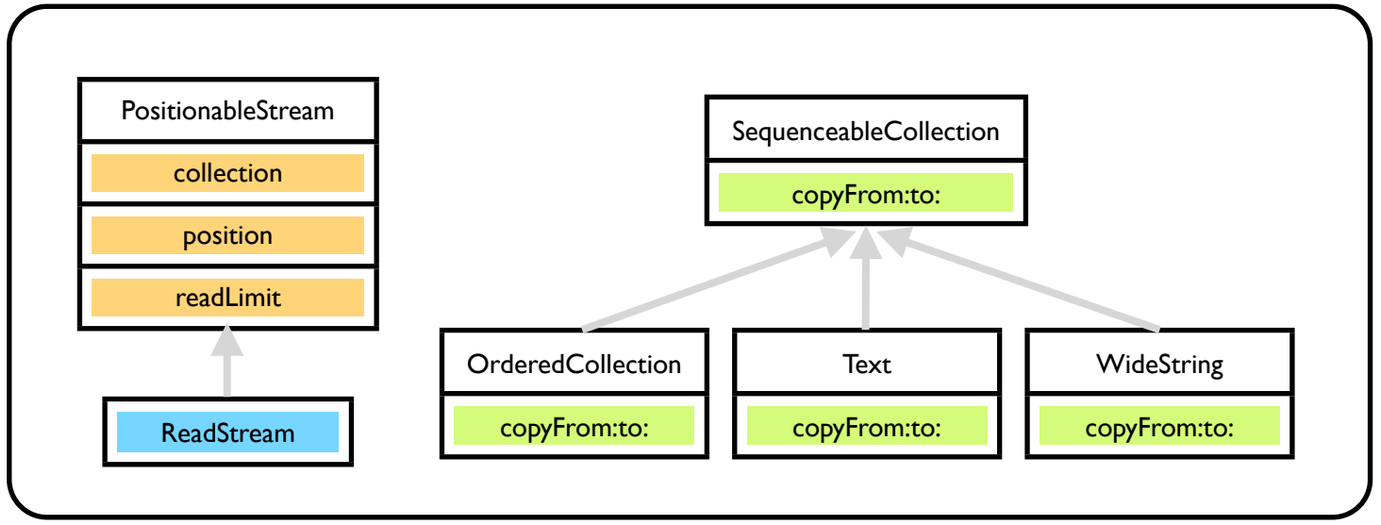
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  undeclared
```

```
VariableBinding undeclared
```

```
PossibleMethodInvocation to:
  (SequenceableColl>>copyFrom:to:[1]),
  (OrderedCollection>>copyFrom:to:[1]),
  (Text>>copyFrom:to:[1]),
  (WideString>>copyFrom:to:[2])
```

```
HostExistence
  name: #ReadStream
```

```
VariableAccess
  name: #collection
```

```
MessageSend
  selector: #copyFrom:to:
```

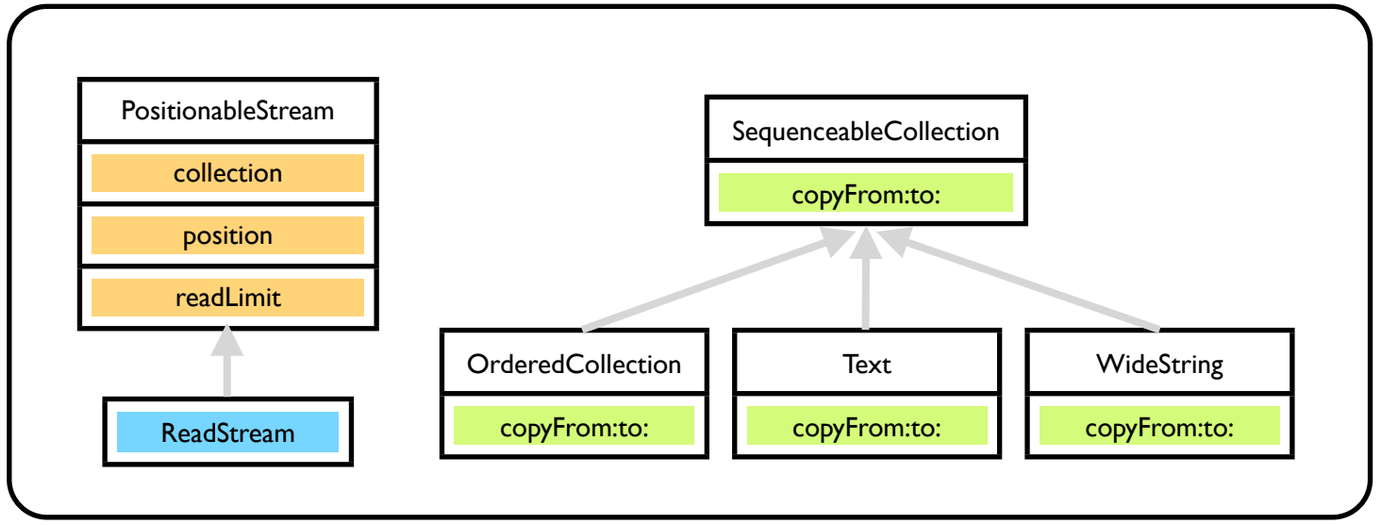
ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
      position := endPosition.

      ^answer
```




```
ClassExistence
  undeclared
```

```
VariableBinding undeclared
```

```
PossibleMethodInvocation empty
```

```
HostExistence
  name: #ReadStream
```

```
VariableAccess
  name: #collection
```

```
MessageSend
  selector: #copyFrom:to:
```

ReadStream

```
next: anInteger
      "Answer the next anInteger elements of my collection."

      | answer endPosition |

      endPosition := position + anInteger min: readLimit.
      answer := collection copyFrom: position+1 to: endPosition.
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      ^answer
```