



Do your students understand their own code?

expressiontutor.org

1. Students solve a programming assignment

Either writing code by themselves... or with the help of a Large Language Model.

```
class LinAlgebra {
  double[] scale(double a, double[] x) {
    ...
  }
  double scaledAt(double a, double[] x, int oneBasedPos) {
    return scale(a, x)[oneBasedPos - 1];
  }
}
```

2. Our system selects interesting expressions

Our system selects an expression from the code submitted by each student based on the criteria set by the instructor.

```
class LinAlgebra {
  double[] scale(double a, double[] x) {
    ...
  }
  double scaledAt(double a, double[] x, int oneBasedPos) {
    return scale(a, x)[oneBasedPos - 1];
  }
}
```

Annotations: include a method call (pointing to `scale`), include an array access (pointing to `[oneBasedPos - 1]`)

3. Activities based on the notional machine are generated

The system automatically generates all the nodes, including distractors.

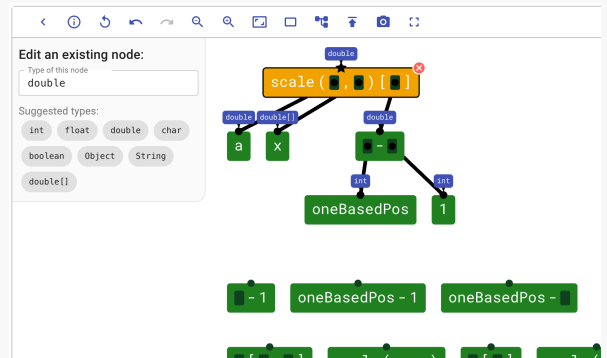
Construct a tree based on the following Java expression:

```
class LinAlgebra {
  double[] scale(double a, double[] x) {...}
  double scaledAt(double a, double[] x,
    int oneBasedPos) {
    return scale(a, x)[oneBasedPos - 1];
  }
}
```



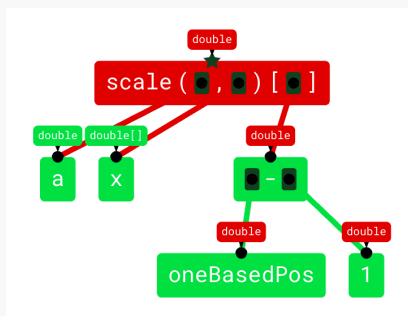
4. Students solve the activities

This requires demonstrating an understanding of the structure and the type of all subexpressions.



5. Our system gives feedback to each student

Incorrect nodes are highlighted, without revealing the full correct solution.



6. The instructor has an overview of the entire class

The system aggregates the data and provides a dashboard to the instructor.

ID	Code	Name		Type		Steps		Time		Solved	Correct	
		Attempt	Correct	Response Size	Correct	Response Size	Response Size	Response Size	Response Size			Response Size
1378856a-686c-417c-843c-376720290213	1.00	1	4	0	1	0	1	0	1	0	Yes	Yes
86c0586a-656e-4740-8650-6c11246835004	0.00	1	1	1	1	1	1	1	1	1	Yes	Yes
58623413-0758-46c5-4338-08c51757628e	0.00	1	1	1	1	1	1	1	1	1	Yes	Yes
76c243c-6968-471c-843c-376720290213	0.00	1	1	1	1	1	1	1	1	1	Yes	Yes

Submission		Reference	

