JavaScript code transformation - AST

@darkyndy

TODO

Write your own JavaScript transpiling code

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Write linting rules that will enforce your team code conventions

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Write “code-mods” to automatically refactor your code

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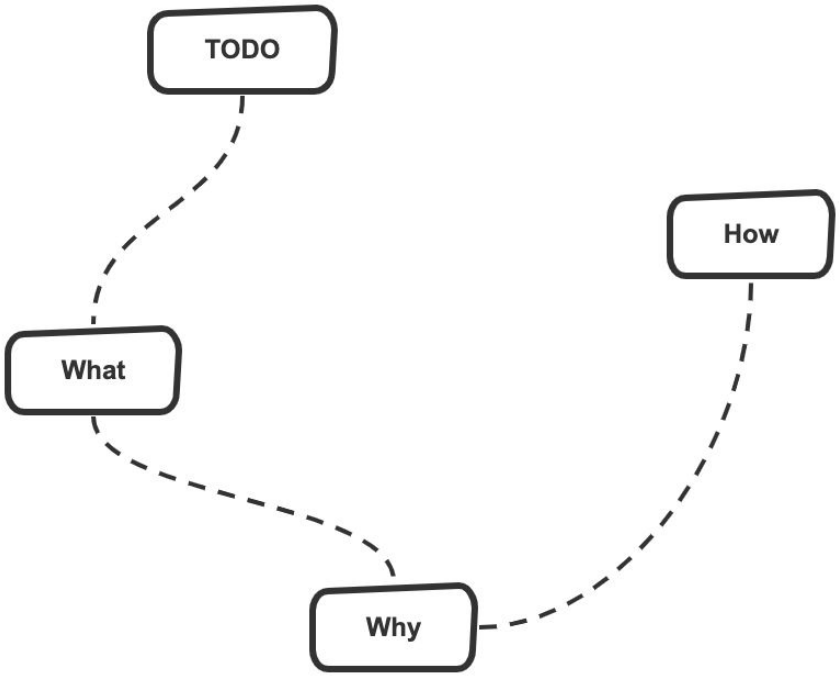
jscodeshift

Paul Comanici

- Technical Lead
- 10+ yrs experience working with JavaScript
- Open source supporter
- Nature lover

Journey



What

Is a tree representation of the abstract syntactic structure of source code written in a programming language.

What

example

Why

Can be edited and enhanced with information such as properties and annotations for every element it contains

Why

```
1
2 console.log('Like');
3
```

Why

```
1
2 console.log('Like');
3
```

```
- arguments:  [
   - StringLiteral = $node {
       type: "StringLiteral"
       start: 13
       end: 19
     + loc: {start, end}
     + extra: {rawValue, raw}
       value: "Like"
     }
  ]
```

Why

```
- arguments:  [
   - StringLiteral = $node {
       type: "StringLiteral"
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   - StringLiteral = $node {
       type: "StringLiteral"
       start: 13
       end: 19
     + loc: {start, end}
     + extra: {rawValue, raw}
       value: "Like"
     }
   - StringLiteral  {
       type: "StringLiteral"
       start: 21
       end: 31
     + loc: {start, end}
     + extra: {rawValue, raw}
       value: "CodeCamp"
     }
  ]
```

Why

```
- arguments:  [
   - StringLiteral = $node {
        type: "StringLiteral"
        start: 13
        end: 19
      + loc: {start, end}
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        value: "Like"
     }
   - StringLiteral  {
        type: "StringLiteral"
        start: 21
        end: 31
     + loc: {start, end}
     + extra: {rawValue, raw}
        value: "CodeCamp"
     }
  ]
```

```
1
2 console.log('Like', 'CodeCamp');
3
```

Why

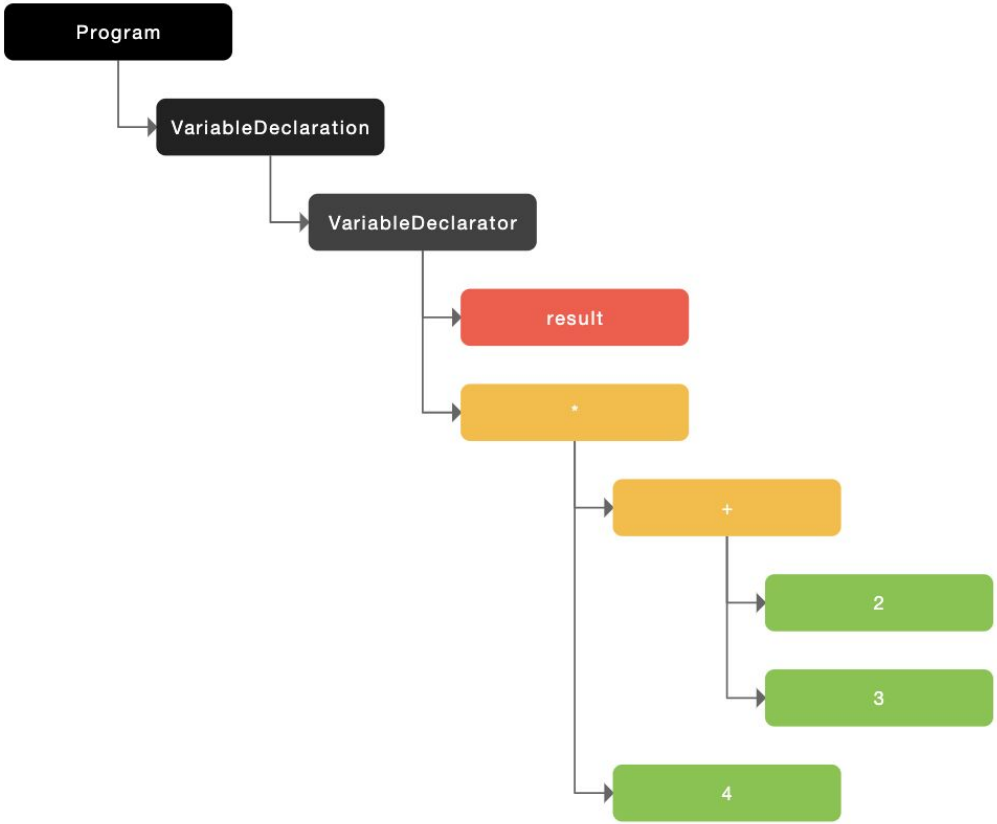
Does not include inessential information (braces, semicolons, parentheses …)

Why

```
const result = (2 + 3) * 4;
```

Why

```
const result = (2 + 3) * 4;
```



Why

Contains extra information about the program (store the position of each element in the source code)

Why

```
1 function logging() {
2   console.log('Like');
3 }
```

Why

```
1 function logging() {
2   console.log('Like');
3 }
```

```
- expression: CallExpression = $node {
    type: "CallExpression"
    start: 23
    end: 42
  + loc: {start, end}
  + callee: MemberExpression {type, start, end, loc, object, ... +2}
  - arguments:  [
    - StringLiteral  {
        type: "StringLiteral"
        start: 35
        end: 41
      + loc: {start, end}
      + extra: {rawValue, raw}
        value: "Like"
      }
    ]
  }
```

Why

- Can be edited and enhanced with information such as properties and annotations for every element it contains
- Does not include inessential information (braces, semicolons, parentheses …)
- Contains extra information about the program (store the position of each element in the source code)

How - parsers

- @babel/parser
- esprima
- acorn
- babylon

Visitor pattern

Separate algorithms from an object structure on which they operate

Visitor pattern

```
1   function Ceo() {
2     let income = 100;
3     this.setIncome = val => {
4       income = val;
5     };
6     this.getIncome = () => income;
7     this.accept = operation => {
8       operation.visit(this);
9     };
10  }
```

Visitor pattern

```
function Ceo() {
  let income = 100;
  this.setIncome = val => {
    income = val;
  };
  this.getIncome = () => income;
  this.accept = operation => {
    operation.visit(this);
  };
}
```

```
function Vp() {
  let income = 70;
  this.setIncome = val => {
    income = val;
  };
  this.getIncome = () => income;
  this.accept = operation => {
    operation.visit(this);
  };
}
```

Visitor pattern

```
21  const extraIncome = {
22    visit: position => {
23      const initialIncome = position.getIncome();
24      position.setIncome(initialIncome * 2);
25    }
26  };
```

Visitor pattern

```
31    const ceo = new Ceo();
32    ceo.accept(extraIncome);
33    console.log(ceo.getIncome()); // 200
34
35    const vp = new Vp();
36    vp.accept(extraIncome);
37    console.log(vp.getIncome()); // 140
```

Resources

- https://astexplorer.net/
- JointJS AST graph
- Babel Plugin Handbook
- JavaScript to SVG flowchart

Thank you!