BUILDING JAVASCRIPT

For JavaScripters

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FOR THOSE WHO DON'T KNOW

- CodePen is an online code playground
- It was founded about 6 years ago
- People use it to demo and prototype projects, as well as to make art
- There's millions and millions of Pens on the site
- You can get a Pro account to have private Pens, team accounts, different modes, and moooore

THE PENS

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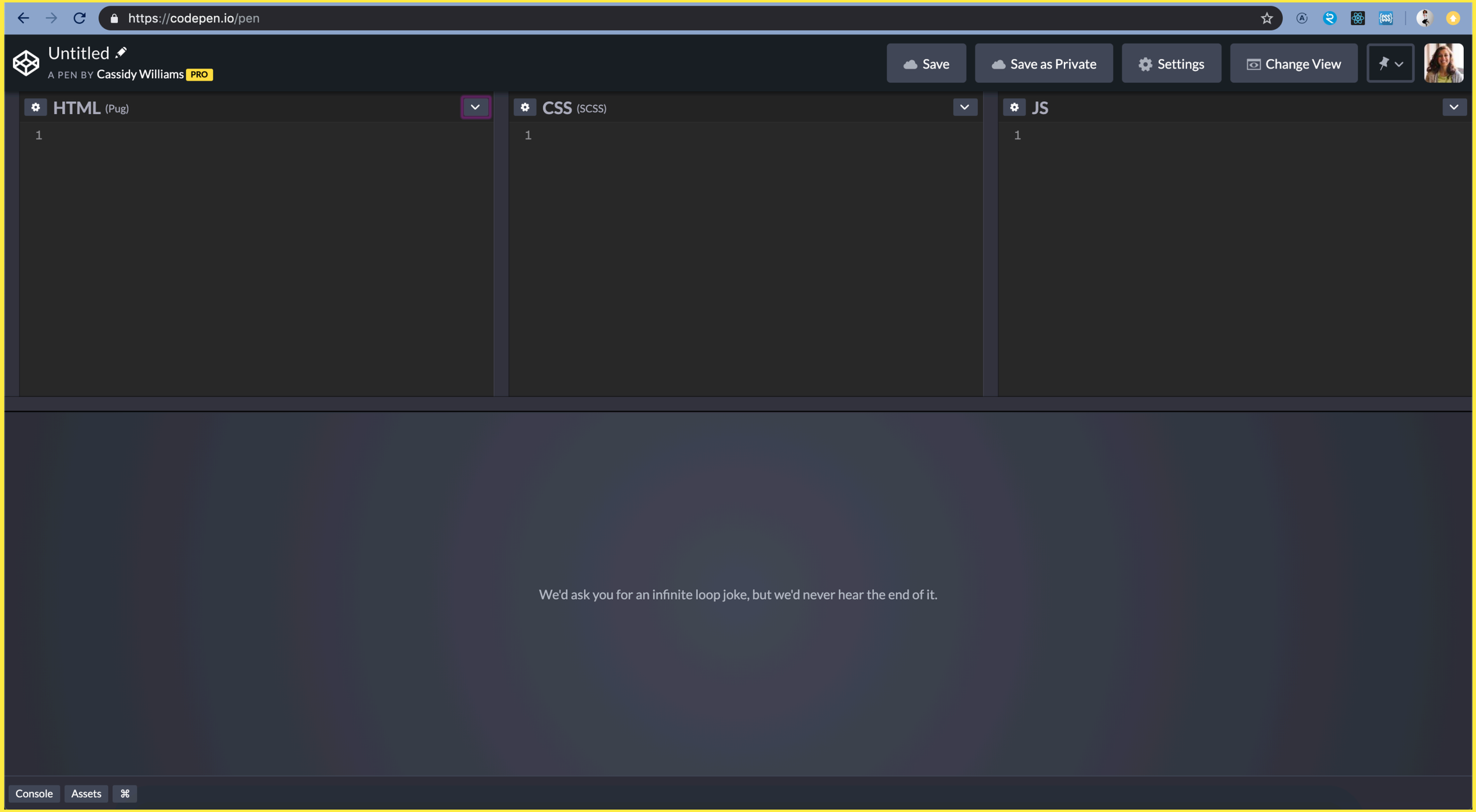
https://codepen.io/pen
Untitled
A PEN BY Cassidy Williams PRO
Save
Save as Private
Settings
Change View
HTML (Pug)
CSS (SCSS)
JS
1
We'd ask you for an infinite loop joke, but we'd never hear the end of it.
Console
Assets

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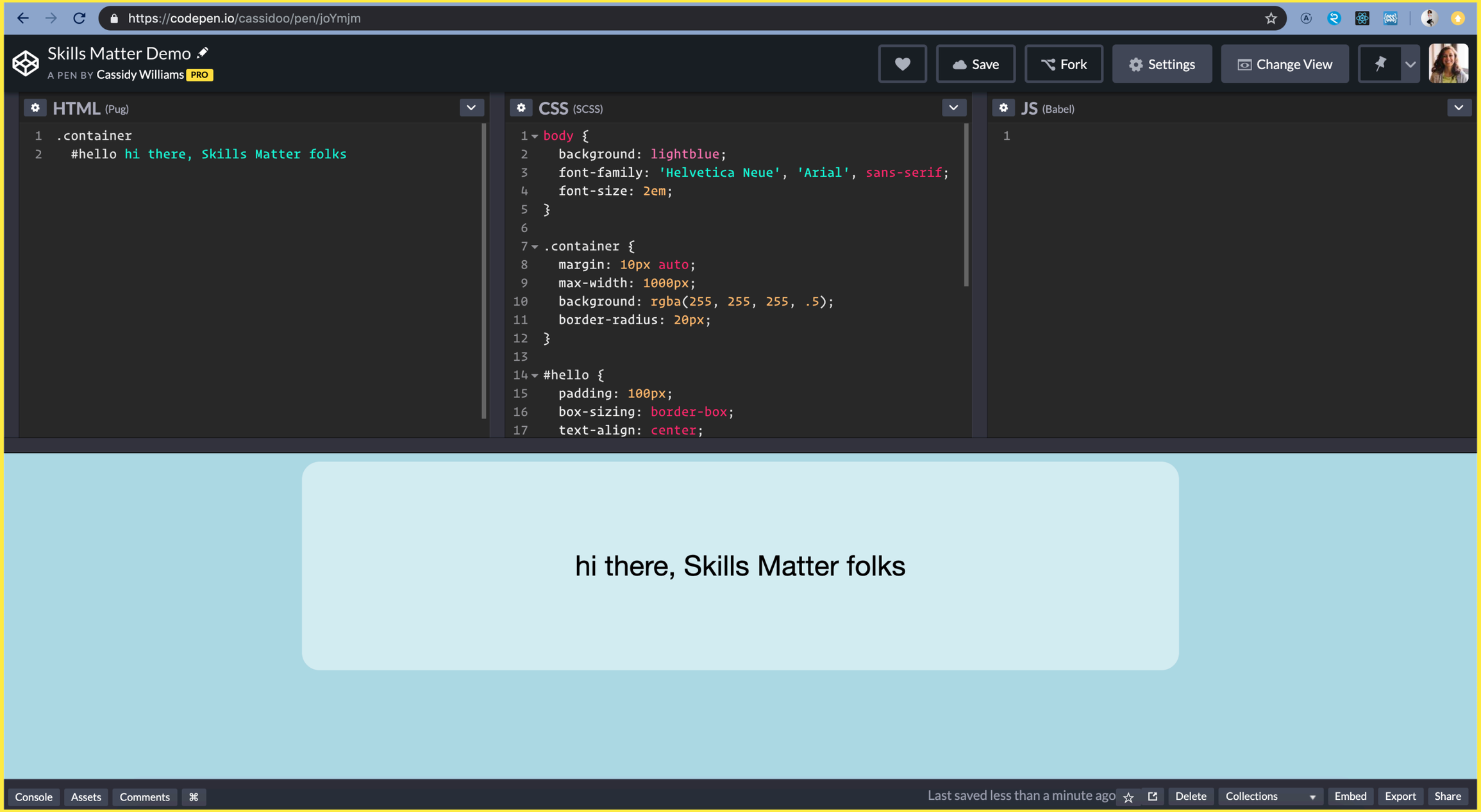
https://codepen.io/cassidoo/pen/joYmjm
Skills Matter Demo
A PEN BY Cassidy Williams PRO
Save
Fork
Settings
Change View
HTML (Pug)
.container
#hello hi there, Skills Matter folks
CSS (SCSS)
body {
background: lightblue;
font-family: 'Helvetica Neue', 'Arial', sans-serif;
font-size: 2em;
}
.container {
margin: 10px auto;
max-width: 1000px;
background: rgba(255, 255, 255, .5);
border-radius: 20px;
}
#hello {
padding: 100px;
box-sizing: border-box;
text-align: center;
JS (Babel)
hi there, Skills Matter folks
Console
Assets
Comments
Last saved less than a minute ago
Delete
Collections
Embed
Export
Share

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https://codepen.io/cassidoo/pen/joYmjm

Skills Matter Demo

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Save | Fork | Settings | Change View

HTML (Pug)

```
.container
  #hello hi there, Skills Matter folks
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CSS (SCSS)

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body {
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```

JS (Babel)

```
function doubleSay(x) {
  return `${x} ${x}`;
}

function exclaim(x) {
  return `${x}, Skills Matter!`;
}

let result = "Hello"
  |> doubleSay
  |> exclaim;
result

document.getElementById('hello').innerText = result;
```

Hello Hello, Skills Matter!

Console | Assets | Comments | ⌘ | Last saved less than a minute ago | Delete | Collections | Embed | Export | Share

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```
function doubleSay(x) {
  return `${x} ${x}`;
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function exclaim(x) {
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}

let result = 'Hello' |> doubleSay |> exclaim;
result;

document.getElementById('hello').innerText = result;
```

LET'S GO BACK IN TIME

LET'S GO BACK IN TIME

- It was very "vanilla" Babel
- babel-polyfill was needed for extra features
- Infinite loop detection was off for both JS and Babel
- Extra plugins didn't work fully

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WHAT WE WANTED

WHAT WE WANTED

- Babel 7, obviously
- All the plugins
- An extendable interface for future things 👀
- Infinite loop detection

ENTERING...

@babel/standalone

```
import { all } from './generated/plugins';
import preset2015 from './preset-es2015';
import presetStage0 from './preset-stage-0';
import presetStage1 from './preset-stage-1';
import presetStage2 from './preset-stage-2';
import presetStage3 from './preset-stage-3';
import presetReact from '@babel/preset-react';
import presetFlow from '@babel/preset-flow';
import presetTypescript from '@babel/preset-typescript';
```

WE HAD TO DO IT OURSELVES

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PLUGINS AND PRESETS

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Browser Support

THUS, WE AXED ALL COMPILATION TO ES2015

WE HAD TO BE EXPLICIT

```
@babel/plugin-proposal-class-properties
@babel/plugin-proposal-decorators
@babel/plugin-proposal-do-expressions
@babel/plugin-proposal-function-bind
@babel/plugin-proposal-function-sent
@babel/plugin-proposal-json-strings
@babel/plugin-proposal-logical-assignment-operators
@babel/plugin-transform-modules-commonjs
@babel/plugin-proposal-nullish-coalescing-operator
@babel/plugin-proposal-numeric-separator
@babel/plugin-proposal-optional-chaining
@babel/plugin-proposal-pipeline-operator
@babel/plugin-proposal-throw-expressions
@babel/plugin-syntax-jsx
@babel/plugin-transform-react-display-name
@babel/plugin-transform-react-jsx
```

CUSTOM PLUGINS

CUSTOM PLUGINS

- Visitor Plugin
- Infinite Loop Plugin

INFINITE LOOP PLUGIN

- You have to navigate the Abstract Syntax Tree
- You can detect all loops and then watch them for an end

INFINITE LOOP PLUGIN

```
function({ types: t }) {
  return {
    visitor: {
      DoWhileStatement(path) {
        injectLoopWatcher(t, path);
      },
      ForStatement(path) {
        injectLoopWatcher(t, path);
      },
      WhileStatement(path) {
        injectLoopWatcher(t, path);
      }
    }
  };
}
```

BABEL CONFIG

BABEL CONFIG

- It determines what is returned by Babel
- We pass our plugins into it
- Docs here: babeljs.io/docs/en/options

BABEL CONFIG

```
{
    code: true,
    comments: true,
    compact: false,
    plugins: getPlugins(),
    retainLines: true,
    sourceMaps: false
}
```

BABEL PROCESSOR

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BABEL PROCESSOR

1. Build the custom CodePen Babel 7 config
2. Process the code
3. Check for errors, code and import errors
4. Build a response to a valid transpile

PROCESSING

PROCESSING

- Build a valid instance of the Babel library
- Transpile JS using the Babel library

```
const transpileWithBabel = (textInput, babelOptions) => {
  const validConfig = babelConfig.buildValidConfig(babelOptions);
  const transpiled = babelTransformSync(textInput, validConfig);

  const { code, metadata } = transpiled;
  const { assets } = metadata;

  return {
    assets,
    code,
  };
};
```

ERRORS

ERRORS

- Validate imports in JS are valid
- Find missing dependencies
- Make sure code can run

```
const getExceptionErrors = error => {
  const line = error && error.loc ? error.loc.line : 1;
  let { message } = error;

  return [
    {
      message,
      code: ERRORS.PROCESSING,
      info: {
        level: LEVELS.ERROR,
        line,
        version: '',
      },
    },
  ];
};
```

CLIENT RESPONSE

CLIENT RESPONSE

- Report errors with messages and line numbers
- Give the caller the processed code and bundle data response it needs to build the final template

```
const processFile = config => {
  try {
    const babelOptions = buildBabelOptions(config);
    const transpiled = transpileWithBabel(config.textInput, babelOptions);

    const { code } = transpiled;
    const { dependencies } = babelOptions;

    return {
      code,
      errors: findErrors(),
    };
  } catch (error) {
    return buildErrorResponse(config, error);
  }
};
```

phew

TESTS!

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TESTS

- Babel tests, plugin tests, client tests, and mooore
- We individually tested every plugin and function

```
test('compiles optional chaining', () => {
  const content = `
      const obj = {
        bar: { baz: 42 }
      };

      const baz = obj?.bar?.baz;
    `;
  const config = testGlobals.getBabelConfig('babel', {}, true, content);

  const result = babelProcessor.processFile(config);
  const { code, errors } = result;

  expect(errors).toEqual([]);

  const expectedResult = `
    var _obj$bar;
    const obj = {
      bar: {
        baz: 42 } };

    const baz = obj === null || obj === void 0 ?
      void 0 : (_obj$bar = obj.bar) === null || _obj$bar === void 0 ?
        void 0 : _obj$bar.baz;
    `;

  expect(customMatchers.whitespaceMatcher(code, expectedResult).pass).toBeTruthy();
});
```

HOOKING IT UP TO THE CLIENT

(I DID NOT DO THIS AND IT'S STILL FAIRLY MAGICAL TO ME)

HOOKING IT UP TO THE CLIENT

- Importing the Babel Processor lib as an external package
- Setting up a webworker to listen for code changes
- Running infinite loop detection, even when Babel is off
- Setting up the UI to respond and react to errors

And voilà

And voilà

- Babel 7 ✔
- All the plugins ✔
- An extendable interface for future things ✔
- Infinite loop detection ✔

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Thank you ❤

QUESTIONS?

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Thank you ❤

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