

ReactJS (JSX vs NoJSX)

JSX (JavaScript XML) is a syntax for embedding XML directly into JavaScript code.

This allows for some neat new logical paths, such as returning a block of HTML code to the caller of a JavaScript function.

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The Gist of JSX

Assuming you have imported a component called `MetadataTable`, you could call `React.createElement()` with classic JavaScript:

```
<script>
  // Without JSX, we can only use plain old JavaScript
  var nojsxContainer = document.querySelector('#react_test_nojsx');
  ReactDOM.render(React.createElement(MetadataTable), nojsxContainer);
</script>
```

Or you could choose to use JSX to directly embed HTML/XML into your JavaScript:

```
<script>
  // With JSX, we can use a syntax that feels a bit more like Scala
  // Notice how we have HTML(XML) embedded in our JavaScript
  var jsxContainer = document.querySelector('#react_test_jsx');
  ReactDOM.render(
    <MetadataTable />,
    jsxContainer
  );
</script>
```

Such a simple example doesn't really illustrate the power of JSX, so let's dive a bit deeper.

How JSX can Simplify Complex Components

Without JSX, the developer ends up calling `React.createElement()` a lot. Like, a LOT a lot.

When things get even the slightest bit complex, the `React.createElement()` syntax (and even the `e()` shorthand) become very tedious to continuously repeat.

This is where JSX can truly shine - rather than a mess of `e('div', {}, e('div', {}, e('div', {}, ... )))`, we can use the cleaner, more familiar syntax of `<div><div><div>...</div></div></div>`

Below, I have provided a few test files. To see these examples in action, simply copy them to your local machine.

You can then view them by navigating a browser to `file:///path/to/example.index.html`

Custom Components Written without JSX

Here is an example of a component written without JSX that can be run by your browser without any compilation necessary - notice that `e()` is a shorthand for `React.createElement()`:

react-nojsx.index.html

```
<!-- Load Bootstrap CSS from CDN -->
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css" integrity="
sha384-BVYiiSIFeK1dGmJRAkycuHAHRg320Mucww7on3RYdg4Va+PmSTsz/K68vbdEjh4u" crossorigin="anonymous">
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap-theme.min.css"
integrity="sha384-rHyoN1iRsVX4nD0JutLnGaslCJuC7uwjduW9SVrLvRYooPp2bWYmgJQIXwL/Sp" crossorigin="anonymous">

<!-- Load React from CDN -->
```

```

<!-- Note: when deploying to production, replace "development.js" with "production.min.js". -->
<script src="//unpkg.com/react@16/umd/react.development.js" crossorigin></script>
<script src="//unpkg.com/react-dom@16/umd/react-dom.development.js" crossorigin></script>
<div id="react_test">Component failed to load</div>

<script>
  'use strict';

  var e = window.React.createElement;
  var ReactDOM = window.ReactDOM;

  class MetadataTable extends React.Component {
    constructor(props) {
      super(props);
      this.state = {
        headers: [
          { key: 'name', label: 'Name' },
          { key: 'type', label: 'Type' },
          { key: 'lastUpdated', label: 'Last Updated' },
          { key: 'value', label: 'Value' },
          { key: 'additionalActions', label: 'More...' }
        ],
        data: [
          { 'name': 0, 'value': 'hello' },
          { 'name': 1, 'value': 'react' },
          { 'name': 2, 'value': 'without' },
          { 'name': 3, 'value': 'jsx' },
        ]
      };
    }

    getTableHeaders() {
      var tableHeaders = [];
      for(var i = 0; i < this.state.headers.length; i++) {
        var header = this.state.headers[i];
        var uniqueKey = 'table_header_' + header.key;

        // Push table header cells into the header row
        tableHeaders.push(e('th', { 'key': uniqueKey, 'width': `${100 / this.state.headers.length}%` }, `${header.label}`));
      }

      // Accumulate and return table header elements
      return tableHeaders;
    }

    getTableRowData() {
      var tableRows = [];
      for(var i = 0; i < this.state.data.length; i++) {
        var item = this.state.data[i];
        var uniqueKey = 'table_row_data_' + i.toString();
        var rowData = [];

        // Loop over selected headers to print table row values
        for(var j = 0; j < this.state.headers.length; j++) {
          var header = this.state.headers[j];
          var uniqueKey = 'table_' + header.key.toString() + '_' + i.toString();

          // Push table cell values into a "row"
          rowData.push(e('td', { 'key': uniqueKey, 'width': `${100 / this.state.headers.length}%` }, `${item[header.key]}`));
        }

        // Push rows of cells into the table
        tableRows.push(e('tr', { 'key': uniqueKey }, rowData));
      }

      // Accumulate and return table row elements
      return tableRows;
    }
  }

```

```

    handleNewValueChange(event) {
      console.debug("OnChange Event:", event);
      this.setState({ 'newValue': event.target.value });
    }

    addNew(event) {
      console.debug("OnClick Event:", event);
      let data = this.state.data;
      data.push({ 'name': this.state.data.length, 'value': this.state.newValue });
      this.setState({ 'data': data });
      this.setState({ 'newValue': '' });
    }

    render() {
      // Re-fetch selected headers and row data
      var tableHeaders = this.getTableHeaders();
      var tableRows = this.getTableRowData();

      // Append an additional row with a submit button to the form
      tableRows.push(e('tr', { 'key': 'submitBtn' },
        e('td', {},
          e('input', {
            'placeholder': 'Dummy text input...',
            'value': this.state.newValue,
            onChange: (event) => this.handleNewValueChange(event)
          })
        ),
        e('td', {},
          e('button', {
            'className': 'btn btn-xs btn-primary',
            onClick: (event) => this.addNew(event)
          }, 'Add new')
        )
      ));

      // Render the table data with React
      return e('div', { 'className': 'table-responsive' },
        e('table', { 'className': 'table table-condensed table-hover'},
          e('thead', {},
            e('tr', { 'key': 'headers' }, tableHeaders)),
          e('tbody', {}, tableRows)
        )
      );
    }
  }

  console.log("Rendering!");
  var domContainer = document.querySelector('#react_test');
  ReactDOM.render(e(Metadatable), domContainer);
  console.log("Rendered!");
</script>

```

With JSX

Now, here is the same component converted to use JSX syntax - note that the browser can no longer directly interpret this code, which must be compiled or "transpiled" using [Babel](#) or something similar. Since we will need to compile the JSX down to CommonJS anyways, we can safely use ES6 syntax (such as [the "let" keyword](#) or [arrow functions](#)) without worrying about browser support, since the compiler should translate these shorthands to their equivalent CommonJS representation.

Notice that we are no longer passing around the values returned from `React.createElement` ... in fact, we don't even explicitly call `React.createElement` at all:

react-jsx.index.html

```

<!-- Load Bootstrap CSS from CDN -->
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css" integrity="sha384-BVYiiSIFeK1dGmJRAkycuHAHRg320mUcww7on3RYdg4Va+PmSTsz/K68vbdEjh4u" crossorigin="anonymous">
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap-theme.min.css" integrity="sha384-rHyoN1iRsVxV4nD0JutlnGaslCJuC7uwjduW9SVrLvRYooPp2bWYgmgJQIXwl/Sp" crossorigin="anonymous">

```

```

<!-- Load React from CDN -->
<!-- Note: when deploying to production, replace "development.js" with "production.min.js". -->
<script src="//unpkg.com/react@16/umd/react.development.js" crossorigin></script>
<script src="//unpkg.com/react-dom@16/umd/react-dom.development.js" crossorigin></script>
<div id="react_test">Component failed to load</div>

<!-- STOP! The contents of the following script tag can be compiled with the debugger console, located
here: https://babeljs.io/en/repl -->
<!-- See react-jsx-compiled.index.html for compiled browser-ready results -->
<script>
  'use strict';

  let ReactDOM = window.ReactDOM;

  // TypeScript used here - feels like a more formal JavaScript
  class MetadataTable extends React.Component {
    constructor(props) {
      super(props);
      this.state = {
        headers: [
          { key: 'name', label: 'Name' },
          { key: 'type', label: 'Type' },
          { key: 'lastUpdated', label: 'Last Updated' },
          { key: 'value', label: 'Value' },
          { key: 'additionalActions', label: 'More...' }
        ],
        data: [
          { 'name': 0, 'value': 'hello' },
          { 'name': 1, 'value': 'react' },
          { 'name': 2, 'value': 'with' },
          { 'name': 3, 'value': 'jsx' },
        ],
        newValue: ''
      };
    }

    getTableHeaders() {
      let tableHeaders = [];
      for(let i = 0; i < this.state.headers.length; i++) {
        let header = this.state.headers[i];
        let uniqueKey = 'table_header_' + header.key;

        // Push table header cells into the header row
        // Notice that we no longer return an HTML element here
        tableHeaders.push({ 'key': uniqueKey, 'width': (100 / this.state.headers.length).toString()
+ '%', 'label': header.label });
      }

      // Accumulate and return table header data
      return tableHeaders;
    }

    getTableRowData() {
      let tableRows = [];
      for(let i = 0; i < this.state.data.length; i++) {
        let item = this.state.data[i];
        let uniqueKey = 'table_row_data_' + i.toString();
        let rowData = [];

        // Loop over selected headers to print table row values
        for(let j = 0; j < this.state.headers.length; j++) {
          let header = this.state.headers[j];
          let uniqueKey = 'table_' + header.key.toString() + '_' + i.toString();

          // Push table cell values into a "row"
          // Notice that we no longer return an HTML element here
          rowData.push({ 'key': uniqueKey, 'width': (100 / this.state.headers.length).toString()
+ '%', 'label': item[header.key] });
        }

        // Push the row of cell data into the table

```

```

        // Notice that we no longer return an HTML element here
        tableRows.push({ key: uniqueKey, 'data': rowData });
    }

    // Accumulate and return table row data
    return tableRows;
}

handleNewValueChange(event) {
    console.debug("OnChange Event:", event);
    this.setState({ 'newValue': event.target.value });
}

addNew(event) {
    console.debug("OnClick Event:", event);
    let data = this.state.data;
    data.push({ 'name': this.state.data.length, 'value': this.state.newValue });
    this.setState({ 'data': data });
    this.setState({ 'newValue': '' });
}

render() {
    // Re-fetch selected headers and row data
    let tableHeaders = this.getTableHeaders();
    let tableRows = this.getTableRowData();

    // Render the table data with React
    // NOTE: JSX syntax is returned - feels a bit like Scala
    return (
        <div className='table-responsive'>
            <table className='table table-condensed table-hover'>
                <thead>
                    <tr>
                        {tableHeaders.map((item, i) => {
                            // For each column header in tableHeaders
                            return (<th key={item.key} width={item.width}>{item.label}</th>);
                        })}
                    </tr>
                </thead>
                <tbody>
                    {tableRows.map((row, i) => {
                        // For each row in tableRows
                        return (
                            <tr key={row.key}>
                                {row.data.map((cell, j) => {
                                    // For each cell in the row
                                    return (<td key={cell.key} width={cell.width}>{cell.label}<
/td>);
                                })}
                            </tr>
                        );
                    })}
                </tbody>
            </table>
            <div>
                <td>
                    <input placeholder='Dummy text input...' value={this.state.newValue}
onChange={this.handleNewValueChange} />
                </td>
                <td>
                    <button className='btn btn-xs btn-primary' onClick={(event) => { this.
addNew(event, this.state.newValue) }}>Add new</button>
                </td>
            </tr>
        </tbody>
    </table>
    </div>
    );
}

console.log("Rendering!");
let domContainer = document.querySelector('#react_test');
```

```

    ReactDOM.render(
      <MetadataTable />,
      domContainer
    );
    console.log("Rendered!");
  </script>

```

Compilation Step

JSX requires us to compile down to JavaScript - to do this, we simply pass our source code through a [Babel compiler](#).

There are many build tools / plugins which can perform this step as well, but I chose to use the [Babel web debugger](#) for this simple example.

The result of the compilation might look as follows - Note that the compiler has replaced the JSX parts in the code below with nested calls to `React.createElement()`.

This compiled output can be then immediately consumed by your browser:

react-jsx-compiled.index.html

```

<!-- Load Bootstrap CSS from CDN -->
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css" integrity="
sha384-BVYiiSIFeK1dGmJRAKycuHAHRg320mUcw7on3RYdg4Va+PmSTsz/K68vbdEjh4u" crossorigin="anonymous">
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap-theme.min.css"
integrity="sha384-rHyoN1iRsVXV4nD0JutlnGaslCJuC7uwjduW9SVrLvRYooPp2bWYgmgJQIXwl/Sp" crossorigin="anonymous">

<!-- Load React from CDN -->
<!-- Note: when deploying to production, replace "development.js" with "production.min.js". -->
<script src="//unpkg.com/react@16/umd/react.development.js" crossorigin></script>
<script src="//unpkg.com/react-dom@16/umd/react-dom.development.js" crossorigin></script>
<div id="react_test">Component failed to load</div>

<!-- STOP! The contents of the following script tag were compiled using the debugger console, located here:
https://babeljs.io/en/repl -->
<!-- See react-jsx.index.html for original compilation source -->
<script>
  'use strict';

  var _createClass = function () { function defineProperties(target, props) { for (var i = 0; i < props.
length; i++) { var descriptor = props[i]; descriptor.enumerable = descriptor.enumerable || false; descriptor.
configurable = true; if ("value" in descriptor) descriptor.writable = true; Object.defineProperty(target,
descriptor.key, descriptor); } } return function (Constructor, protoProps, staticProps) { if (protoProps)
defineProperties(Constructor.prototype, protoProps); if (staticProps) defineProperties(Constructor,
staticProps); return Constructor; }; }();

  function _classCallCheck(instance, Constructor) { if (!(instance instanceof Constructor)) { throw new
TypeError("Cannot call a class as a function"); } }

  function _possibleConstructorReturn(self, call) { if (!self) { throw new ReferenceError("this hasn't
been initialised - super() hasn't been called"); } return call && (typeof call === "object" || typeof call ===
"function") ? call : self; }

  function _inherits(subClass, superClass) { if (typeof superClass !== "function" && superClass !== null)
{ throw new TypeError("Super expression must either be null or a function, not " + typeof superClass); }
subClass.prototype = Object.create(superClass && superClass.prototype, { constructor: { value: subClass,
enumerable: false, writable: true, configurable: true } }); if (superClass) Object.setPrototypeOf ? Object.
setPrototypeOf(subClass, superClass) : subClass.__proto__ = superClass; }

  var ReactDOM = window.ReactDOM;

  // TypeScript used here - feels like a more formal JavaScript

  var MetadataTable = function (_React$Component) {
    _inherits(MetadataTable, _React$Component);

    function MetadataTable(props) {
      _classCallCheck(this, MetadataTable);

      var _this = _possibleConstructorReturn(this, (MetadataTable.__proto__ || Object.getPrototypeOf

```

```
(MetadataTable)).call(this, props));
```

```
    _this.state = {
      headers: [{ key: 'name', label: 'Name' }, { key: 'type', label: 'Type' }, { key:
'lastUpdated', label: 'Last Updated' }, { key: 'value', label: 'Value' }, { key: 'additionalActions', label:
'More...' }],
      data: [{ 'name': 0, 'value': 'hello' }, { 'name': 1, 'value': 'react' }, { 'name': 2,
'value': 'with' }, { 'name': 3, 'value': 'jsx' }],
      newValue: ''
    };
    return _this;
  }

  _createClass(MetadataTable, [{
    key: 'getTableHeaders',
    value: function getTableHeaders() {
      var tableHeaders = [];
      for (var i = 0; i < this.state.headers.length; i++) {
        var header = this.state.headers[i];
        var uniqueKey = 'table_header_' + header.key;

        // Push table header cells into the header row
        tableHeaders.push({ 'key': uniqueKey, 'width': (100 / this.state.headers.length).
toString() + '%', 'label': header.label });
      }

      // Accumulate and return table header data
      return tableHeaders;
    }
  }, {
    key: 'getTableRowData',
    value: function getTableRowData() {
      var tableRows = [];
      for (var i = 0; i < this.state.data.length; i++) {
        var item = this.state.data[i];
        var uniqueKey = 'table_row_data_' + i.toString();
        var rowData = [];

        // Loop over selected headers to print table row values
        for (var j = 0; j < this.state.headers.length; j++) {
          var header = this.state.headers[j];
          var _uniqueKey = 'table_' + header.key.toString() + '_' + i.toString();

          // Push table cell values into a "row"
          rowData.push({ 'key': _uniqueKey, 'width': (100 / this.state.headers.length).
toString() + '%', 'label': item[header.key] });
        }

        // Push the row of cell data into the table
        tableRows.push({ key: uniqueKey, 'data': rowData });
      }

      // Accumulate and return table row data
      return tableRows;
    }
  }, {
    key: 'handleNewValueChange',
    value: function handleNewValueChange(event) {
      console.debug("OnChange Event:", event);
      this.setState({ 'newValue': event.target.value });
    }
  }, {
    key: 'addNew',
    value: function addNew(event) {
      console.debug("OnClick Event:", event);
      var data = this.state.data;
      data.push({ 'name': this.state.data.length, 'value': this.state.newValue });
      this.setState({ 'data': data });
      this.setState({ 'newValue': '' });
    }
  }, {
```

```

key: 'render',
value: function render() {
    var _this2 = this;

    // Re-fetch selected headers and row data
    var tableHeaders = this.getTableHeaders();
    var tableRows = this.getTableRowData();

    // Render the table data with React
    // NOTE: JSX syntax is returned - feels a bit like Scala
    return React.createElement(
        'div',
        { className: 'table-responsive' },
        React.createElement(
            'table',
            { className: 'table table-condensed table-hover' },
            React.createElement(
                'thead',
                null,
                React.createElement(
                    'tr',
                    null,
                    tableHeaders.map(function (item, i) {
                        // For each column header in tableHeaders
                        return React.createElement(
                            'th',
                            { key: item.key, width: item.width },
                            item.label
                        );
                    })
                )
            ),
            React.createElement(
                'tbody',
                null,
                tableRows.map(function (row, i) {
                    // For each row in tableRows
                    return React.createElement(
                        'tr',
                        { key: row.key },
                        row.data.map(function (cell, j) {
                            // For each cell in the row
                            return React.createElement(
                                'td',
                                { key: cell.key, width: cell.width },
                                cell.label
                            );
                        })
                    );
                })
            ),
            React.createElement(
                'tr',
                null,
                React.createElement(
                    'td',
                    null,
                    React.createElement('input', { placeholder: 'Dummy text input...' },
value: this.state.newValue, onChange: this.handleNewValueChange })
                ),
                React.createElement(
                    'td',
                    null,
                    React.createElement(
                        'button',
                        { className: 'btn btn-xs btn-primary', onClick: function onClick
(event) {
                            _this2.addNew(event, _this2.state.newValue);
                        } },
                        'Add new'
                    )
                )
            )
        )
    );
}

```



```
    )
  )
)
);
}
});

    return MetadataTable;
}(React.Component);

console.log("Rendering!");
var domContainer = document.querySelector('#react_test');
ReactDOM.render(React.createElement(MetadataTable, null), domContainer);
console.log("Rendered!");
</script>
```