

Web Application Development for Industrial Engineers

การพัฒนาแอปพลิเคชันสำหรับวิศวกรอุตสาหกรรม

Module bundler

What is a module bundler?

- Module bundlers are tools to bundle JavaScript modules into a single JavaScript files that can be executed in the browser.

Bundling?

- In a large application, you usually split JavaScript code into multiple files.
 - Using a `module` system.
 - This makes code more maintainable.
- A bad way is to add JavaScript files into html via script tags.

```
<head>
  <script src="/src/this.js"></script>
  <script src="/src/is.js"></script>
  <script src="/src/a.js"></script>
  <script src="/src/bad.js"></script>
  <script src="/src/way.js"></script>
</head>
```

Why is this bad?

- Each file requires a separate http requests.
 - 5 round trip requests in order to get your application started.
- You have to make sure the order is correct.
- You have to prevent naming conflicts between "files".
- How do we get rid of unused files?

Other problems

- How do we maintain the correct links to assets like images, fonts, css files?
- How can we make sure our code runs in most browsers?
- How can we minify the code?
- We can benefit from a tool that analyzes the code.

Module bundlers aim to solve these kinds of problems.

Popular bundlers

- [Webpack](#)
 - We will use this.
- [Rollup](#)
- [Parcel](#)

Webpack installation

```
mkdir webpack-demo  
cd webpack-demo  
npm init -y  
npm install webpack webpack-cli --save-dev
```


Entry and output

- Create `src` folder and `index.js` file
- Create `dist` folder and `index.html` file

```
root
├── dist
│   └── index.html
└── src
    └── index.js
```

Entry and output

- In `index.html`, add to the header

```
<script src="main.js" defer></script>
```

Webpack configuration

- Create `webpack.config.js`



- webpack.config.js

```
const path = require('path');

module.exports = {
  entry: './src/index.js',
  output: {
    filename: 'main.js',
    path: path.resolve(__dirname, 'dist'),
  },
  devtool: 'eval-source-map',
  mode: 'development',
};
```

VSCode configuration

- create `jsconfig.json`



- jsconfig.json

```
{  
  "compilerOptions": {  
    "baseUrl": "."  
  },  
  "include": ["src"],  
  "exclude": ["node_modules"]  
}
```

Write some code

- `index.js`

```
const div = document.createElement('div');  
const p1 = document.createElement('p');  
p1.textContent = 'Hello from Webpack.';  
div.appendChild(p1);  
document.body.append(div);
```

Building code

- In `terminal`

```
npx webpack --config webpack.config.js
```

- or

```
npx webpack
```

- If a `webpack.config.js` is present, the `webpack` command picks it up by default.
- Inspect the `dist` folder to see the bundled code.

NPM scripts

- `package.json`

```
{  
  "scripts": {  
    "test": "echo \"Error: no test specified\" && exit 1",  
    "build": "webpack"  
  }  
}
```

- Don't forget the extra `,`.

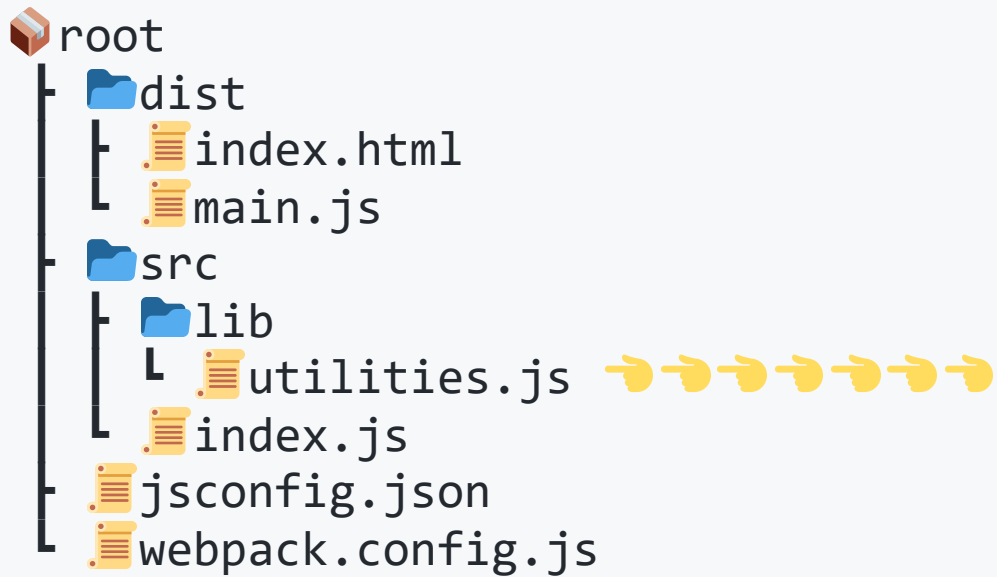
NPM scripts

- Now we can type in the `terminal`.

```
npm run build
```

Import

- Create a file `utilities.js`



- Add the following code to `utilities.js`.

```
function getMessage() {  
    return 'Module is working, nice!';  
}  
  
const data = {  
    name: 'Tim',  
    age: 20,  
};  
  
export { getMessage, data };
```

- `index.js`

```
import { getMessage } from './lib/utilities';
import { data } from './lib/utilities';

const div = document.createElement('div');
const p1 = document.createElement('p');
p1.textContent = 'Hello from Webpack.';
div.appendChild(p1);

const p2 = document.createElement('p');
p2.textContent = getMessage();
div.appendChild(p2);

console.log(data);

document.body.append(div);
```

- Check the page and console.

Loading CSS

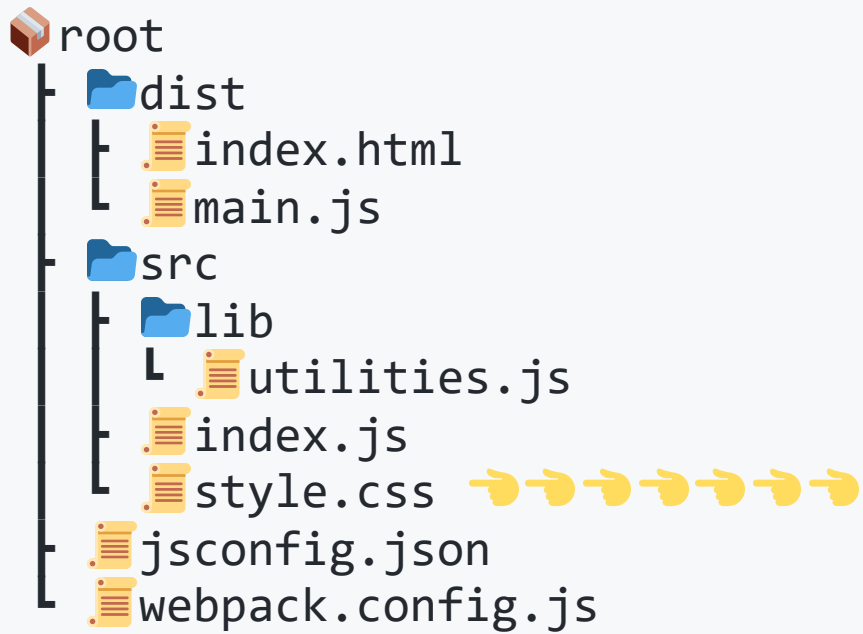
- In order to import a CSS file from within a JavaScript module, you need to install and add the `style-loader` and `css-loader` to your module configuration:

```
npm install --save-dev style-loader css-loader
```

- Modify `webpack.config.js`

```
module.exports = {  
  // ...  
  module: {  
    rules: [  
      {  
        test: /\.css$/i,  
        use: ['style-loader', 'css-loader'],  
      },  
    ],  
  },  
};
```

- Create `./src/style.css`



- Add in `style.css`

```
.main {  
  font-family: Arial, Helvetica, sans-serif;  
  font-size: 1.5rem;  
}
```

- Modify `index.js`

```
import { getMessage } from './lib/utilities';  
import { data } from './lib/utilities';  
import './style.css';  
  
// ...  
  
div.classList.add('main');  
  
document.body.append(div);
```

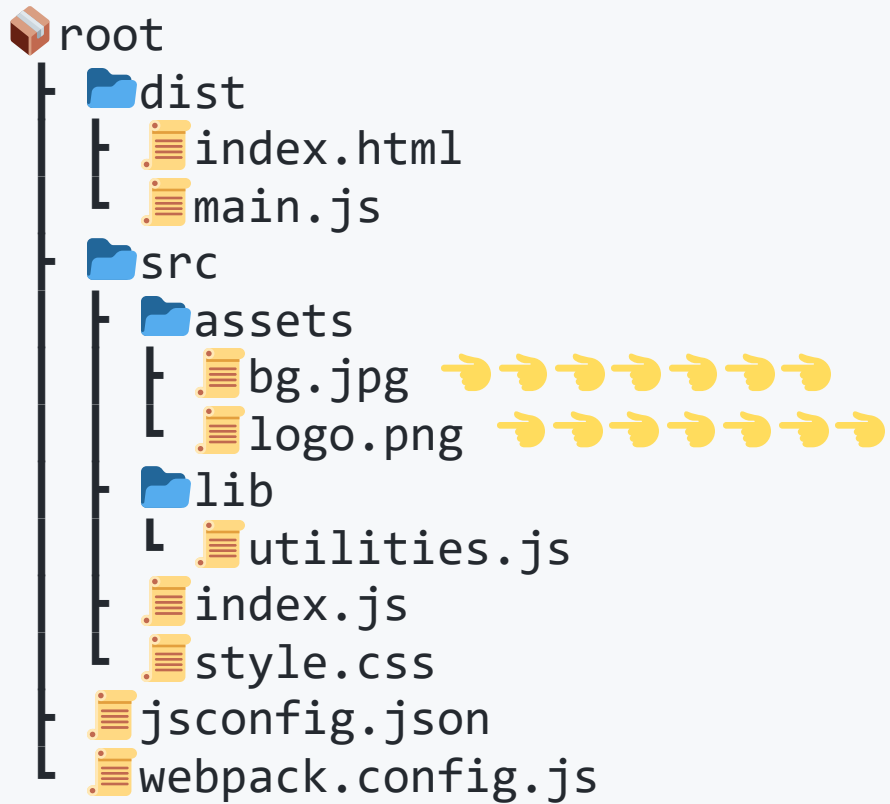
- Build by running `npm run build` in the `terminal`.
- To see what webpack did, inspect the page and look at the page's head tags.

Loading Images

- Modify `webpack.config.js`

```
module.exports = {  
  module: {  
    rules: [  
      {  
        test: /\.css$/i,  
        use: ['style-loader', 'css-loader'],  
      },  
      // Add from here ----->  
      {  
        test: /\.(png|svg|jpg|jpeg|gif)$/i,  
        type: 'asset/resource',  
      },  
    ],  
  },  
};
```

- Add images.



- modify `style.css`

```
.main {  
  font-family: Arial, Helvetica, sans-serif;  
  font-size: 1.5rem;  
}  
  
/* Add here */  
.main {  
  display: flex;  
  flex-direction: column;  
  justify-content: center;  
  align-items: center;  
  height: 100vh;  
  background: url('./assets/bg.jpg');  
  background-repeat: no-repeat;  
  background-size: cover;  
}
```

- Modify `index.js`

```
import { getMessage } from './lib/utilities';  
import { data } from './lib/utilities';  
import './style.css';  
import logoPath from './assets/logo.png';
```

```
// ...
```

```
const logo = new Image(200);  
logo.src = logoPath;  
div.appendChild(logo);  
  
document.body.append(div);
```


- Build by running `npm run build` in the `terminal`.
- You can see that we can now use images in both `CSS` and `JavaScript` files.

Watch mode

- Rebuild automatically when there is a file change.

```
{
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1",
    "build": "webpack",
    "watch": "webpack --watch"
  }
}
```

Using webpack-dev-server

- We can start the server by installing the package.

```
npm install --save-dev webpack-dev-server
```

- Modify `webpack.config.js`

```
module.exports = {  
  // ...  
  devServer: {  
    static: './dist',  
    hot: true,  
  },  
};
```

- Modify `package.json`

```
{  
  "scripts": {  
    "test": "echo \"Error: no test specified\" && exit 1",  
    "build": "webpack",  
    "watch": "webpack --watch",  
    "start": "webpack serve --open"  
  }  
}
```

- And simply run:

```
npm start
```