Webpack-公开课

课堂目标

- 理解webpack打包流程
- AST基础知识
- 分析模块之间依赖图谱
- 动手实现简易webpack

webpack打包原理分析

webpack 在执行npx webpack进行打包后，都干了什么事情?

```
(function(modules) {
  var installedModules = {};

  function __webpack_require__(moduleId) {
    if (installedModules[moduleId]) {
      return installedModules[moduleId].exports;
    }
    var module = (installedModules[moduleId] = {
      i: moduleId,
      l: false,
      exports: {}
    });
    modules[moduleId].call(
      module.exports,
      module,
      module.exports,
      __webpack_require__
    );
    module.l = true;
    return module.exports;
  }
  return __webpack_require__((__webpack_require__.s =
"./index.js"));
})({
  "./index.js": function(module, exports) {
    eval(
      '// import a from "./a";\n\nconsole.log("hello
word");\n\n\n//# sourceURL=webpack:///./index.js?'
    );
  }
});
```

大概的意思就是，我们实现了一个**webpack_require** 来实现自己的模块化，把代码都缓存在installedModules里，代码文件以对象传递进来，key是路径，value是包裹的代码字符串，并且代码内部的require，都被替换成了**webpack_require**

自己实现一个bundle.js

- 模块分析：读取入口文件，分析代码

```
const fs = require("fs");

const fenximokuai = filename => {
  const content = fs.readFileSync(filename, "utf-8");
  console.log(content);
};

fenximokuai("./index.js");
```

- 拿到文件中依赖，这里我们不推荐使用字符串截取，引入的模块名越多，就越麻烦，不灵活，这里我们推荐使用@babel/parser，这是babel7的工具，来帮助我们分析内部的语法，包括es6，返回一个ast抽象语法树

@babel/parser:https://babeljs.io/docs/en/babel-parser

```
//安装@babel/parser
npm install @babel/parser --save



//bundle.js
const fs = require("fs");
const parser = require("@babel/parser");

const fenximokuai = filename => {
  const content = fs.readFileSync(filename, "utf-8");

  const Ast = parser.parse(content, {
    sourceType: "module"
  });
  console.log(Ast.program.body);
};

fenximokuai("./index.js");
```

- 接下来我们就可以根据body里面的分析结果，遍历出所有的引入模块，但是比较麻烦，这里还是推荐babel推荐的一个模块@babel/traverse，来帮我们处理。

  npm install @babel/traverse --save

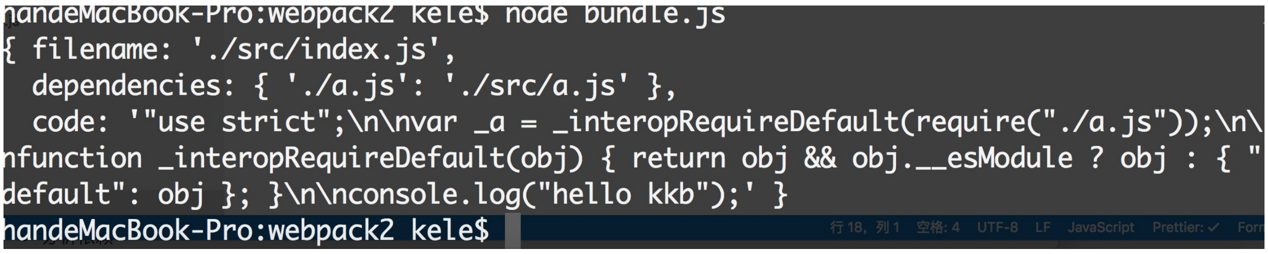
```
const fs = require("fs");
const path = require("path");
const parser = require("@babel/parser");
const traverse = require("@babel/traverse").default;

const fenximokuai = filename => {
  const content = fs.readFileSync(filename, "utf-8");

  const Ast = parser.parse(content, {
    sourceType: "module"
  });

  const dependencies = [];
  //分析ast抽象语法树，根据需要返回对应数据，
  //根据结果返回对应的模块，定义一个数组，接受一下
node.source.value的值
  traverse(Ast, {
    ImportDeclaration({ node }) {
      console.log(node);
      dependencies.push(node.source.value);
    }
  });
  console.log(dependencies);
};

fenximokuai("./index.js");
```



```
handeMacBook-Pro:webpack2 kele$ node bundle.js
{ filename: './src/index.js',
  dependencies: { './a.js': './src/a.js' },
  code: '"use strict";\n\nvar _a = _interopRequireDefault(require("./a.js"));\n\
nfunction _interopRequireDefault(obj) { return obj && obj.__esModule ? obj : { "
default": obj }; }\n\nconsole.log("hello kkb");' }
handeMacBook-Pro:webpack2 kele$
```

分析上图，我们要分析出信息：

- 入口文件
- 入口文件引入的模块
  - 引入路径
  - 在项目中里的路径
- 可以在浏览器里执行的代码

处理现在的路径问题：

```
//需要用到path模块
const parser = require("@babel/parser");

//修改 dependencies 为对象，保存更多的信息
const dependencies = {};

//分析出引入模块，在项目中的路径
const newfilename =
        "./" + path.join(path.dirname(filename),
node.source.value);

//保存在dependencies里
dependencies[node.source.value] = newfilename;
```

把代码处理成浏览器可运行的代码，需要借助@babel/core，和@babel/preset-env，把ast语法树转换成合适的代码

```
const babel = require("@babel/core");

const { code } = babel.transformFromAst(Ast, null, {
    presets: ["@babel/preset-env"]
  });
```

导出所有分析出的信息：

```
return {
    filename,
    dependencies,
    code
  };
```

完成代码参考：

```
const fs = require('fs');
const path = require('path');
const parser = require('@babel/parser');
const traverse = require('@babel/traverse').default;
const babel = require('@babel/core');

const moduleAnalyser = (filename) => {
  const content = fs.readFileSync(filename, 'utf-8');
  const ast = parser.parse(content, {
    sourceType: 'module'
  });
  const dependencies = {};
  traverse(ast, {
    ImportDeclaration({ node }) {
      const dirname = path.dirname(filename);
      const newFile = './' + path.join(dirname,
node.source.value);
      dependencies[node.source.value] = newFile;
    }
  });
  const { code } = babel.transformFromAst(ast, null, {
    presets: ["@babel/preset-env"]
  });
  return {
    filename,
    dependencies,
    code
  }
}

const moduleInfo = moduleAnalyser('./src/index.js');
console.log(moduleInfo);
```

- 分析依赖

上一步我们已经完成了一个模块的分析，接下来我们要完成项目里所有模块的分析：

```
const fs = require('fs');
const path = require('path');
const parser = require('@babel/parser');
const traverse = require('@babel/traverse').default;
const babel = require('@babel/core');
const moduleAnalyser = (filename) => {
  const content = fs.readFileSync(filename, 'utf-8');
  const ast = parser.parse(content, {
    sourceType: 'module'
  });
  const dependencies = {};
  traverse(ast, {
    ImportDeclaration({ node }) {
      const dirname = path.dirname(filename);
      const newFile = './' + path.join(dirname,
node.source.value);
      dependencies[node.source.value] = newFile;
    }
  });
  const { code } = babel.transformFromAst(ast, null, {
    presets: ["@babel/preset-env"]
  });
  return {
    filename,
    dependencies,
    code
  }
}

const makeDependenciesGraph = (entry) => {
  const entryModule = moduleAnalyser(entry);
  const graphArray = [ entryModule ];
  for(let i = 0; i < graphArray.length; i++) {
    const item = graphArray[i];
    const { dependencies } = item;
    if(dependencies) {
      for(let j in dependencies) {
        graphArray.push(
          moduleAnalyser(dependencies[j])
        );
      }
    }
  }
  const graph = {};
  graphArray.forEach(item => {
    graph[item.filename] = {
      dependencies: item.dependencies,
      code: item.code
    }
  });
  return graph;
}

const graghInfo = makeDependenciesGraph('./src/index.js');
console.log(graghInfo);
```

- 生成代码

```
const fs = require('fs');
const path = require('path');
const parser = require('@babel/parser');
const traverse = require('@babel/traverse').default;
const babel = require('@babel/core');

const moduleAnalyser = (filename) => {
  const content = fs.readFileSync(filename, 'utf-8');
  const ast = parser.parse(content, {
    sourceType: 'module'
  });
  const dependencies = {};
  traverse(ast, {
    ImportDeclaration({ node }) {
      const dirname = path.dirname(filename);
      const newFile = './' + path.join(dirname,
node.source.value);
      dependencies[node.source.value] = newFile;
    }
  });
  const { code } = babel.transformFromAst(ast, null, {
    presets: ["@babel/preset-env"]
  });
  return {
    filename,
    dependencies,
    code
  }
}

const makeDependenciesGraph = (entry) => {
  const entryModule = moduleAnalyser(entry);
  const graphArray = [ entryModule ];
  for(let i = 0; i < graphArray.length; i++) {
    const item = graphArray[i];
    const { dependencies } = item;
    if(dependencies) {
      for(let j in dependencies) {
        graphArray.push(
          moduleAnalyser(dependencies[j])
        );
      }
    }
  }
  const graph = {};
  graphArray.forEach(item => {
    graph[item.filename] = {
      dependencies: item.dependencies,
      code: item.code
    }
  });
  return graph;
}

const generateCode = (entry) => {
  const graph =
JSON.stringify(makeDependenciesGraph(entry));
```

```
  return `
    (function(graph){
      function require(module) {
        function localRequire(relativePath) {
          return
require(graph[module].dependencies[relativePath]);
        }
        var exports = {};
        (function(require, exports, code){
          eval(code)
        })(localRequire, exports, graph[module].code);
        return exports;
      };
      require('${entry}')
    })(${graph});
  `;
}

const code = generateCode('./src/index.js');
console.log(code);
```

end