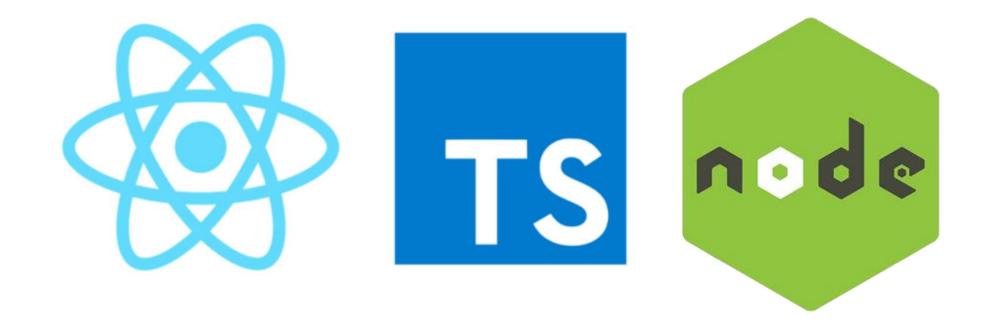


# Full-stack Application Development

**Novelties in ECMAScript 6+** 

#### Where to Find The Code and Materials?

https://github.com/iproduct/react-typescript-academy-2022



#### EcmaScript 6 – ES 2015, Harmony

#### [https://github.com/lukehoban/es6features]

- arrows
- classes
- enhanced object literals
- template strings
- destructuring
- default + rest + spread
- let + const
- iterators + for..of
- Generators
- unicode

- Modules + module loaders
- map + set + weakmap + weakset
- proxies
- symbols
- subclassable built-ins
- Promises
- math + number + string + array + object APIs
- binary and octal literals
- reflect api
- tail calls

# ES6 Classes [http://es6-features.org/]

```
class Shape {
  constructor (id, x, y) {
     this.id = id
     this.move(x, y)
  move (x, y) {
     this.x = x
     this.y = y
```

```
class Rectangle extends Shape {
  constructor (id, x, y, width, height) {
    super(id, x, y)
     this.width = width
    this.height = height
class Circle extends Shape {
  constructor (id, x, y, radius) {
    super(id, x, y)
     this.radius = radius
```

### **Enhanced Object Literals**

```
var obj = {
  // __proto__
  __proto__: theProtoObj,
  // Shorthand for 'handler: handler'
  handler,
  // Methods
  toString() {
   // Super calls
  return "d" + super.toString();
  // Computed (dynamic) property names
  ['prop_' + (() => 42)()]: 42
```

### **Template Strings**

```
// Basic literal string creation
`In JavaScript '\n' is a line-feed.`
// Multiline strings
`In JavaScript this is
not legal.`
// String interpolation
var name = "Bob", time = "today";
`Hello ${name}, how are you ${time}?`
```

### **Tagged Templates**

```
function myTag(strings, personExp, ageExp) {
 let str0 = strings[0]; // "That "
 let str1 = strings[1]; // " is a "
 let str2 = strings[2]; // "."
 let ageStr;
 if (ageExp > 99){
  ageStr = 'centenarian';
 } else {
  ageStr = 'youngster';
return `${str0}${personExp}${str1}${ageStr}${str2}`;
```

```
let person = 'Mike';
let age = 28;

let output =
  myTag`That ${ person } is a ${ age }.`;

console.log(output);
// That Mike is a youngster.
```

### Symbols, Iterators, for-of

```
let fibonacci = {
 [Symbol.iterator]() {
  let pre = 0, cur = 1;
  return {
    next() {
     [pre, cur] = [cur, pre + cur];
     return { value: cur }
for (var n of fibonacci) {
 // truncate the sequence at 1000
 if (n > 1000)
  break;
 console.log(n);
```

#### **Iterators - II**

```
let fibonacci = {
 [Symbol.iterator]() {
  let pre = 0, cur = 1, index = 0;
  return {
    next() {
     [pre, cur] = [cur, pre + cur];
     index++;
     return { done: cur > 1000, value: cur };
for (var n of fibonacci) {
 console.log(n);
```

#### **Generators**

```
var fibonacci = {
 [Symbol.iterator]: function*() {
  var pre = 0,
   cur = 1;
  for (let i = 0; i < 15; i++) {
   var temp = pre;
    pre = cur;
    cur += temp;
   if (cur < 1000) yield cur;
for (var n of fibonacci) {
 // truncate the sequence at 1000
 console.log(n);
```

# Block Scope Vars: let [http://es6-features.org/]

```
for (let i = 0; i < a.length;
  i++) {
  let x = a[i]
for (let i = 0; i < b.length;
  i++) {
  let y = b[i]
```

```
const callbacks = []
for (let i = 0; i <= 2; i++) {
  callbacks[i] =
     function () { return i * 2 }
callbacks[0]() === 0
callbacks[1]() === 2
callbacks[2]() === 4
```

#### **ES6 Arrow Functions and this**

```
• ECMAScript 6:
this.nums.forEach((v) => {
   if ( \vee \% 5 === 0 )
     this.fives.push(v)
})
• ECMAScript 5:
var self = this;
this.nums.forEach(function (v) {
   if (v \% 5 === 0)
     self.fives.push(v);
});
```

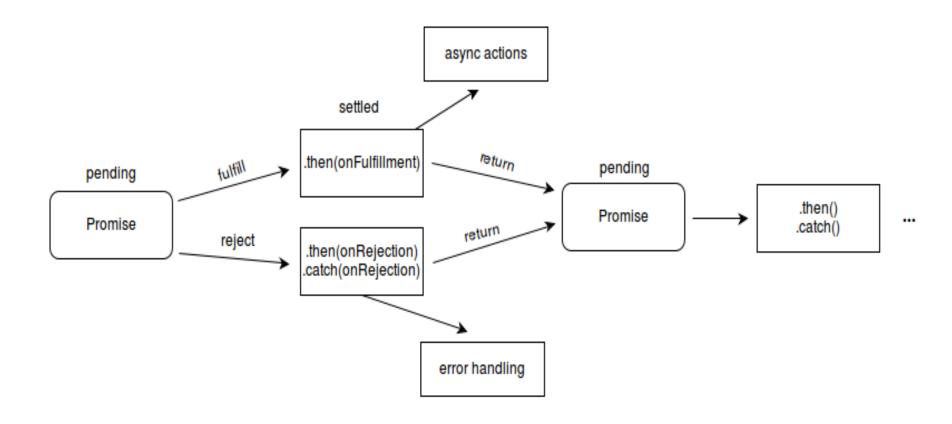
#### Array and Object Destructuring

```
let persons = [
 { name: 'Michael Harrison',
   parents: {
     mother: 'Melinda Harrison',
     father: 'Simon Harrison',
    }, age: 35},
 { name: 'Robert Moore',
   parents: {
     mother: 'Sheila Moore',
     father: 'John Moore',
    }, age: 25}];
for (let {name: n, parents: { father: f }, age } of persons) {
  console.log(`Name: ${n}, Father: ${f}, age: ${age}`);
```

#### ES6 Promises [http://es6-features.org/]

```
function msgAfterTimeout (msg, who, timeout) {
  return new Promise((resolve, reject) => {
    setTimeout(() => resolve(`${msg} Hello ${who}!`), timeout)
  })
msgAfterTimeout("", "Foo", 1000).then((msg) => {
  console.log(`done after 1000ms:${msg}`);
  return msgAfterTimeout(msg, "Bar", 2000);
).then((msg) => {
  console.log(`done after 3000ms:${msg}`)
```

#### **ES6 Promises**



### **Combining ES6 Promises**

```
function fetchAsync (url, timeout, onData, onError) { ... }
fetchPromised = (url, timeout) => {
  return new Promise((resolve, reject) => {
    fetchAsync(url, timeout, resolve, reject)
  })
Promise.all([
  fetchPromised("http://backend/foo.txt", 500),
  fetchPromised("http://backend/bar.txt", 500)
]).then( (data) => {
  let [foo, bar] = data
  console.log(`success: foo=${foo} bar=${bar}`)
}).catch( (err) => {
  console.log(`error: ${err}`)
```

### **Combining ES6 Promises**

```
function fetchAsync (url, timeout, onData, onError) { ... }
fetchPromised = (url, timeout) => {
  return new Promise((resolve, reject) => {
    fetchAsync(url, timeout, resolve, reject)
  })
Promise.all([
  fetchPromised("http://backend/foo.txt", 500),
  fetchPromised("http://backend/bar.txt", 500)
]).then( (data) => {
  let [foo, bar] = data
  console.log(`success: foo=${foo} bar=${bar}`)
console.log(`error: ${err}`)
```

## Async - Await - Try - Catch

```
async function init() {
 try {
       const userResult = await fetch("user.json");
       const user = await userResult.json();
       const gitResp = await fetch(`http://api.github.com/users/${user.name}`);
        const githubUser = await gitResp.json();
       const img = document.createElement("img");
       img.src = githubUser.avatar_url;
       document.body.appendChild(img);
       await new Promise((resolve, reject) => setTimeout(resolve, 6000));
       img.remove();
       console.log("Demo finished.");
 } catch (err) { console.log(err); }
```

#### JavaScript Module Systems - CommonJS

• math.js: exports.add = function() { var sum = 0, i = 0, args = arguments, len = args.length; while (i < len) {</pre> sum += args[i++]; return sum; **}**; • increment.js: var add = require('./math').add; exports.increment = function(val) { return add(val, 1); **}**;

#### <u>JavaScript Module Systems – AMD I</u>

```
//Calling define with module ID, dependency array, and factory
//function
define('myModule', ['dep1', 'dep2'], function (dep1, dep2) {
    //Define the module value by returning a value.
    return function () {};
});
                                                              module 1 module 2 module 3
define(["alpha"], function (alpha) {
    return {
       verb: function(){
                                                              module 1
          return alpha.verb() + 2;
                                                                     module 3
                                                                 module 2
});
```

### JavaScript Module Systems - AMD II

 Asynchronous module definition (AMD) – API for defining code modules and their dependencies, loading them asynchronously, on demand (lazy), dependencies managed, client-side

```
define("alpha", ["require", "exports", "beta"],
 function(require, exports, beta) {
    exports.verb = function() {
     return beta.verb();
     //OR
     return require("beta").verb();
});
define(function (require) {
    require(['a', 'b'], function (a, b) {//use modules a and b
    });
});
```

### <u>JavaScript Module Systems – ES6</u>

```
lib/math.js
export function sum (x, y) { return x + y }
export var pi = 3.141593
// someApp.js
import * as math from "./lib/math"
console.log("2\pi = " + math.sum(math.pi, math.pi))
// otherApp.js
import { sum, pi } from "./lib/math"
console.log("2\pi = " + sum(pi, pi))
// default export from hello.js and import
export default () => ( <div>Hello from React!</div>);
import Hello from "./hello";
```

#### Thank's for Your Attention!



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