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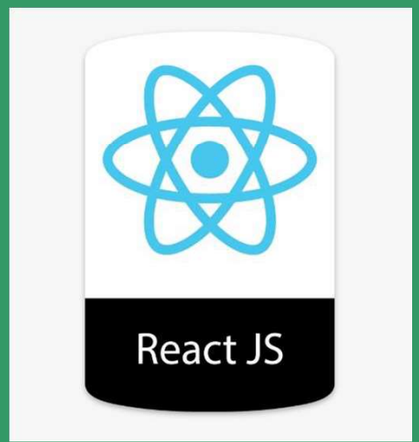
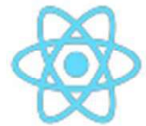
Prior Entering into React JS

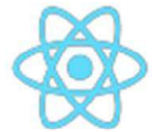


The Recap Need Before Enter React



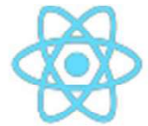
What is React?

- React is a JavaScript library for building user interfaces, that is maintained by Facebook as an Open Source project under the MIT license
- "React is a JavaScript library for building User Interfaces"
  - React applications run in the browser.
  - This facilitates speedier responses to user actions.
  - It is maintained by Facebook and community
- React is a library for building composable user interfaces.
- It has to be emphasised that React is **NOT** a framework; it is a library.
- User Interfaces as in web pages can be split into components.
- Many developers tend to use react as the V in MVC.
- React abstracts the DOM providing a simpler programming model and better performance.



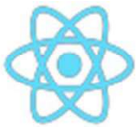
Why React?

- React is a JavaScript library used for building reusable UI components.
- UI state is cumbersome to handle using plain JavaScript.
  - DOM elements need to be manually targeted in order to change the structure of the HTML.
  - Complex web applications that need elements to be added/removed tend to become tedious using just JavaScript/jQuery.
- React helps developers focus on business logic
  - Creators have developed react using patterns and best practices thus ensuring optimal code base for us to start with.
- React enjoys a huge ecosystem and vibrant community support.



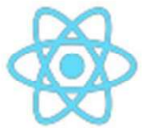
React – ES6

- React applications typically are built with the latest version of JavaScript.
- The newer features allow for the creation of cleaner and robust React applications.
- React itself employs a lot of these newer JavaScript features.
- JavaScript as a language is evolving fairly rapidly.



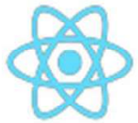
Classes

- Classes are a new feature in ES6, used to describe the blueprint of an object
  - They perceive the transformation of ECMAScript's prototypal inheritance model to a more traditional class-based language.
- ES6 classes offer a much nicer, cleaner and clearer syntax to create objects and deal with inheritance.
- The class syntax is not introducing a new object-oriented inheritance model to JavaScript.



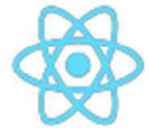
ES 2015

- ES5 has been around since 2009.
  - It is supported by most of the popular browsers.
- In June 2015 a new specification of the JavaScript standard was approved that contains a lot of new features.
- It is called ECMAScript 2015 or also called ES6 as it is the 6th edition of the standard.
  - ECMAScript is the official name of the JavaScript language.
- Existing browsers don't support most of the features of ES6 yet.



ES 2015...

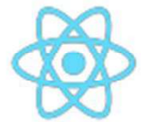
- Feature support across browsers varies widely.
- Are we expected to wait a few years and commence using ES6 after browsers start offering support?
  - http://kangax.github.io/compat-table/es6/
- Fortunately not!
- There are tools that can convert ES6 code into ES5 code.
- We write code using the new useful features of ES6 and generate ES5 code that will work in most of the current browsers.



ES6 / ES 2015

ES6 brings a lot of new features, some of which include:

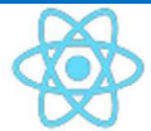
- Classes
- Arrow Functions
- Template Strings
- Inheritance
- Constants and Block Scoped Variables
- Modules



Classes...

```
class Shape {
  constructor(type){
     this.type = type;
  }
  getType(){
      return this.type;
  }
}
```

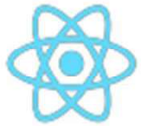
- Use the **`class`** keyword to declare a class.
- **`constructor`** is a special method for creating and initializing an object.
  - There can only be one special method with the name **`constructor`**



Classes...

- The **static** keyword defines a static method for a class.
- Static methods are called without instantiating their class and are not callable when the class is instantiated.
- Static methods are often used to create utility functions for an application.

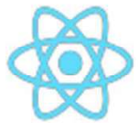
```
class Shape {
  constructor(type){
     this.type = type;
  }
  static getClassName(){
    const name = 'Shape';
       return name;
  }
}

console.log(Shape.getClassName());
```



Subclassing

- The **extends** keyword is used in class declarations to create a class as a child of another class.
- The **super** keyword is used to call functions on an object's parent.

```
class Animal {
  constructor(name) {
    this.name = name;
  }

  speak() {
    console.log(this.name + ' makes a noise.');
  }
}

class Dog extends Animal {
  speak() {
    super.speak();
    console.log(this.name + ' barks.');
  }
  }

var d = new Dog('Mitzie');
d.speak();
```

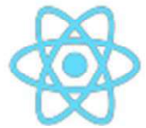


this revisited

- In JavaScript '**this**' keyword is used to refer to the instance of the class.

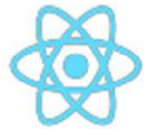
```
var shape = {
  name: 'square',
  say: function(){
        console.log('This is say(): ' + this.name);

        setTimeout(function(){
              console.log('Inside setTimeout(): '
              + this.name);
        }, 2000);
  }
};

shape.say();
```

- The **this.name** is empty when accessed within **setTimeout**.



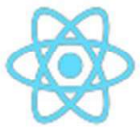
Arrow functions

- ES6 offers new feature for dealing with **`this`**, "**arrow functions**" **=>**
  - Also known as *fat arrow*
- Some of the motivators for a *fat arrow* are:
  - One does not need to specify **`function`**
  - It lexically captures the meaning of **`this`**
- The fat arrow notation can be used to define anonymous functions in a simpler way.
- Helps provide the context to **`this`**



Arrow functions

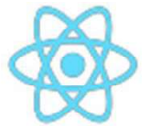
```
var shape = {
      name: 'square',
      say: function(){
            console.log('This is say(): ' + this.name);

            setTimeout(() => {
                  console.log('Inside setTimeout(): ' + this.name);
            }, 2000);
      }
};

shape.say();
```



Arrow functions...

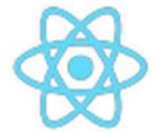
- Arrow functions do not set a local copy of **`this`**, **`arguments`** etc.
- When **`this`** is used in an arrow function, JavaScript uses the **`this`** from the outer scope.
- If **`this`** *should* be the calling context, do not use the arrow function.

let



- **var** variables in JavaScript are *function scoped*.
- This is different from many other languages(Java, C#) where variables are *block scoped*.
- In ES5 JavaScript and earlier, **var** variables are scoped to the function and they can "*see*" outside their functions into the outer context.

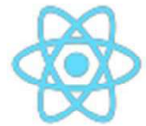
```
var foo = 123;
if(true){
    var foo = 456;
}
console.log(foo);  //456
```



`let`...

- ES6 introduces the **`let`** keyword to allow defining variables with true *block scope*.
- Use of the **`let`** instead of **`var`** gives a true unique element disconnected from what is defined outside the scope.

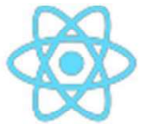
```
let foo = 123;
if(true){
 let foo = 456;
}
console.log(foo);  //123
```



let...

- Functions create a new variable scope in JavaScript as expected.

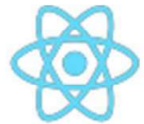
```
var num = 123;
function numbers(){
    var num = 456;
}

numbers();
console.log(num);    //123
```



`let`...

- Usage of **`let`** helps reduce errors in loops.
- **`let`** is extremely useful to have for the vast majority of the code.
- It helps decrease the chance of a programming oversight.

```
var index = 0;
var myArray = [1,2,3];
for(let index = 0; index < myArray.length;
          index++){
    console.log(myArray[index]);
}
console.log(index);    //0
```



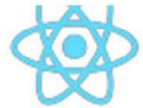
const

- **const** is a welcome addition in ES6.
- It allows immutable variables.
- To use **const**, replace **var** with **const**

```
const num = 123;
```

- **const** is a good practice for both readability and maintainability.
- **const** declarations must be initialized

```
const foo;  //ERROR
```



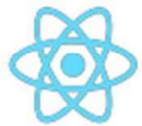
const

- A **const** is block scoped like the **let**
- A **const** works with object literals as well.

```
const foo = { bar : 123 };
foo = { bar : 456 };  //ERROR
```

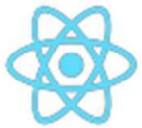
- **const** allows sub properties of objects to be mutated

```
const foo = { bar : 123 };
foo.bar = 456;  //allowed
console.log(foo);  // { bar : 456 }
```



Template Strings

- In traditional JavaScript, text that is enclosed within matching “ or ‘ marks is considered a string.
- Text within double or single quotes can only be on one line.
- There was no way to insert data into these strings.
- If there was a need it would have required concatenation that looked complex and not so elegant.
- ES6 introduces a new type of string literal that is marked with back ticks (`)



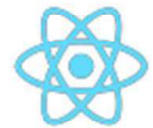
Template Strings

- The motivators for Template strings include
  - Multiline Strings
  - String Interpolation
- Multiline Strings

```
var desc = 'Do not give up \
\n Do not bow down';
```

  - with Template Strings

```
var desc = `Do not give up
Do not bow down`;
```



Template Strings...

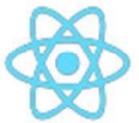
- String Interpolation

```
var lines = 'Do not give up';
var html = '<div>' + lines + '</div>';
```

  - with Template Strings

```
var lines = 'Do not give up';
var html = `<div>${lines}</div>`;
```

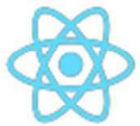
- Any placeholder inside the interpolation **${ }** is treated as a JavaScript expression and evaluated.



Spread and Rest Operators

- These new operators are represented by ...
- *Spread* operator is used to split up array elements OR object properties

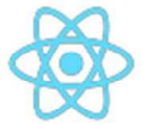
```
let myData = ['A', 'B', 'C'];
let myNewData = [...myData, 'D']
console.log(myNewData);  //   ['A', 'B', 'C', 'D']

let user = { name : 'Lakshman'}
let userData = {
  ...user,
    email : 'laks@acme.org'
}
console.log(userData);  //     [object Object] {email:"laks@acme.org",
                                                name: "Lakshman"}
```



Spread and Rest Operators…

- ***Rest*** operator is used to merge a list of function arguments into an array.
  - Array methods can be applied to the arguments list.

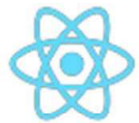
```
function getData(...args){
  return(args.filter(el => el > 3).sort())
}
console.log(getData(3,1,4,8,6))     //    [4, 6, 8]
```



Destructuring

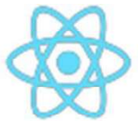
- *Destructuring* allows the extraction of array elements or object properties and store them in variables.
  - *Spread* operator takes out all array elements or all properties and distributes them in a new array or object.
- *Destructuring* allows pulling out single array elements or properties and store them in variables.

```
let myChars = ['A', 'B', 'C'];
[char1, char2] = myChars;
console.log(char1, char2);   //  'A' 'B'
[char1, , char3] = myChars;
console.log(char1, char3);   //  'A' 'C'
```



Modules

- JavaScript has always had problem with namespaces.
  - Variables and functions can end up in the global namespace if not cautious.
- JavaScript lacks built-in features specific to code organization.
- Modules help resolve these issues.



Modules in ES6

- In ES6 each module is defined in its own file.
- The functions and variables defined in a module are not visible outside unless explicitly exported.
- A module can be coded in a way such that only those values that need to be accessed by other parts of the application need be exported.
- Modules in ES6 are declarative in nature.
- To export variables from a module use **`export`**.
- To consume the exported variables in a different module use **`import`**.

Working with Modules

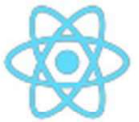
```
function getRandom(){
        return Math.random();
}

function add(n1, n2){
        return(n1+n2);
}

export {getRandom, add}
```

Utils.js

- The **export** keyword is used to export the two functions.
- The exported functions can be renamed while exporting

```
export {getRandom as random, add as sum}
```

Working with Modules...



```
import { getRandom, add } from 'Utils';

 console.log(getRandom());
 console.log(add(1,2));
```

useUtils.js

- This imports the exported values from the module 'Utils'.
- A single value can be imported as well

```
import { add } from 'utils';
```