Episode 18 : Higher-Order Functions ft. Functional Programming

Q: What is Higher Order Function?

Ans: Higher-order functions are regular functions that take one or more functions as arguments and/or return functions as a value from it. Eg:

```
function x() {
  console.log('Hi');
}
function y(x) {
  x();
}
y(x); // Hi
// y is a higher order function
// x is a callback function
```

Let's try to understand how we should approach solution in interview. I have an array of radius and I have to calculate area using these radius and store in an array.

First Approach:

```
const radius = [1, 2, 3, 4];
const calculateArea = function (radius) {
  const output = [];
  for (let i = 0; i < radius.length; i++) {
    output.push(Math.PI * radius[i] * radius[i]);
  }
  return output;
};
console.log(calculateArea(radius));
```

The above solution works perfectly fine but what if we have now requirement to calculate array of circumference. Code now be like

```
const radius = [1, 2, 3, 4];
const calculateCircumference = function (radius) {
  const output = [];
  for (let i = 0; i < radius.length; i++) {
    output.push(2 * Math.PI * radius[i]);
  }
  return output;
};
console.log(calculateCircumference(radius));
```

But over here we are violating some principle like DRY Principle, now lets observe the better approach.

```
const radiusArr = [1, 2, 3, 4];

// logic to calculate area
const area = function (radius) {
    return Math.PI * radius * radius;
}

// logic to calculate circumference
const circumference = function (radius) {
    return 2 * Math.PI * radius;
}

const calculate = function(radiusArr, operation) {
    const output = [];
    for (let i = 0; i < radiusArr.length; i++) {
        output.push(operation(radiusArr[i]));
    }
    return output;
}
console.log(calculate(radiusArr, area));
console.log(calculate(radiusArr, circumference));
// Over here calculate is HOF
// Over here we have extracted logic into separate functions. This is the beauty
of functional programming.

Polyfill of map
// Over here calculate is nothing but polyfill of map function
// console.log(radiusArr.map(area)) == console.log(calculate(radiusArr, area));

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Lets convert above calculate function as map function and try to use. So,

Array.prototype.calculate = function(operation) {
    const output = [];
    for (let i = 0; i < this.length; i++) {
        output.push(operation(this[i]));
    }
    return output;
}
console.log(radiusArr.calculate(area))
```

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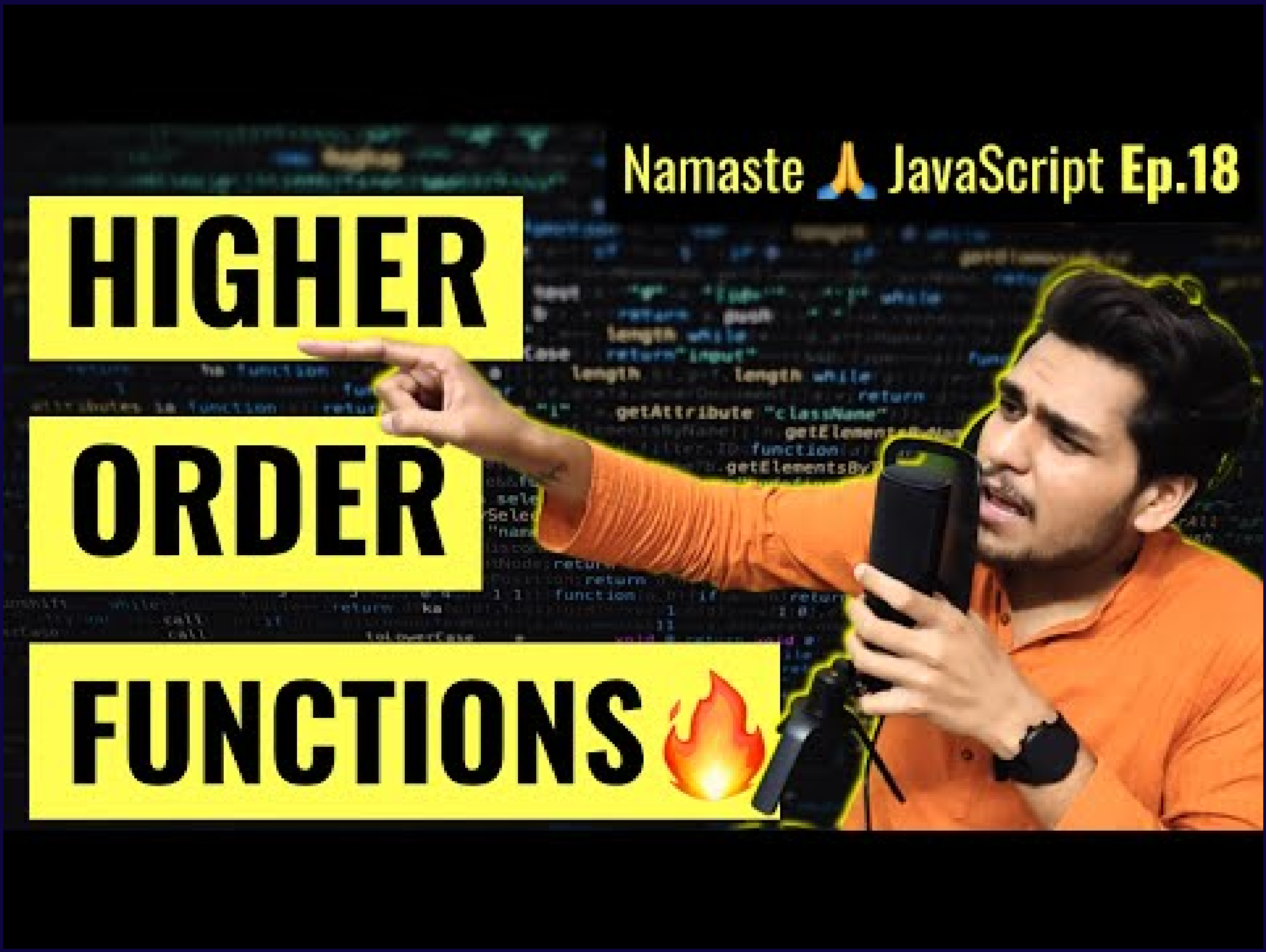

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