

Fundamentals of Functional Programming in JavaScript

WHAT IS FUNCTIONAL PROGRAMMING?



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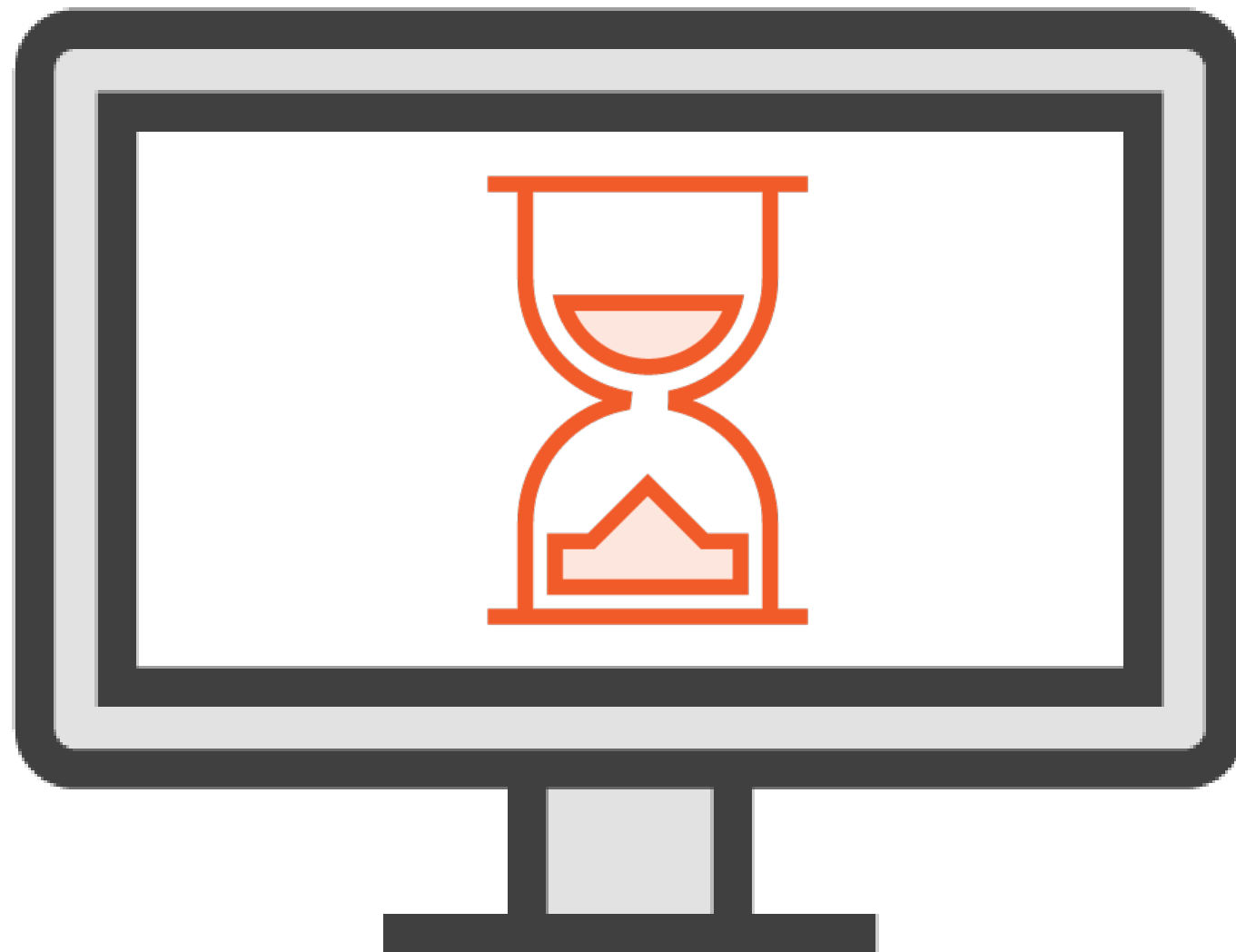
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Insurance?
Algorithms?

Functional
programming





Pure functions

Immutability



Higher order functions

Side effects





What Is Functional Programming?



Trying to Learn Functional Programming



Functional Programming

Functional programming is a **programming paradigm**—a style of building the structure and elements of computer programs—that treats computation as the evaluation of **mathematical functions** and avoids changing-state and **mutable data**



Programming Paradigm



Procedural

**Object-oriented
programming**

Metaprogramming



Declarative

What vs. How



Imperative

```
for (var i = 0; i < users.length; ++i){  
    users[i].lastModified = new Date();  
}
```



Declarative

```
users.map((u) => {  
    u.lastModified = new Date();  
    return u;  
})
```



```
[{username: 'bob'},  
{username: 'alice'}]
```

◀ Initial value

```
[{username: 'bob',  
lastModified: Today},  
{username: 'alice',  
lastModified: Today}]
```

◀ Value after function





Declare What You Mean



Mathematical Functions




```
add(1, 2)
```

◀ **Always** returns three



Pure functions

Don't depend on data other than what is passed in, and don't alter data other than what they returned



```
Math.random();
```

◀ 0.4795137441251427

```
Math.random();
```

◀ 0.578366884496063



Pure Function

```
Math.max(10, 5);
```

```
Math.max(10, 5);
```





The Power of Functions



Mutable Data



Immutable Data

Data that cannot be changed after it's created



```
const firstArray = ['d', 'b', 'a', 'c']
```

```
const secondArray =  
immutableSort(firstArray);
```

◀ **firstArray** = ['d', 'b', 'a', 'c']
◀ **secondArray** = ['a', 'b', 'c', 'd']



Immutable Data is Easier to Reason About





Side Effects May be Harmful



Why Use Functional Programming?



Why would I use
functional
programming?





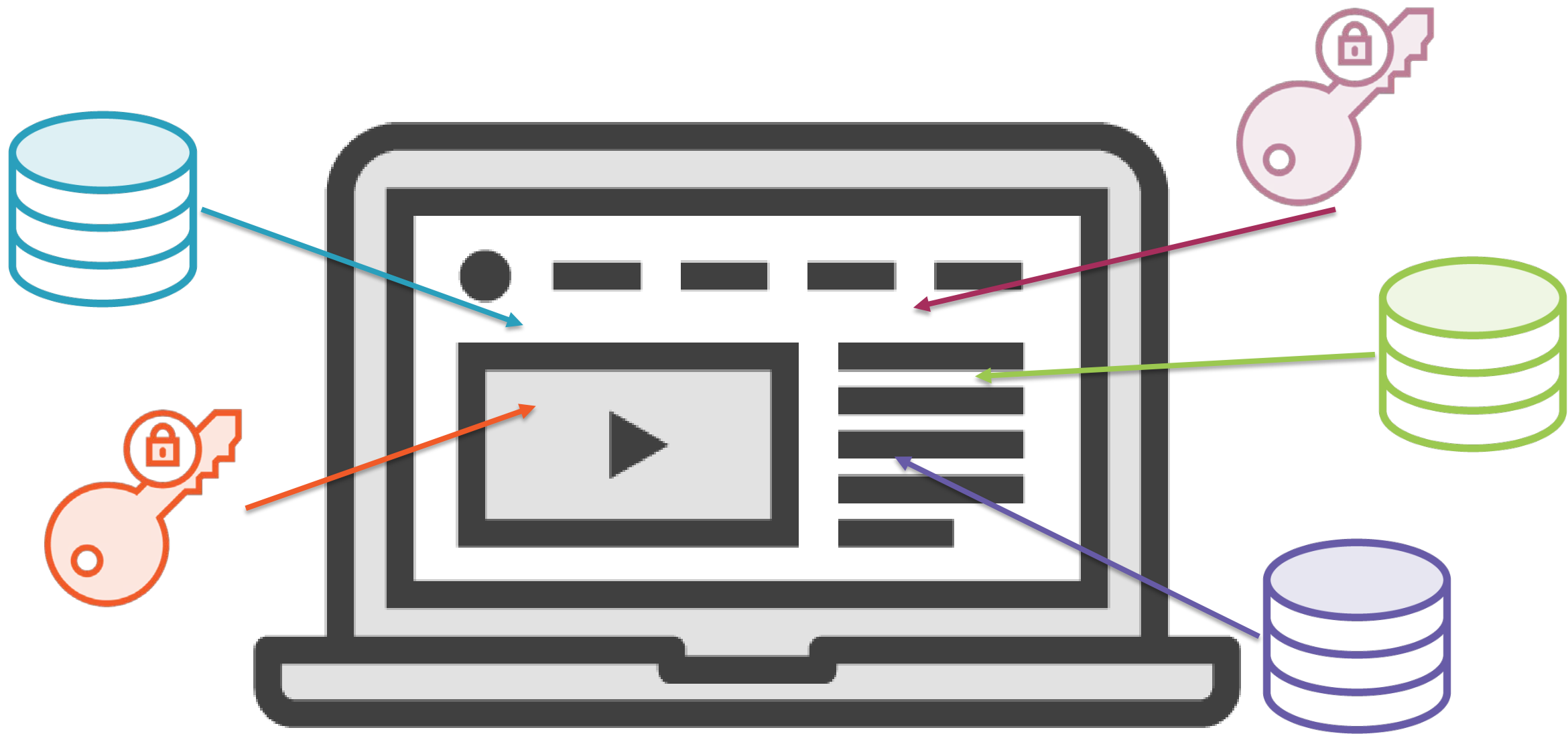
Functional Programming is Not New





Easier to Reason







What is it doing?

How does it do it?

Testing Functional Programs



Set up application state

Verify results



```
Math.max(10, 5);
```



```
max = Math.max(10, 5);
```



Functional programming
makes your code easier to
reason about.



