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A quick introduction to pipe() and compose() in JavaScript

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Functional programming's been quite the eye-opening journey for me. This post, and posts like it, are an attempt to share my insights and perspectives as I trek new functional programming lands.

Pipe

The concept of `pipe` is simple—it combines `n` functions. It's a pipe flowing left-to-right, calling each function with the output of the last one.

Let's write a function that returns someone's `name`.

```
getName = (person) => person.name;

getName({ name: 'Buckethead' });
// 'Buckethead'
```

Let's write a function that uppercases strings.

```
uppercase = (string) => string.toUpperCase();

uppercase('Buckethead');
// 'BUCKETHEAD'
```

So if we wanted to get and capitalize `person`'s name, we could do this:

```
name = getName({ name: 'Buckethead' });
uppercase(name);

// 'BUCKETHEAD'
```

That's fine but let's eliminate that intermediate variable `name`.

```
uppercase(getName({ name: 'Buckethead' }));
```

to add a function that gets the first 6 characters of a string?

```
get6Characters = (string) => string.substring(0, 6);

get6Characters('Buckethead');
// 'Bucket'
```

Resulting in:

```
get6Characters(uppercase(getName({ name: 'Buckethead' })));

// 'BUCKET';
```

Let's get really crazy and add a function to reverse strings.

```
reverse = (string) =>
  string
    .split('')
    .reverse()
    .join('');

reverse('Buckethead');
// 'daehtekcuB'
```

Now we have:

```
reverse(get6Characters(uppercase(getName({ name: 'Buckethead' }))));
// 'TEKCUB'
```

Pipe to the rescue!

Instead of jamming functions within functions or creating a bunch of intermediate variables, let's `pipe` all the things!

```
pipe(
  getName,
  uppercase,
  get6Characters,
  reverse
)({ name: 'Buckethead' });
// 'TEKCUB'
```

Pure art. It's like a todo list!

Let's step through it.

For demo purposes, I'll use a `pipe` implementation from one of Eric Elliott's functional programming articles.

```
pipe = (...fns) => (x) => fns.reduce((v, f) => f(v), x);
```

I love this little one-liner.

Using *rest* parameters, see my article on that, we can pipe `n` functions. Each function takes the output of the previous one and it's all *reduced* ? to a single value.

And you can use it just like we did above.

```
pipe(
  getName,
```

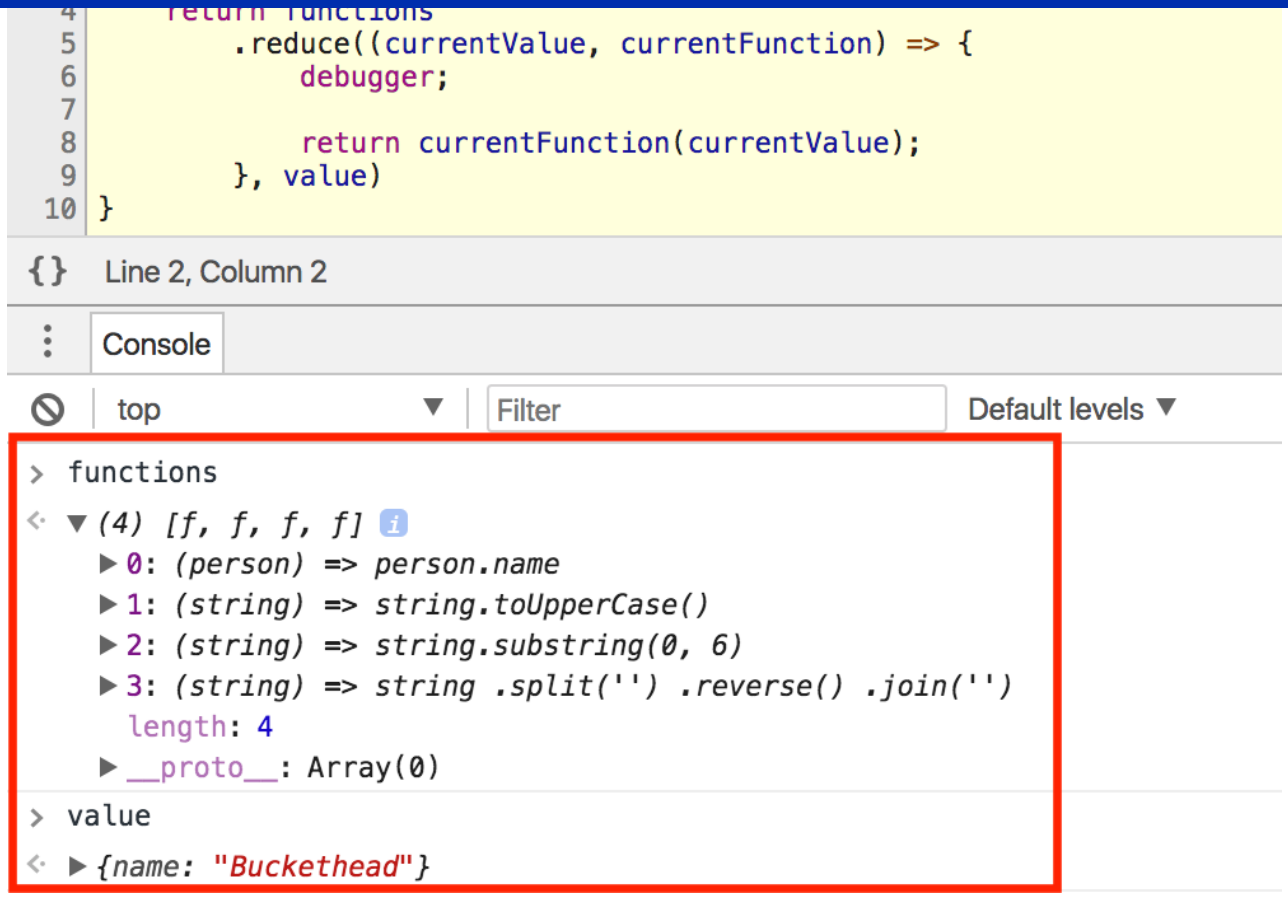
```
// 'TEKCUB'
```

I'll expand `pipe` and add some debugger statements, and we'll go line by line.

```
pipe = (...functions) => (value) => {
  debugger;

  return functions.reduce((currentValue, currentFunction) => {
    debugger;

    return currentFunction(currentValue);
  }, value);
};
```

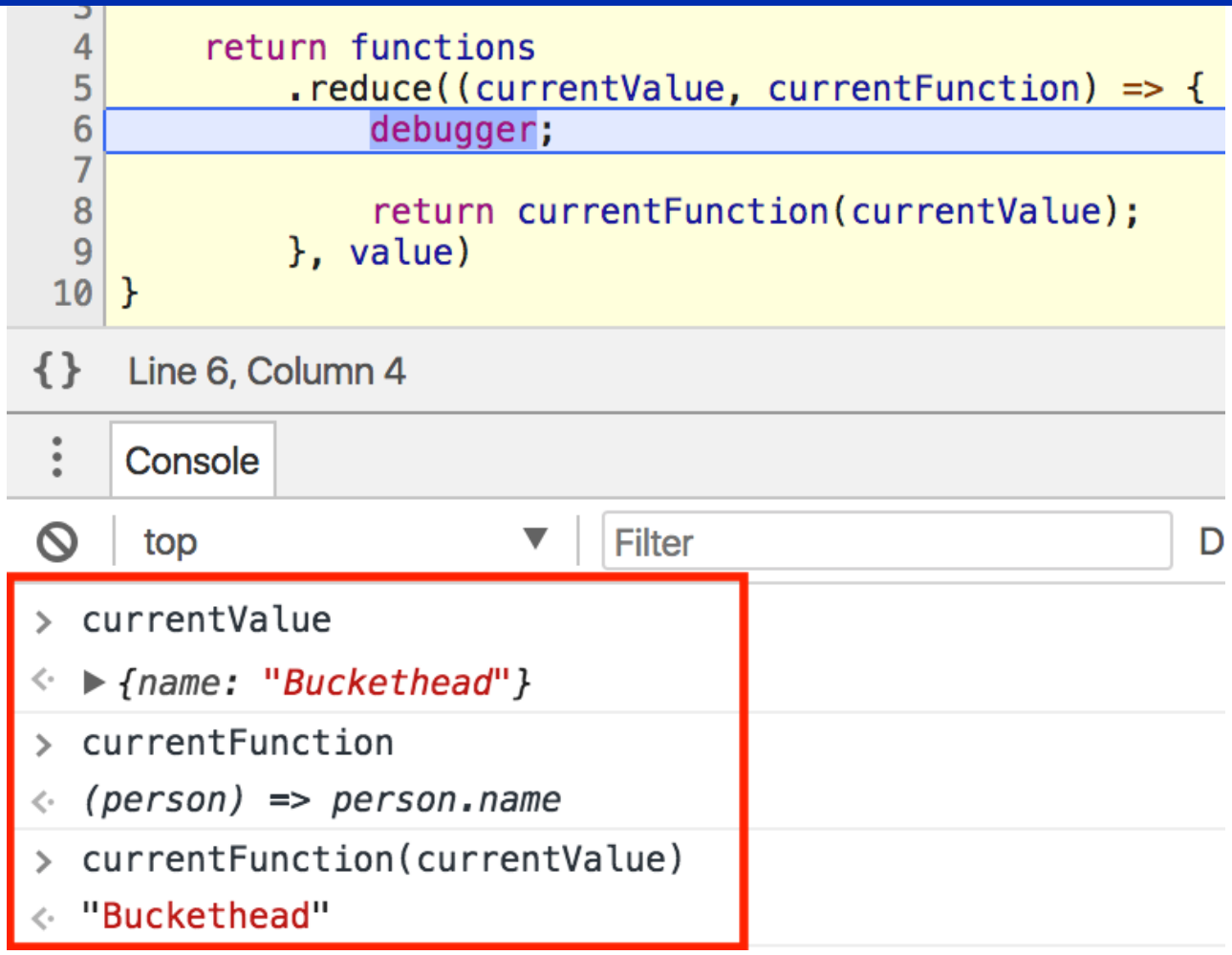
```
> pipe = (...functions) => (value) => {
      debugger;

      return functions
          .reduce((currentValue, currentFunction) => {
              debugger;

              return currentFunction(currentValue);
          }, value)
  }
```

Call `pipe` with our example and let the wonders unfold.



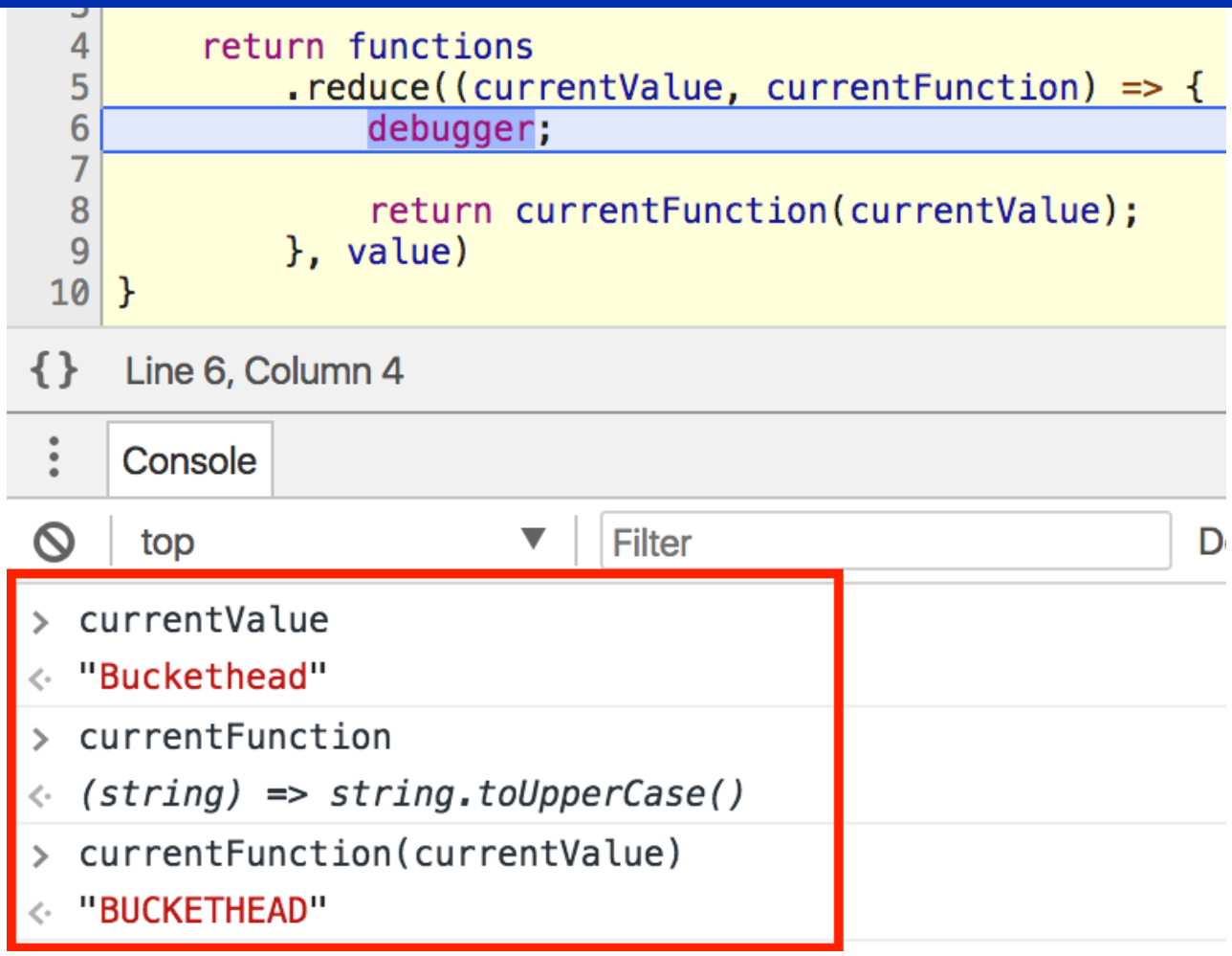
Check out the local variables. `functions` is an array of the 4 functions, and `valu e` is `{ name: 'Buckethead' }`.

Since we used *rest* parameters, `pipe` allows any number of functions to be used. It'll just loop and call each one.

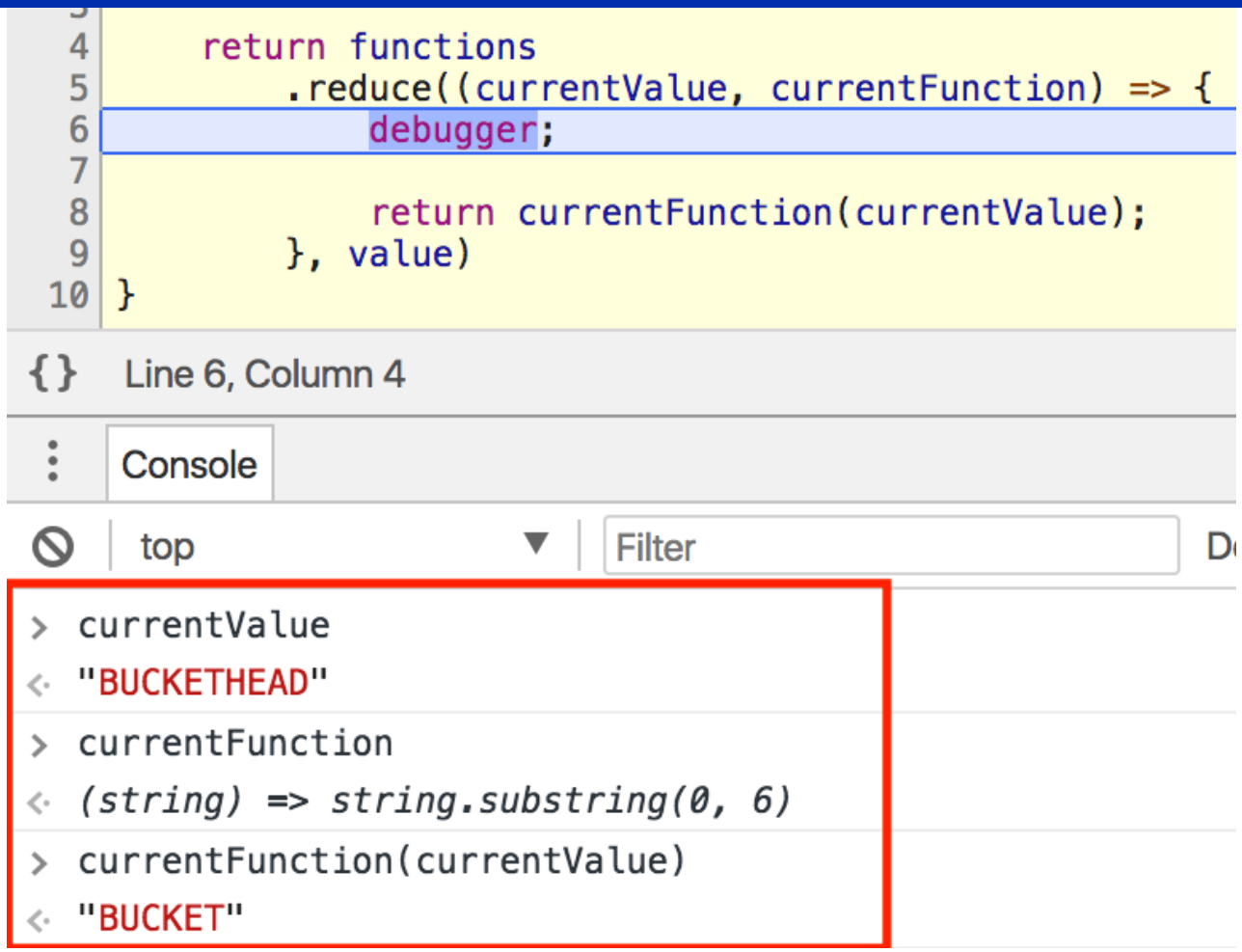


On the next debugger, we're inside `reduce`. This is where `currentValue` is passed to `currentFunction` and returned.

We see the result is `'Buckethead'` because `currentFunction` returns the `.name` property of any object. That will be returned in `reduce`, meaning it becomes the new `currentValue` next time. Let's hit the next debugger and see.



Now `currentValue` is `'Buckethead'` because that's what got returned last time. `currentFunction` is `uppercase`, so `'BUCKETHEAD'` will be the next `currentValue`.



The same idea, pluck `'BUCKETHEAD'`'s first 6 characters and hand them off to the next function.

```
    return functions
        .reduce((currentValue, currentFunction) => {
            debugger;

            return currentFunction(currentValue);
        }, value)
}
```

{} Line 6, Column 4

Console

top ▼ Filter D

```
> currentValue
"BUCKET"
> currentFunction
(string) => string
  .split('')
  .reverse()
  .join('')
> currentFunction(currentValue)
reverse('.aedi emaS')
```

```
pipe = (...functions) => (value) => {
    debugger;

    return functions
        .reduce((currentValue, currentFunction) => {
            debugger;

            return currentFunction(currentValue);
        }, value)
}
```

{} Line 6, Column 4

Console

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```
"TEKCUB"
```

And you're done!

What about compose()?

It's just `pipe` in the other direction.

So if you wanted the same result as our `pipe` above, you'd do the opposite.

```
compose(
  reverse,
  get6Characters,
  uppercase,
  getName
)({ name: 'Buckethead' });
```

Notice how `getName` is last in the chain and `reverse` is first?

Here's a quick implementation of `compose`, again courtesy of the Magical Eric Elliott, from the same article.

```
compose = (...fns) => (x) => fns.reduceRight((v, f) => f(v), x);
```

I'll leave expanding this function with `debugger`s as an exercise to you. Play around with it, use it, appreciate it. And most importantly, have fun!

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