What the ?$% is a monad?!

A lightning introduction to functional programing

“a monad is a Stream in Java”

It’s a functional programming thing.

Oh yeah, of course...

Functional Programming is...

Courtesy of Wikipedia

a programming paradigm that treats computation as the evaluation of mathematical functions and avoids changing-state and mutable data

A programming paradigm is a mental model for how to think about programming.

Imperative v. Declarative Programming Paradigms

Imperative programming paradigms say you should think about code as telling the computer what to do.

We most often think of this as “programming”, probably because that’s how computer hardware works.

Object oriented programming is a specific type of imperative programming.

Declarative programming paradigms say you should think about code as describing what you want done, not how to do it.

You ***declare*** what you want

SQL - you the question you want the answer to (your query), and you don’t worry about how the database does the computation.

HTML - you describe how you want the page to look, not how the web browser should do the rendering

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Mathematical v. “Programming” Function

A **function** in programming land is:

a named section of a program that performs a specific task.

Think:

```
int doubleThis(int x) {
        return 2*x;
}
```

But you might do something complicated:

```
void processMessage() {
        process(queue.pop())
}
```

A **function** in math land is:

a rule for taking inputs to outputs

Think:

$$f(x) = 2x$$

You can’t do anything more complicated.

Functional Programming is...

Courtesy of Wikipedia

a programming paradigm that treats computation as the evaluation of mathematical functions **and a*voids* *changing-state and mutable data***

State & Mutable Data

In imperative programming, you can think of **state** as the contents of the variables as your program is running.

Mutable data is data that can change, like those variables in your state.

What's wrong with that?!

Incorrectly modifying state and mutable data is pretty much the root of all bugs.

So, if we want *bug free code*, and we all do, we should get rid of state and mutable data!

Right?!

Functional Programming is...

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a programming paradigm that treats computation as the evaluation of mathematical functions and avoids changing-state and mutable data

Thank you!

Oh yeah, what's a monad?!

A monad is just a monoid in the category of endofunctors

But you should just think of it as a design pattern in functional programming.