Hunt the Trevor

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When Hunted Wumpus comes into play, each other player may put a creature card from his or her hand into play.

Just one can feed a dozen people for a month.

Agenda

1. What is a Monad?
   - Intuition
   - Theory
2. Reader
   - First Principals
   - Definition
   - Example
3. Writer
   - First Principals
   - Definition
   - Example
4. State
   - First Principals
   - Definition
   - Example
5. It's Trevor Hunting Time

What is a Monad? (Recap)

Intuition

Let's make a program

```
main = do putStrLn "What is 2 + 2?"
          x <- readLn
          if x == 4
              then putStrLn "You're right!"
              else putStrLn "You're wrong!"
```

What is a Monad? (Recap)

Theory

Functor Definition

$$\text{fmap} :: \textbf{Functor } \mathrm{F} \Rightarrow (a \rightarrow b) \rightarrow \mathrm{F}\, a \rightarrow \mathrm{F}\, b$$

Applicative Definition

$$\text{pure} :: \textbf{Applicative } \mathrm{A} \Rightarrow a \rightarrow \mathrm{A}\, a$$

$$(<\!*\!>) :: \textbf{Applicative } \mathrm{A} \Rightarrow \mathrm{A}\,(a \rightarrow b) \rightarrow \mathrm{A}\, a \rightarrow \mathrm{A}\, b$$

What is a Monad? (Recap)

Theory

Monad Definition

$$\text{return} :: \textbf{Monad}\ \mathrm{M} \;\Rightarrow\; a \;\rightarrow\; \mathrm{M}\,a$$

$$(\gg\!=) :: \textbf{Monad}\ \mathrm{M} \;\Rightarrow\; \mathrm{M}\,a \;\rightarrow\; (a \;\rightarrow\; \mathrm{M}\,b) \;\rightarrow\; \mathrm{M}\,b$$

- return constructs the monad
- $\gg\!=$ allows composition of the monad
- Note: You might see other people say you need join to define the monad, providing either $\gg\!=$ or join is “rigorously” equivalent.