Welcome!

If you haven't installed Elixir, follow the instructions on:

https://elixir-lang.org/install.html

Drinking the Elixir

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Agenda

- 15:00 - 15:30 Presentation
- 15:30 - 17:30 Challenges
- 17:30 - 18:30 Food!
- 18:30 - 19:00 Announcing winners

Elixir?

- build on top of Erlang
- inspired by Ruby
- immutable
- functional
- dynamically typed
- weakly typed, optionally strong

Syntax

```
iex> 1               # integer
iex> 0x1F            # integer
iex> 1.0             # float
iex> true            # boolean
iex> :hello          # atom
iex> ?A              # char
iex> "elixir"        # string|binary
iex> <<0, 255>>      # binary
iex> [1, 2, 3]       # list
iex> {1, 2, 3}       # tuple
iex> %{1 => 2}       # map
```

```
iex> 1 + 2
3
iex> Kernel.+(1, 2)
3
iex> "Hello " <> "there!"
"Hello there!"
iex> is_binary("hellö")
true
iex> String.length("hellö")
5
iex> String.upcase("hellö")
"HELLÖ"
iex> String.graphmemes("hellö")
["h","e","l","l","ö"]
```

Functions

```
iex> greet = fn x -> "Hello " <> x <> "!" end
iex> greet.("there")
"Hello there!"
```

Modules

```
# greeting.ex
defmodule Greeting do
  def hello(), do: hello("world")
  def hello(thing) do
    "Hello " <> thing <> "!"
  end
end
```

```
iex> import_file("greeting.ex")
iex> Greeting.hello()
"Hello world!"
iex> Greeting.hello("there")
"Hello there!"
```

Pattern matching

Destructuring

```
iex> [1, a] = [1, 2]
iex> a
2
iex> {:ok, {:hello, a}} = {:ok, {:hello, "world"}}
iex> a
"world"
iex> [2, a] = [1, 2]
** (MatchError) no match of right hand side value: [1, 2]
```

Responses

```
iex> case File.read("path/to/file") do
...>   {:ok, binary_contents} -> IO.puts(contents)
...>   {:error, reason} -> IO.puts("Error: " <> reason)
...> end
```

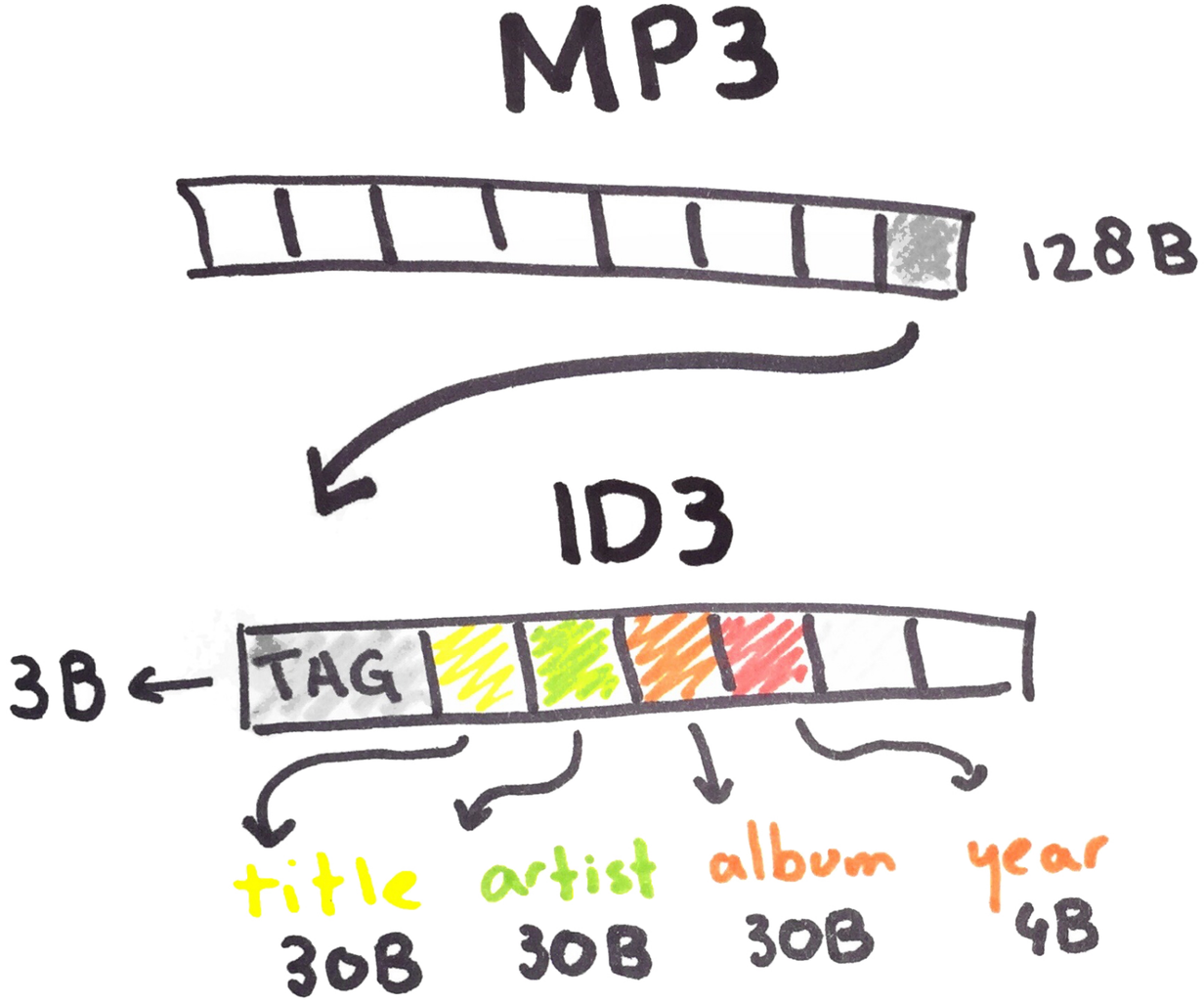
Same-head functions

```
defmodule Fibonacci do
  def fib(0), do: 0
  def fib(1), do: 1
  def fib(n) when n > 0, do: fib(n-2) + fib(n-1)
  def fib(_), do: raise "Invalid input: need zero or higher"
end
```

Binary pattern matching

"Get from a MP3 file the title, artist, album, and year"

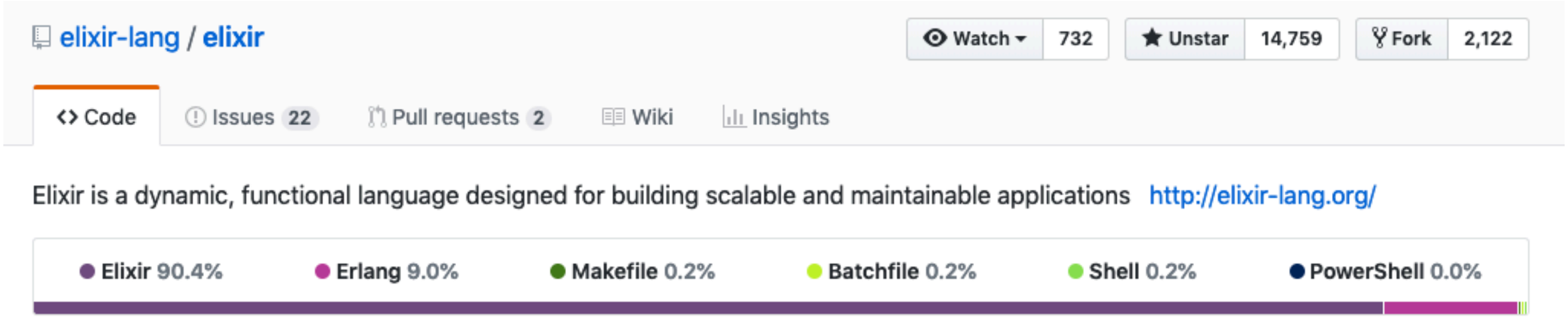
ID3v1: https://en.wikipedia.org/wiki/ID3#ID3v1


MP3
128B
ID3
3B
TAG
title
30B
artist
30B
album
30B
year
4B

```elixir
defmodule ID3Parser do
  def parse(file_name) do
    case File.read(file_name) do
      {:ok, contents} ->
        song_byte_size = byte_size(contents) - 128
        << _ :: binary-size(song_byte_size),
           id3_tag :: binary >> = contents

        << "TAG",
           title  :: binary-size(30),
           artist :: binary-size(30),
           album  :: binary-size(30),
           year   :: binary-size(4),
           _      :: binary >> = id3_tag

      _ ->
        IO.puts "Couldn't open " <> file_name
    end
  end
end
```

Meta-programming

Most of Elixir is written in Elixir!



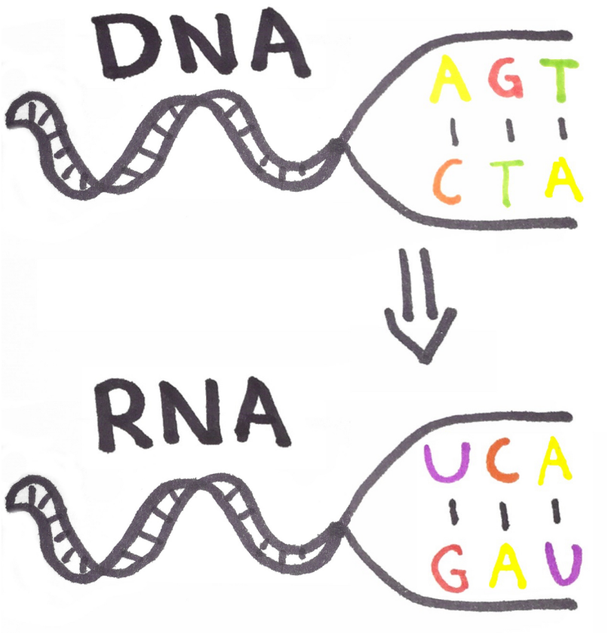
```elixir
if is_thruthy() do
  do_something()
else
  do_something_else()
end

# becomes:
# https://github.com/elixir-lang/elixir/blob/master/lib/elixir/lib/kernel.ex#L3054

case is_thruthy() do
  x when x in [false, nil] ->
    do_something_else()
  _ ->
    do_something()
end
```

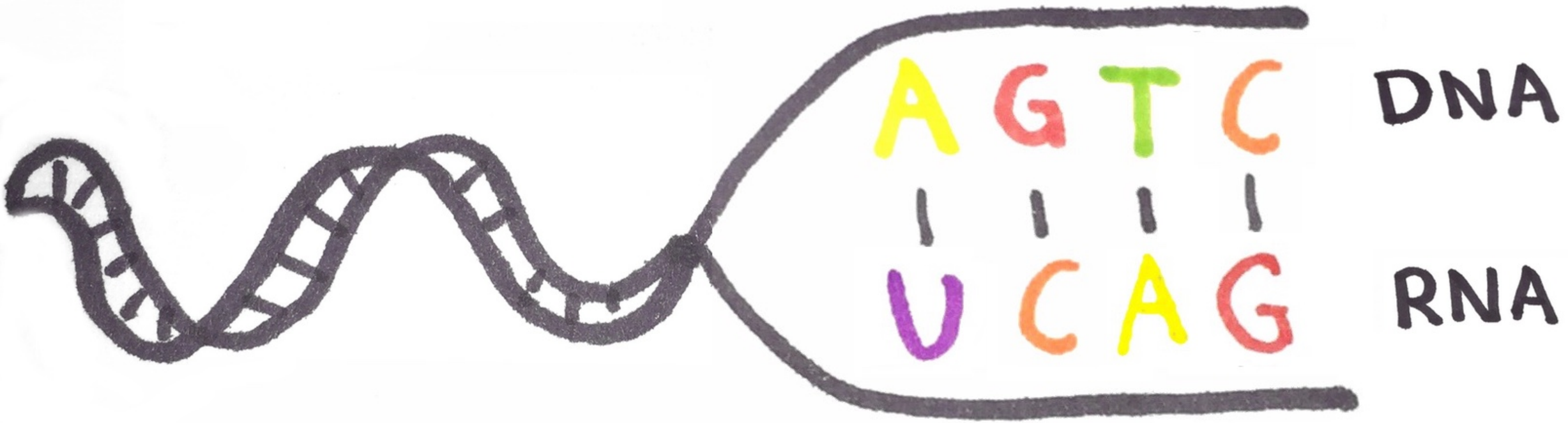
Unquoted expressions

```
iex> number = 2
iex> ast = quote do
...> 1 + unquote(number)
...> end
{:+, [context: Elixir, import: Kernel], [1, 2]}
iex> Macro.to_string(ast)
"1 + 2"
```

Compile-time functions

"Convert a given DNA strand to its RNA complement."



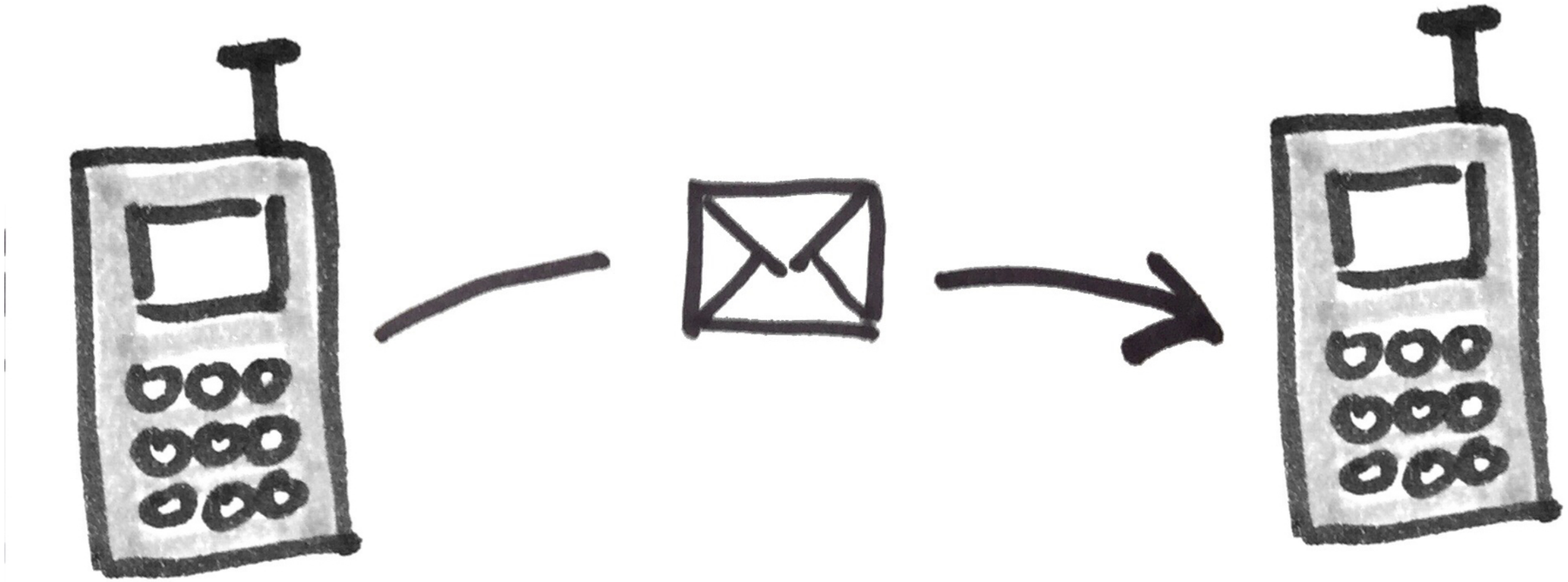

A G T C
DNA
U C A G
RNA

```
# rna.ex
defmodule RNATranscription do
  def to_rna("A"), do: "U"
  def to_rna("G"), do: "C"
  def to_rna("T"), do: "A"
  def to_rna("C"), do: "G"
end

iex> import_file("rna.ex")
iex> RNATranscription.to_rna("T")
"A"
```

```elixir
# rna.ex
defmodule RNATranscription do
  mapping = %{
    "G" => "C",
    "C" => "G",
    "T" => "A",
    "A" => "U"
  }
  for { dna, rna } <- mapping do
    def to_rna(unquote(dna)), do: unquote(rna)
  end
end

iex> import_file("rna.ex")
iex> RNATranscription.to_rna("T")
"A"
```

Processes

- Erlang virtual machine processes
- follows the actor model



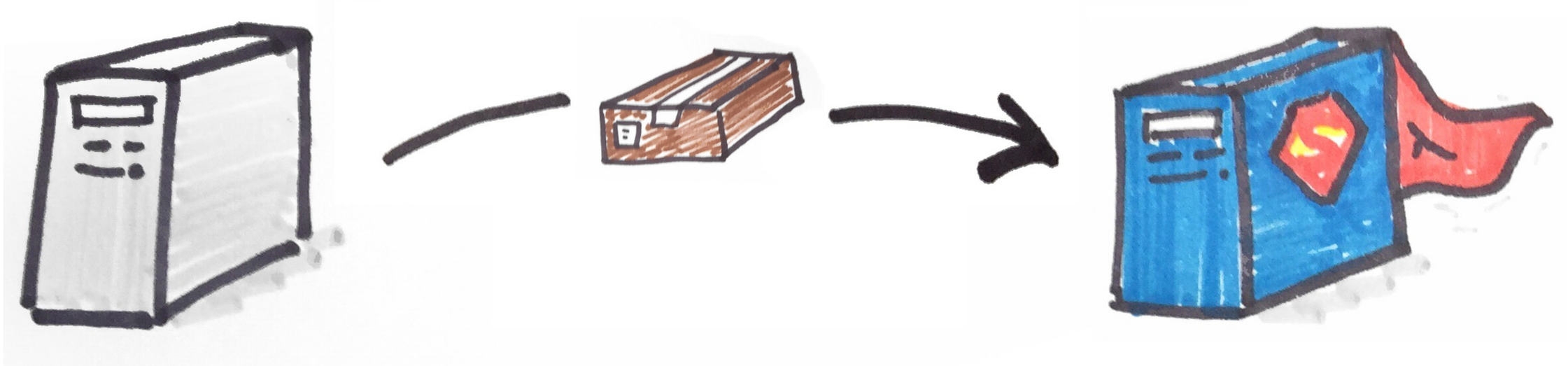
```
iex> for num <- 1..1000 do
...>   spawn(fn -> IO.puts(num * 2) end)
...> end
2
4
6
8
10
12
...
```

```
iex> self()
#PID<0.103.0>
iex> send(self(), "Hello!")
"Hello!"
iex> flush()
"Hello!"
:ok
```

```
iex> pid = spawn(fn ->
...>   IO.puts("Waiting for messages")
...>   receive do
...>     msg -> IO.puts("Received: " <> msg)
...>   end
...>   IO.puts("Done!")
...>end)
Waiting for messages
#PID<0.1134.0>

iex> send(pid, "Hello world!")
Received "Hello world!"
Done!
iex> send(pid, "Hello world!")
iex>
```

```elixir
# my_process.ex
defmodule MyProcess do

  def loop(), do: loop(0)
  def loop(counter) do
    receive do
      msg -> IO.puts("#{counter} - #{inspect msg}")
    end
    loop(counter + 1)
  end

end

iex> import_file("my_process.ex")
iex> pid = spawn(MyProcess, :loop, [])
iex> send(pid, "Hello world!")
0 - "Hello world!"
iex> send(pid, "Hello there!")
1 - "Hello there!"
```

Remote nodes



```
$ iex --name foo@10.1.0.1 --cookie secret

$ iex --name bar@10.1.0.2 --cookie secret
```

```
iex(foo@10.1.0.1)> Node.list()
[]
iex(foo@10.1.0.1)> Node.connect(:"bar@10.1.0.2")
true
iex(foo@10.1.0.1)> Node.list()
[:"bar@10.1.0.2"]
```

```
iex(foo@10.1.0.1)> greetings = fn ->
...> IO.puts("Hello from " <> Node.self())
...> end
iex(foo@10.1.0.1)> Node.spawn(:"bar@10.1.0.2", greetings)
#PID<9071.68.0>
Hello from bar@10.1.0.2
```

```
iex(foo@10.1.0.1)> pid = Node.spawn(:"bar@10.1.0.2", fn ->
...>   receive do
...>     {:ping, client} -> send(client, :pong)
...>   end
...> end)
#PID<9014.59.0>
iex(foo@10.1.0.1)> send(pid, {:ping, self})
{:ping, #PID<0.73.0>}
iex(foo@10.1.0.1)> flush()
:pong
:ok
```

Challenges!

Repository:

github.com/avisi/techday_elixir

Slides:

github.com/brianvanburken/
knowledge-sharing/

presentations > Drinking the Elixir