

Crypto Twitter is Wrong: This is How Rollups *Really* Work

Kelvin Fichter

Engineering @ OP Labs

Eternal Optimist @ The Optimism Collective

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We better start agreeing on stuff or Ethereum is cooked

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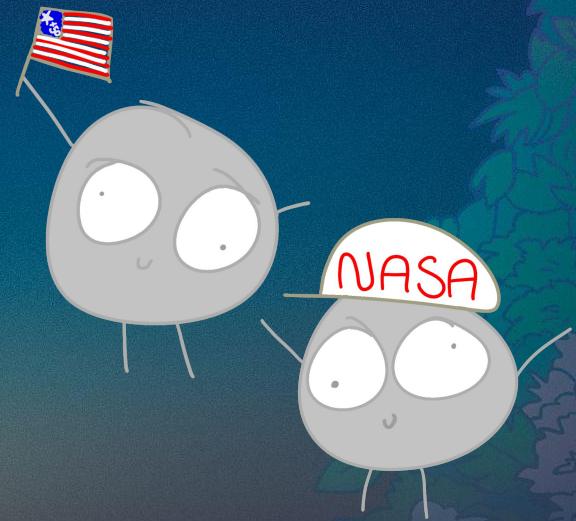
Eternal Optimist @ The Optimism Collective



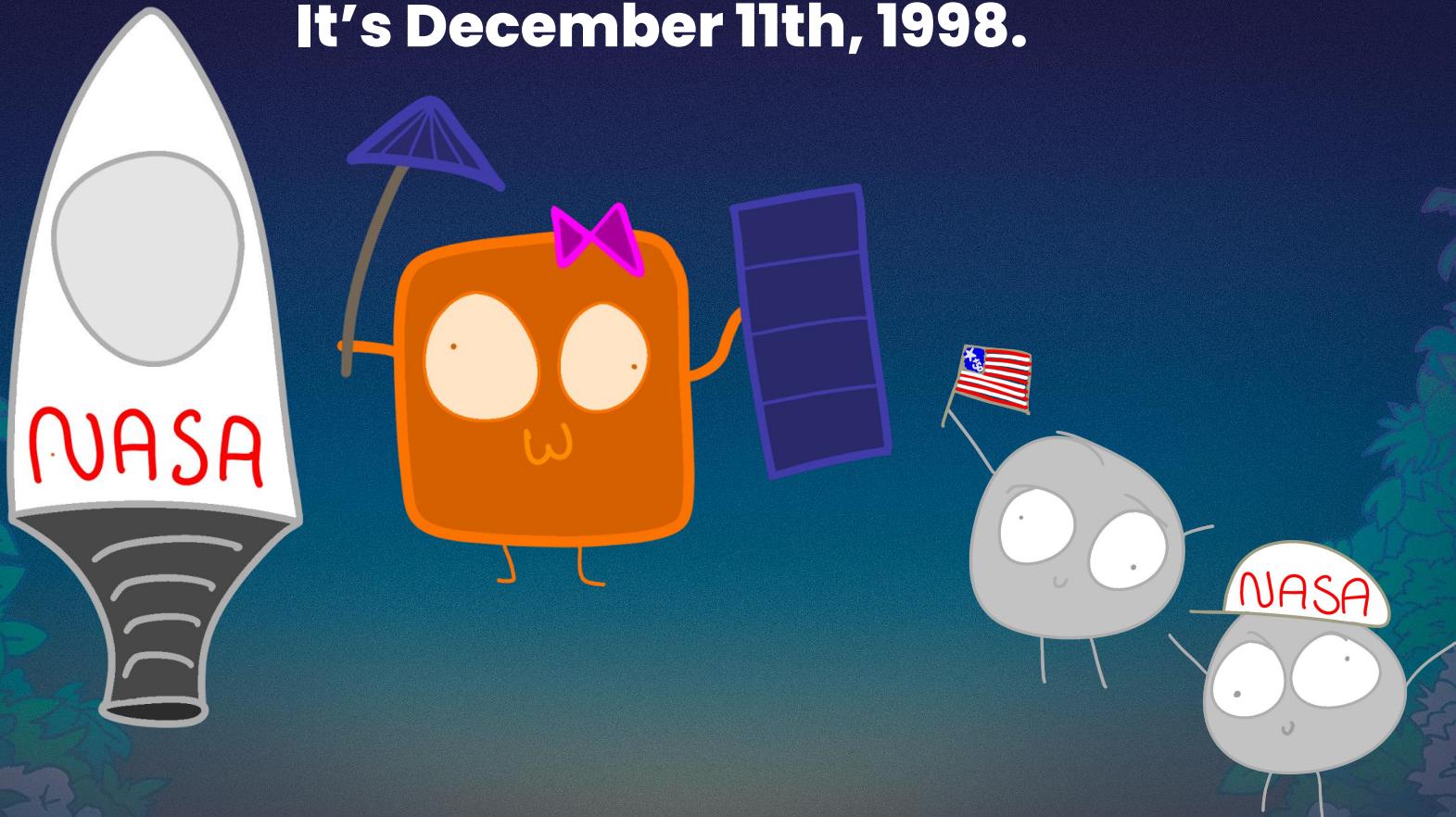
I want to tell you a story.

It's December 11th, 1998.

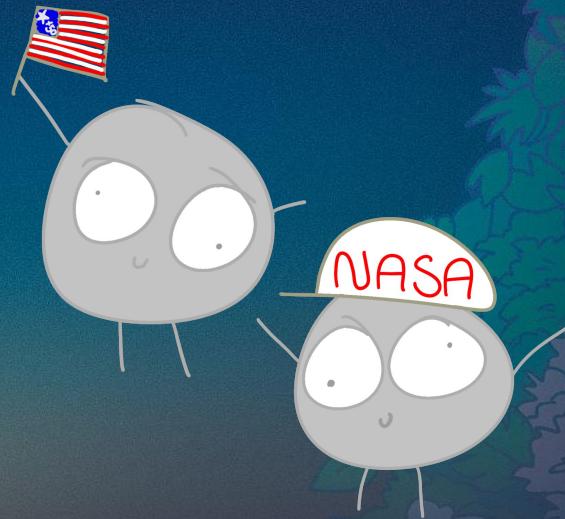
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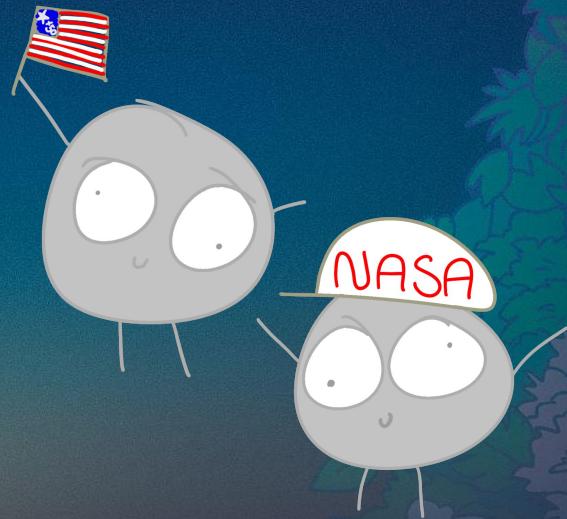
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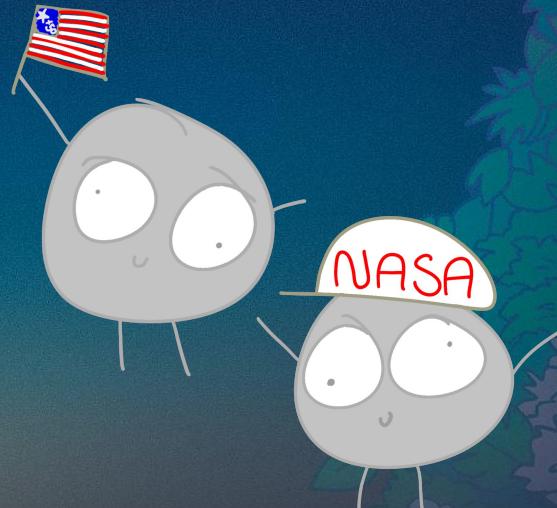


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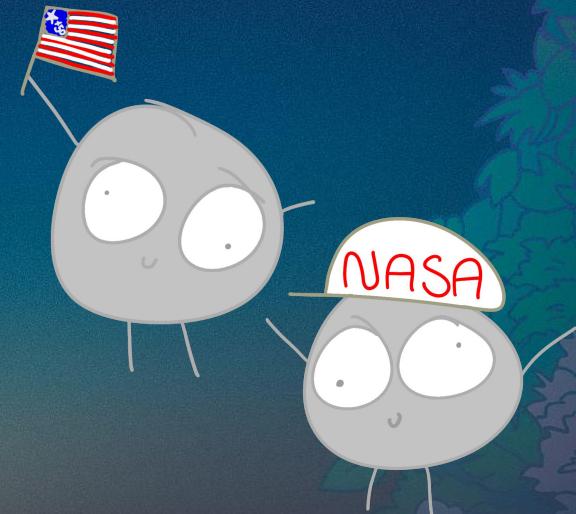


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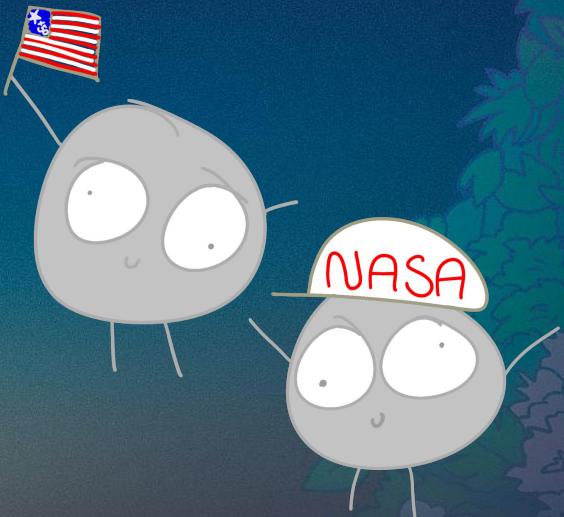


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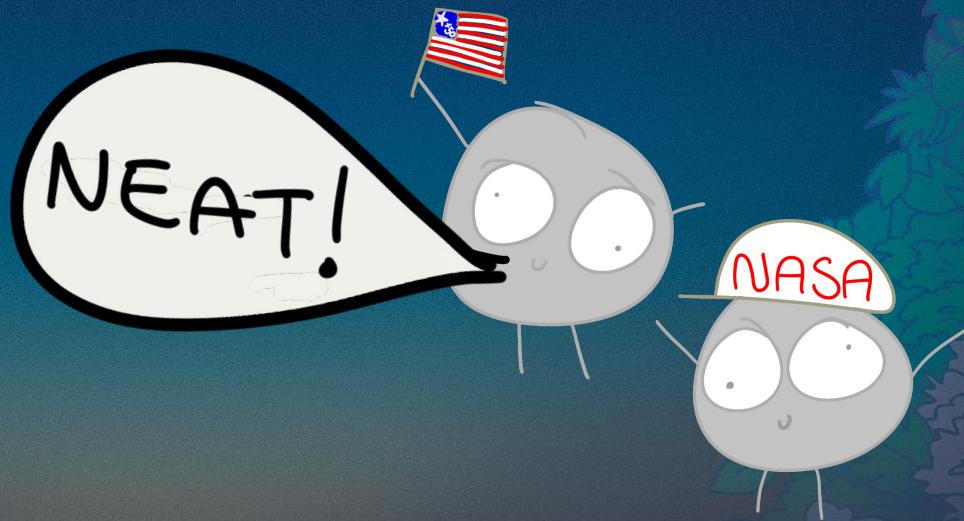




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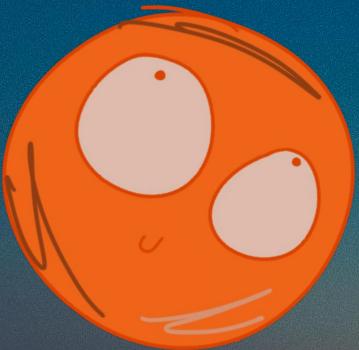


It's December 11th, 1998.



It's a long, tense journey to Mars.

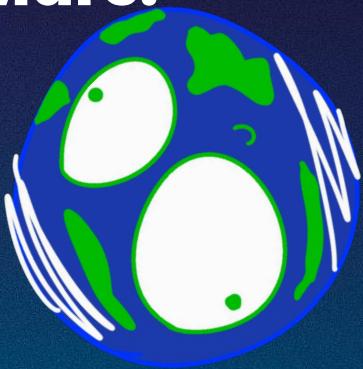
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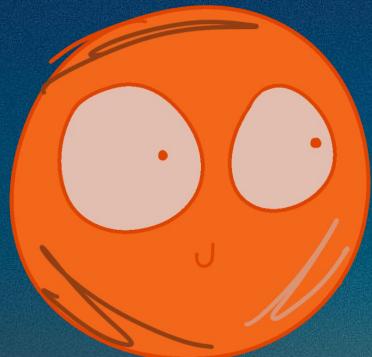


And then, finally, it's time for orbital insertion.

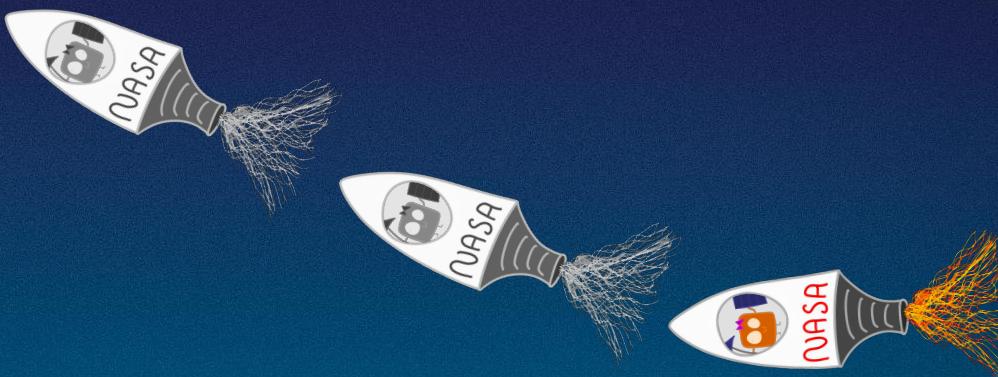
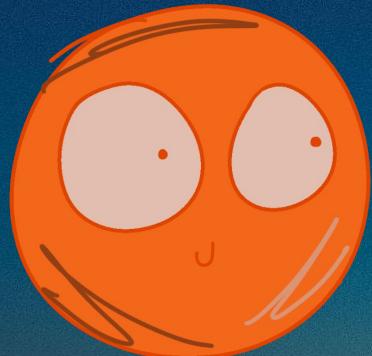
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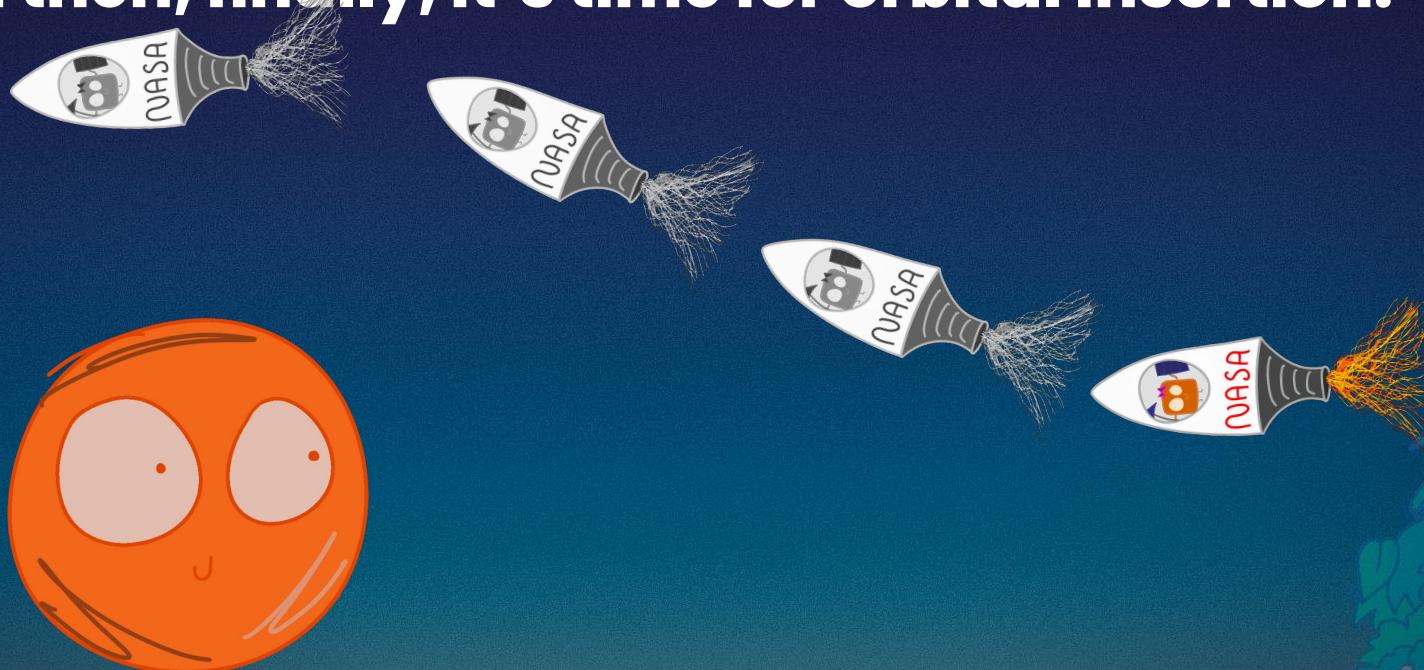
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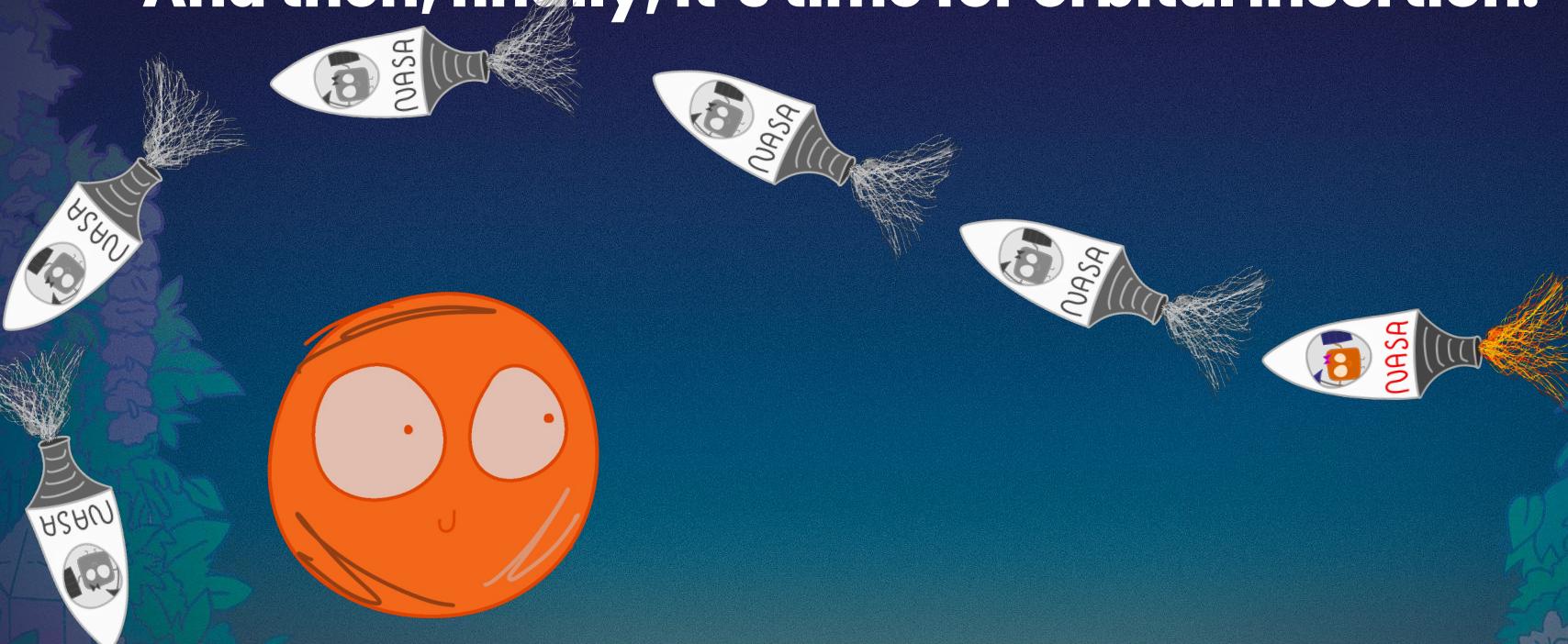
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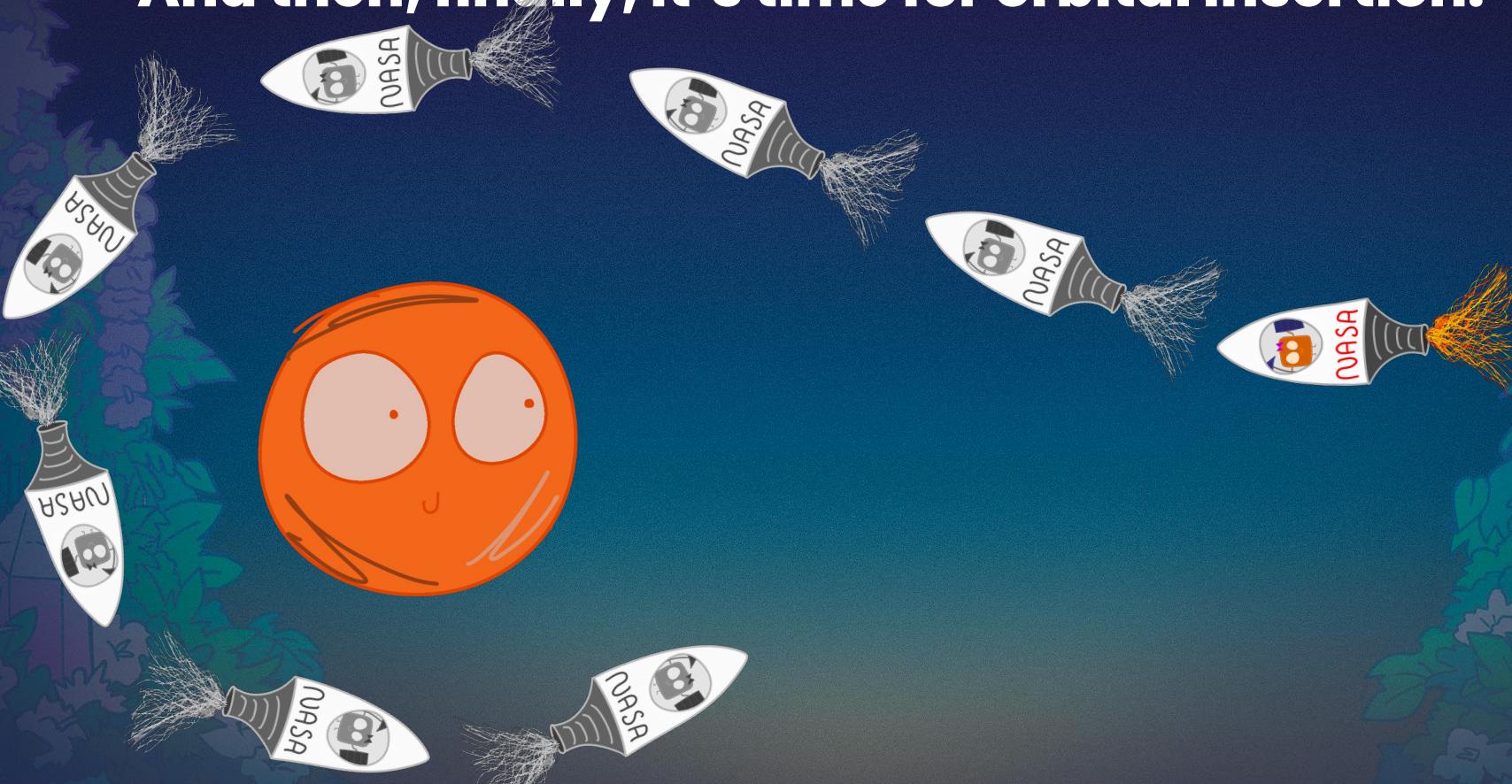
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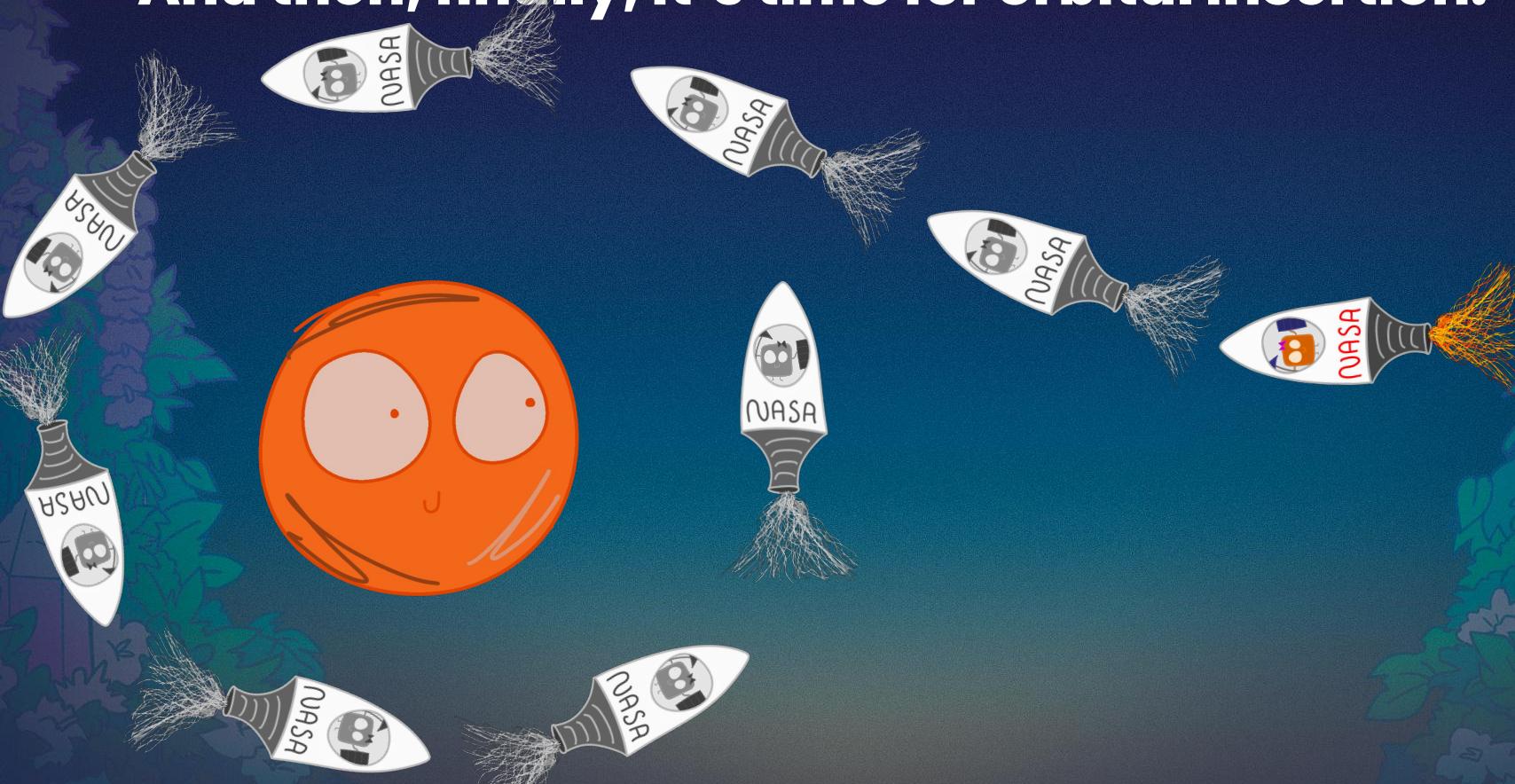
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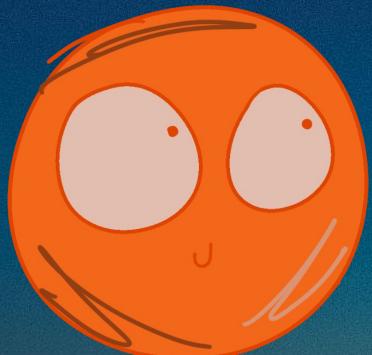
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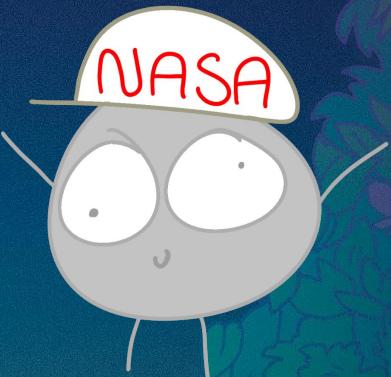


Bang! Pow! Whammy! Failure!

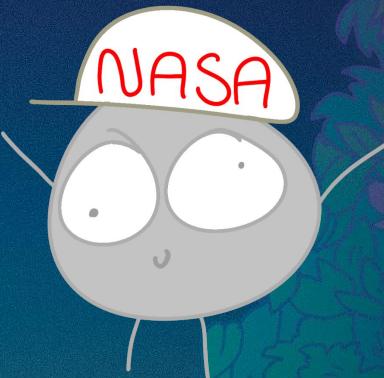
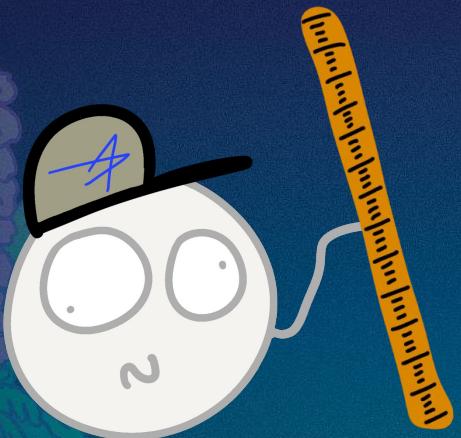


What happened?

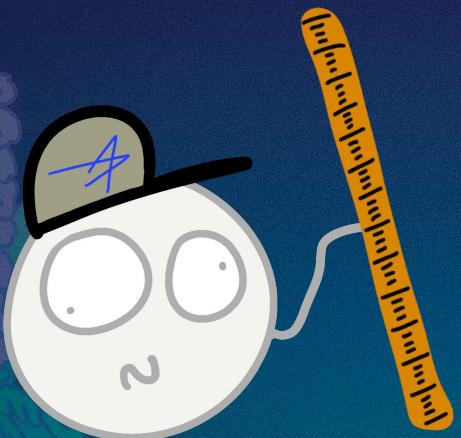
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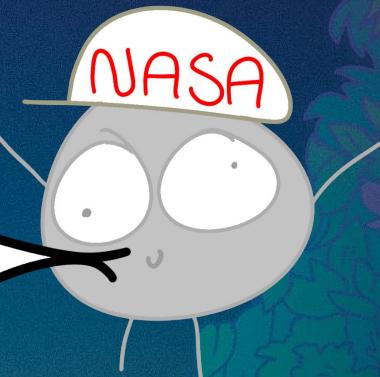
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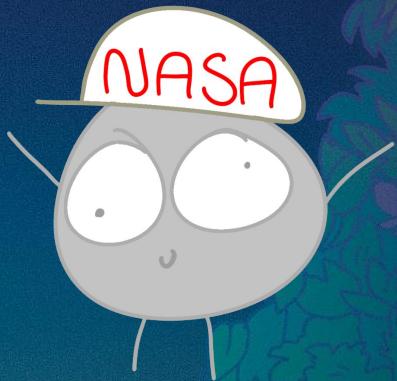
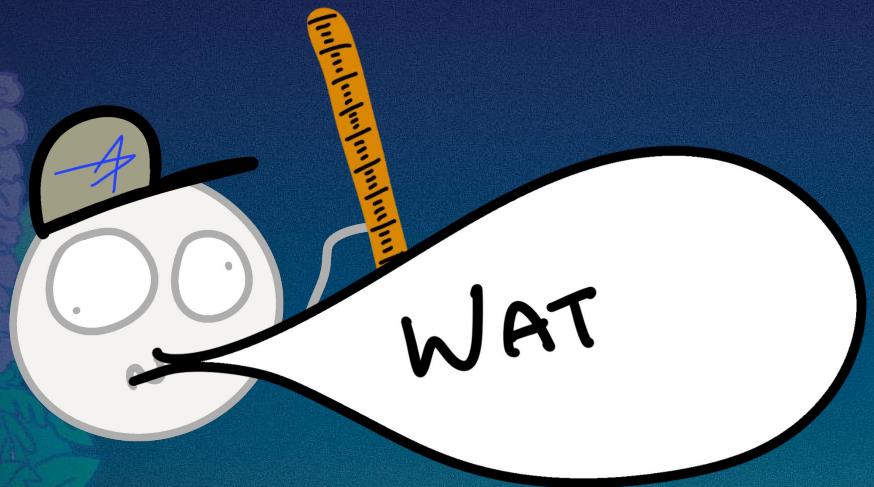
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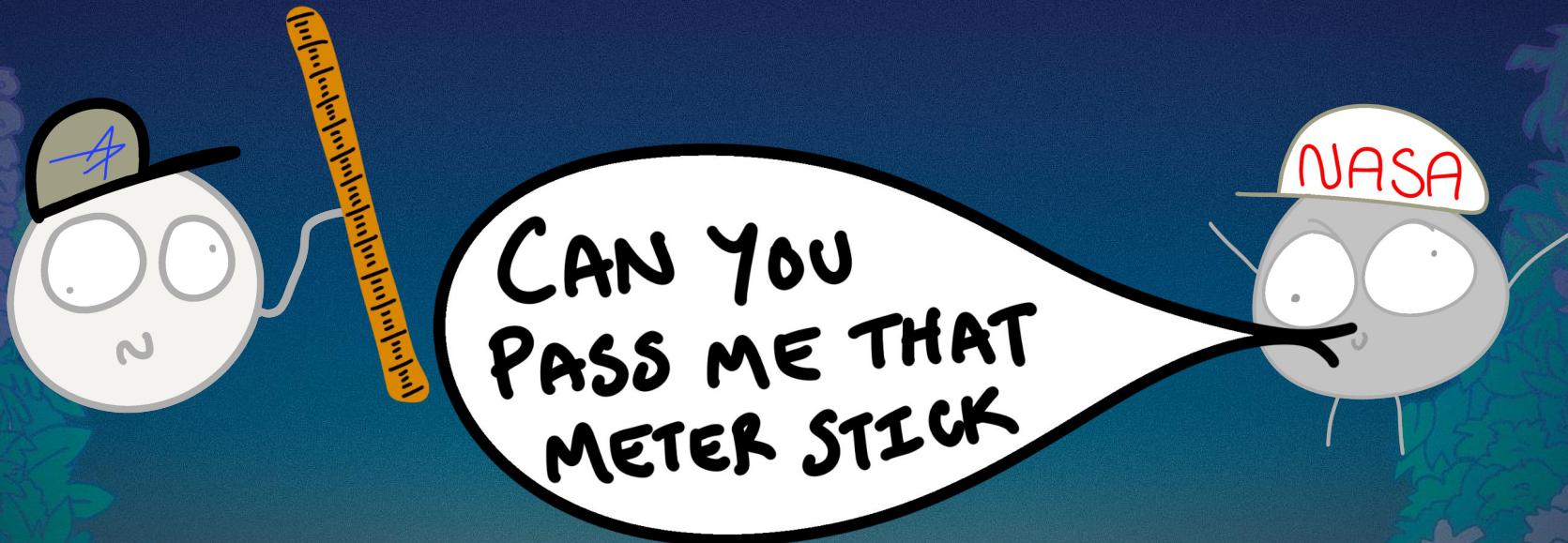
HEY
LOCKHEED



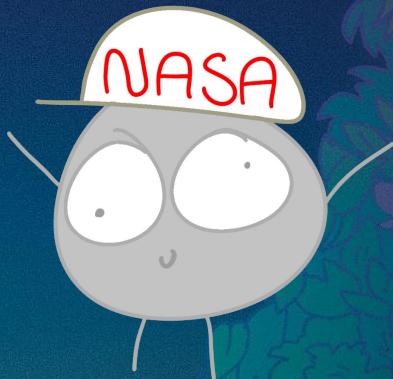
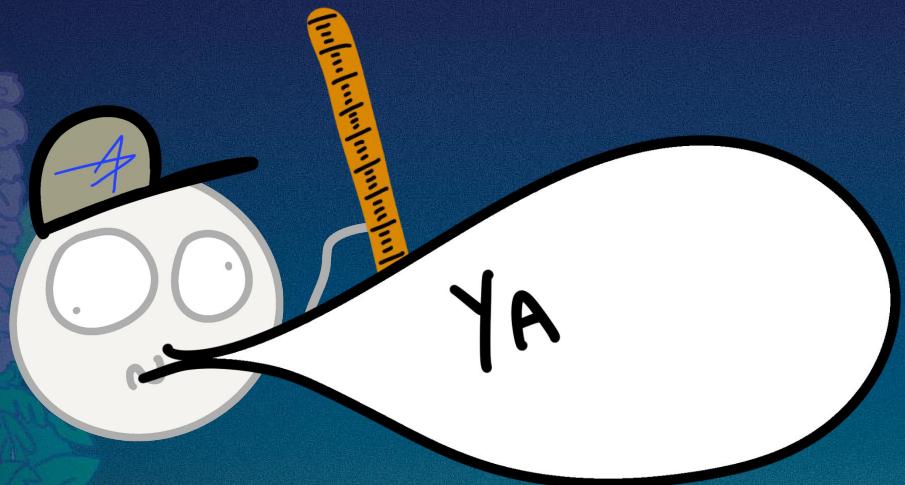
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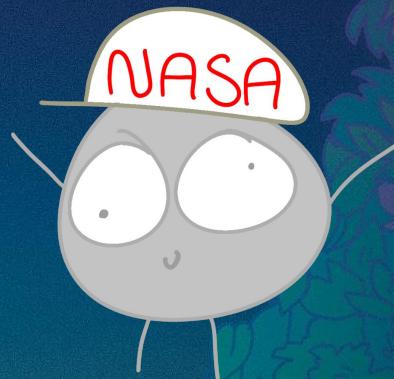
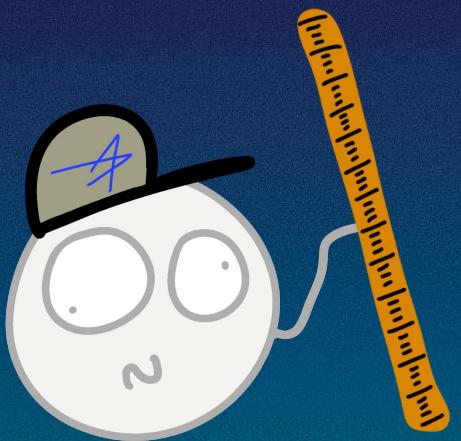
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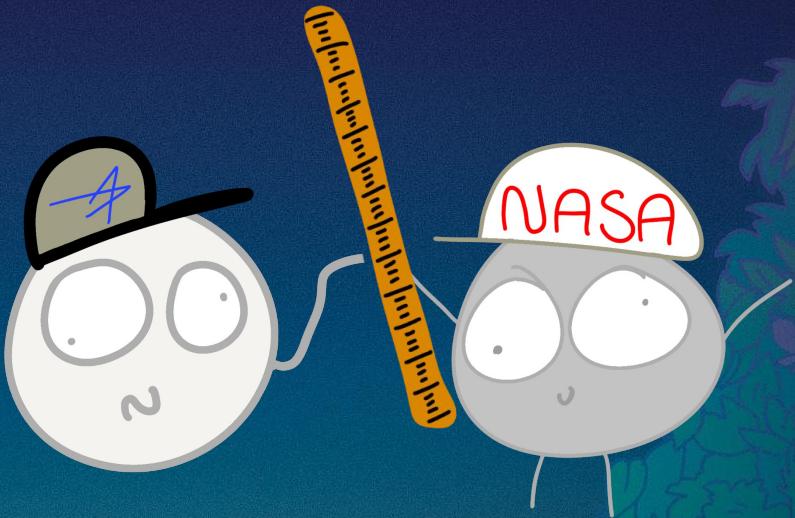
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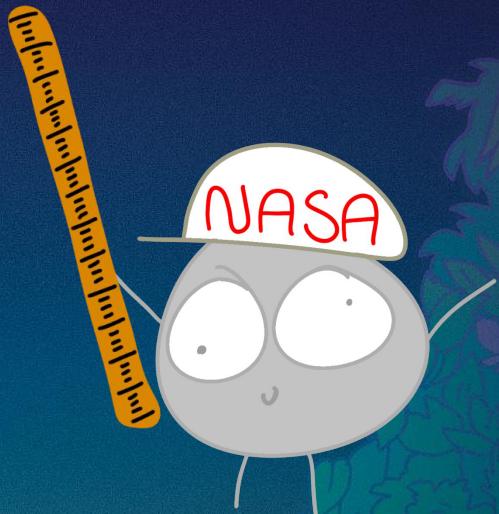
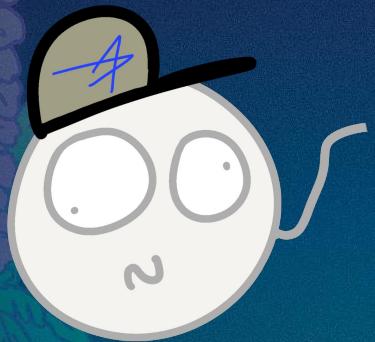
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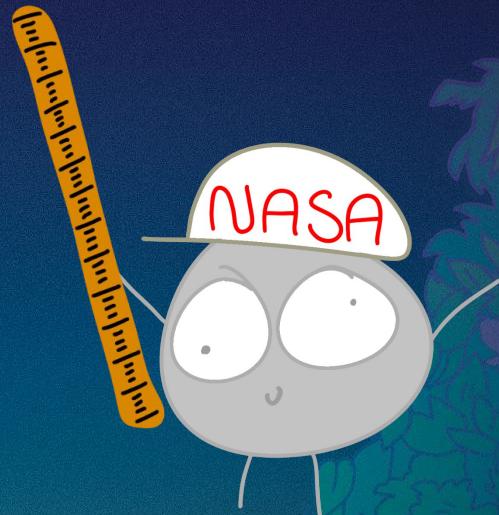
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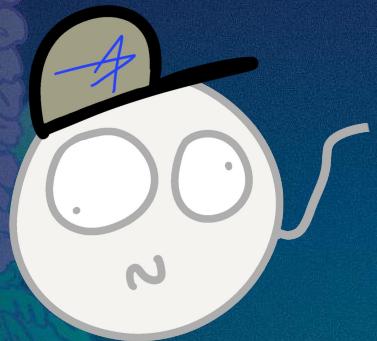
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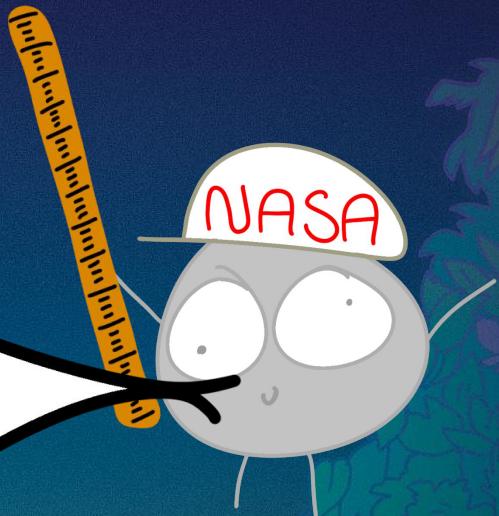
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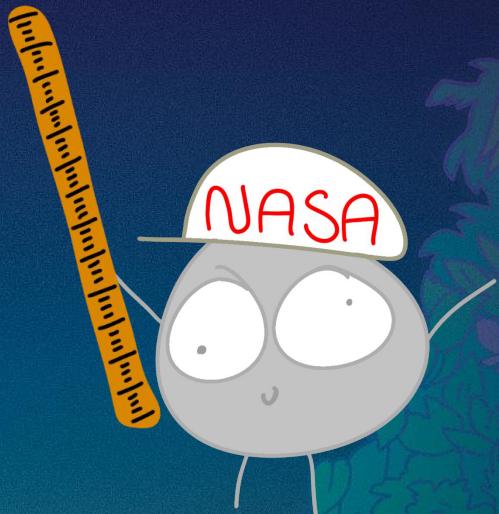
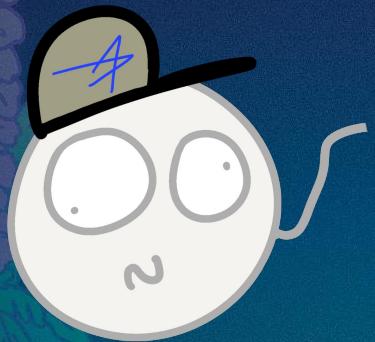
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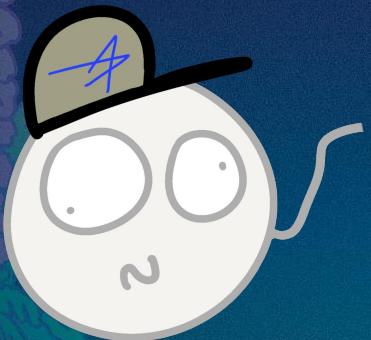
THIS IS A
*~~**~~ING
YARD STICK



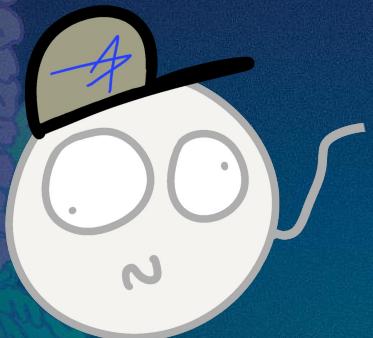
What happened?



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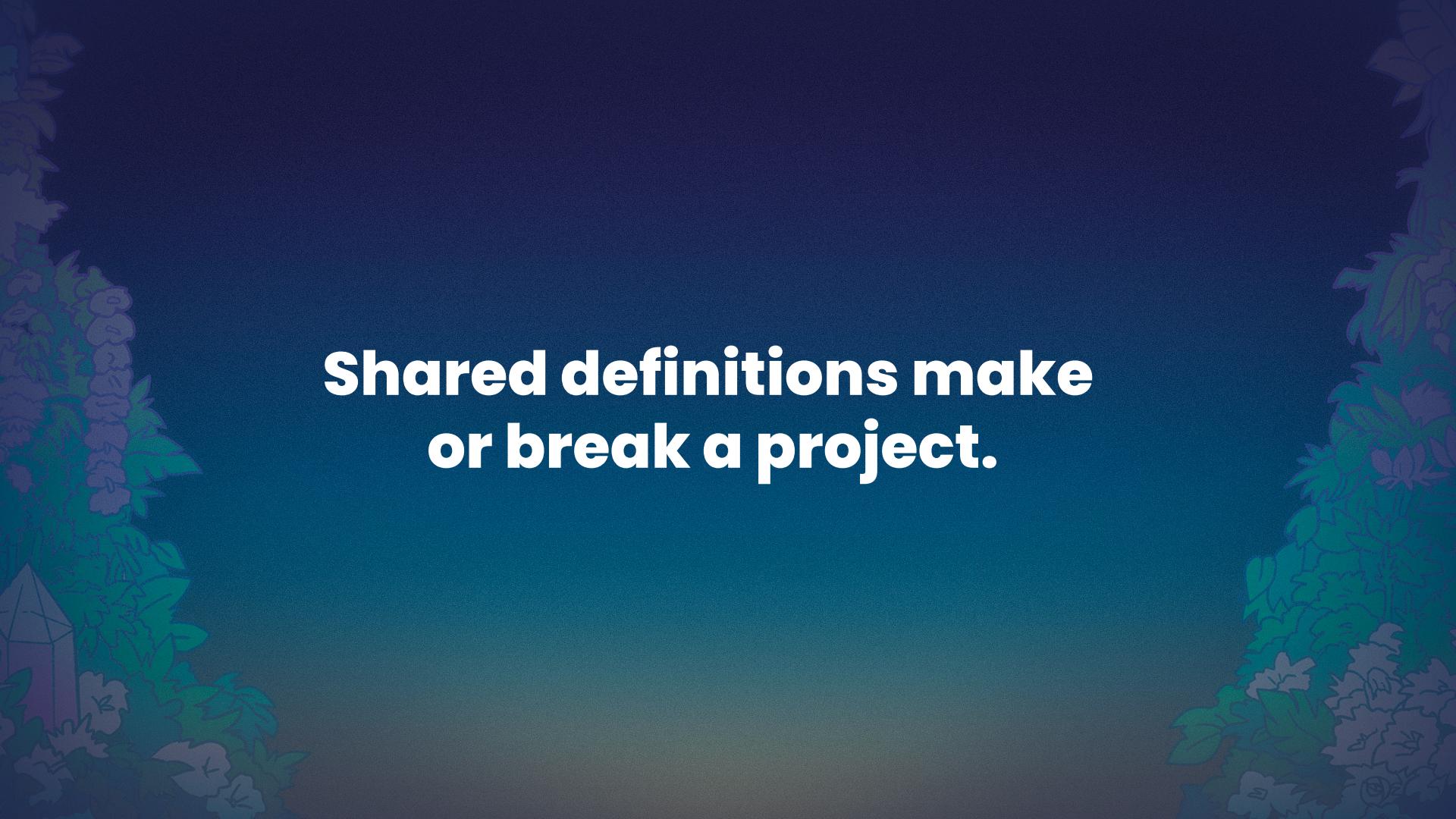


What happened?



**NASA was using metric, Lockheed was
using US customary units.**

Oopsie!



**Shared definitions make
or break a project.**

While Ethereum is facing more competition than ever, we're wasting our time talking past one another.

I asked the internet what they think an L2 is

I asked the internet what they think an L2 is

“An L2 is a chain that settles to an L1”

I asked the internet what they think an L2 is

“An L2 is a cultural extension of Ethereum”

I asked the internet what they think an L2 is

**“Like cutlery, a Layer 2 is a function
description, not a specific design or
form”**

I asked the internet what they think an L2 is

**“I give up on the other definition...
let’s just stop saying L2, it’s a
nightmare”**





**We can't build the future of
Ethereum without clear,
shared definitions.**

**Shared definitions allow us to
work *together* to see the whole
picture and fill in the gaps.**

**We better start writing a
dictionary or we'll end up like
the Mars Climate Orbiter.**

Encyclopedia Etheria

Aardvark





Aardvark



Rollup is just a normal
blockchain that runs on top of
blockchain for ordering and

A Rollup is just a normal
blockchain that runs on top of another
blockchain for ordering and
validation.

**A Rollup is just a normal
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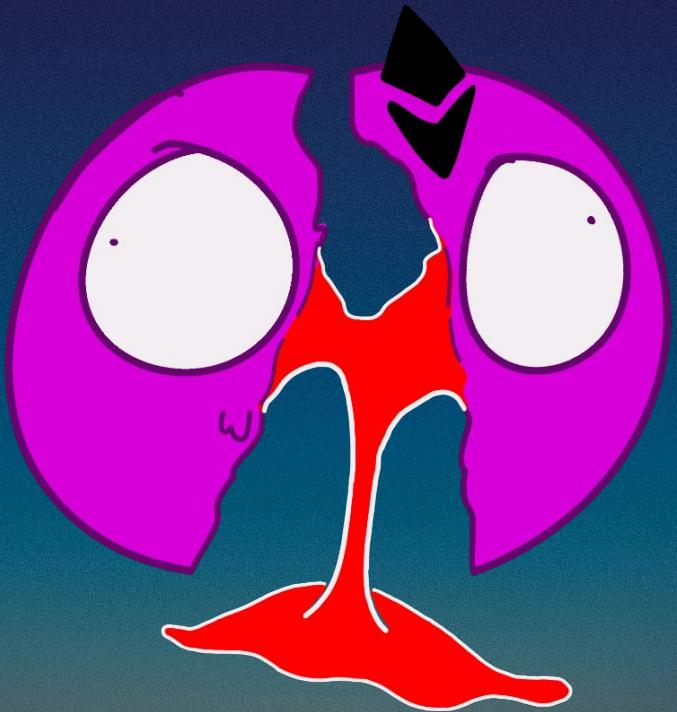
**A Rollup is just a normal
blockchain that uses another
blockchain for ordering and
data availability.**

What even is a blockchain?

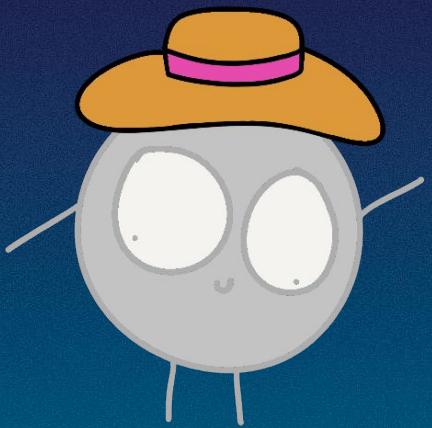
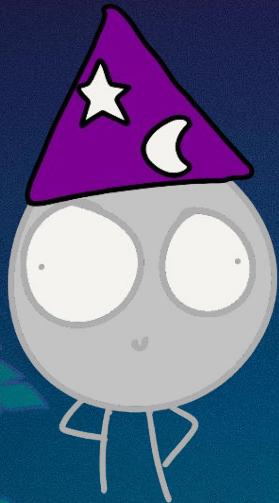
What even is a blockchain?



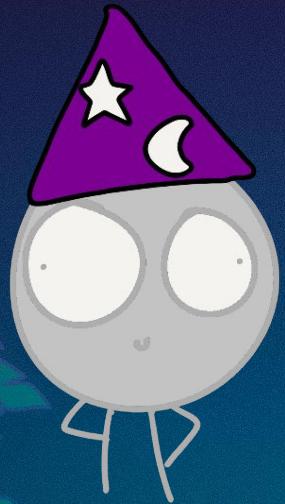
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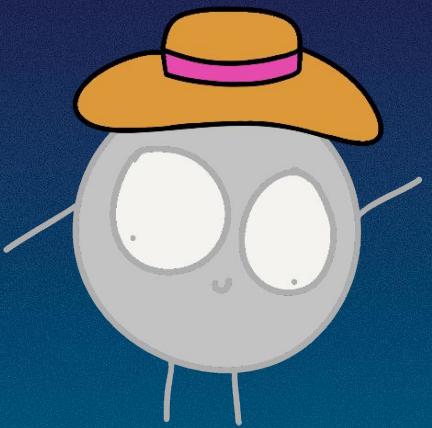
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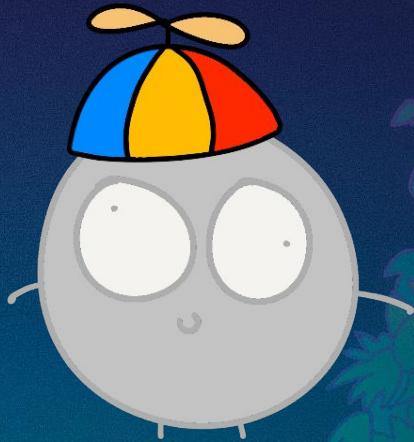
What even is a blockchain?



1 ETH

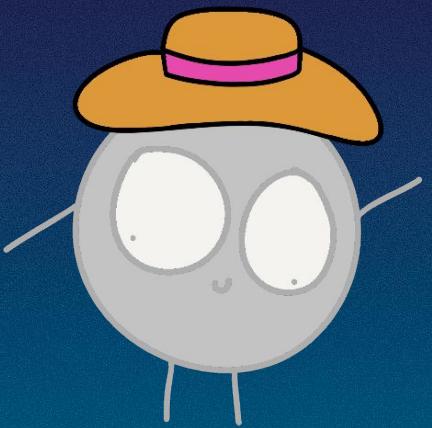
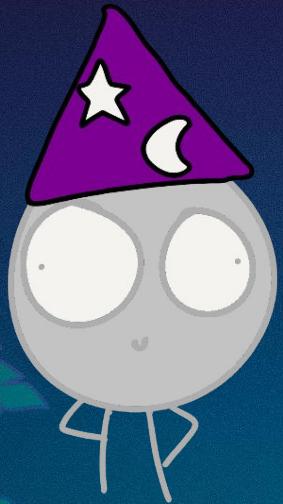


2 ETH

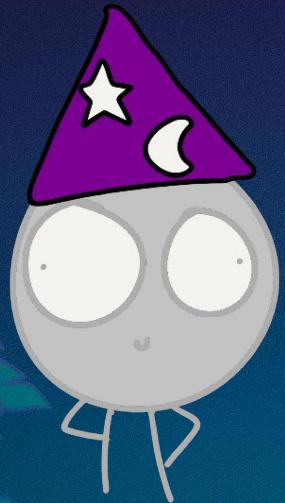


0 ETH

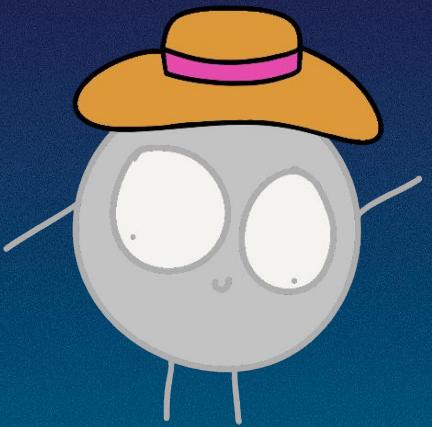
What even is a blockchain?



What even is a blockchain?



0 ETH



2 ETH



1 ETH

Ordering is critical!

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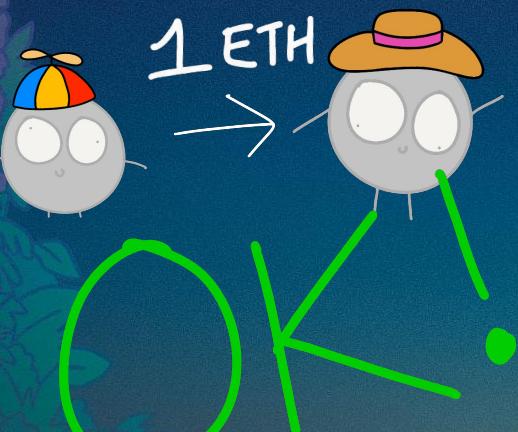
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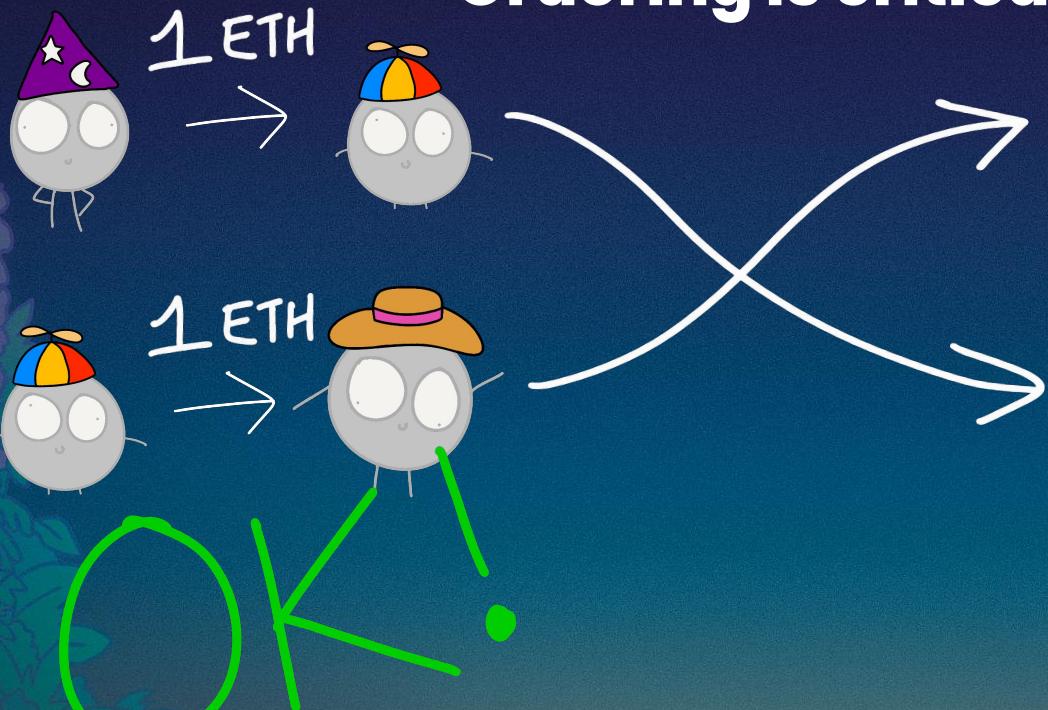
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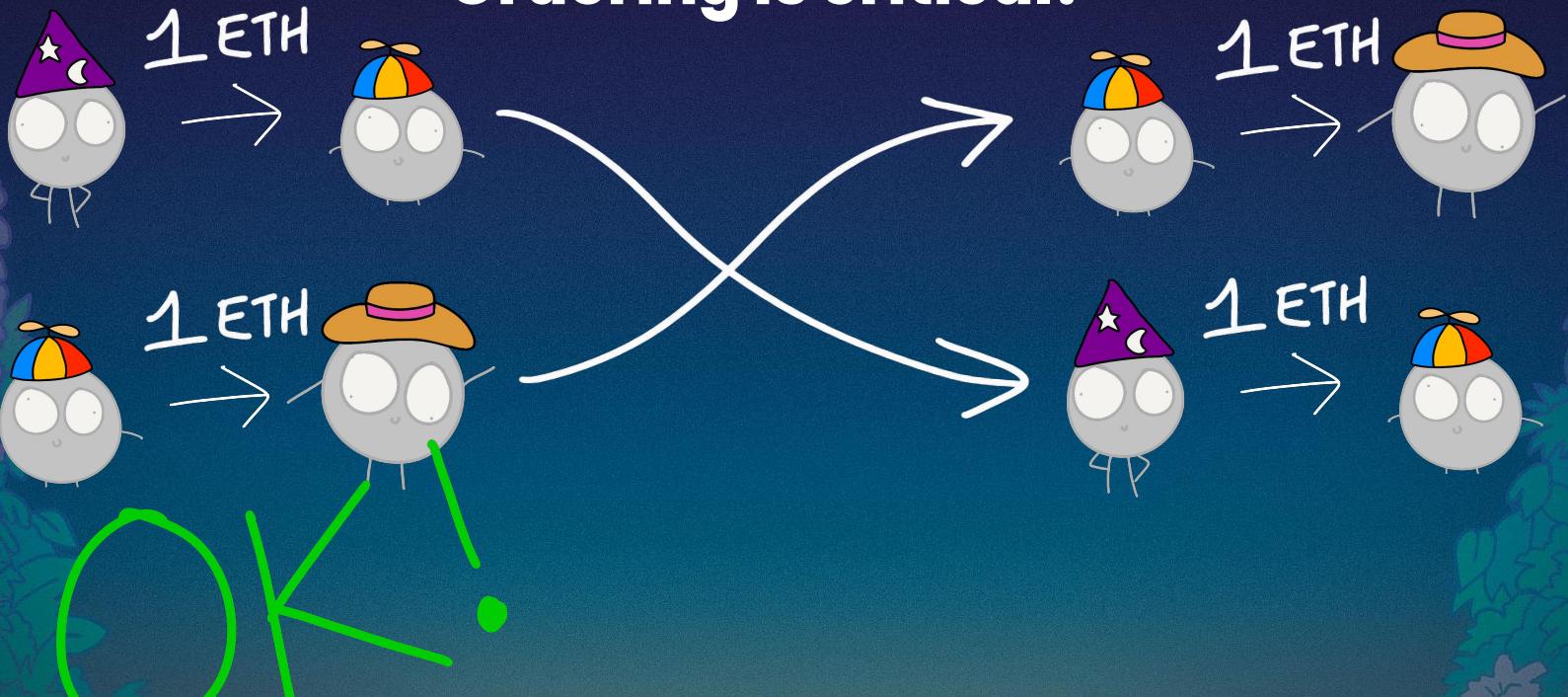
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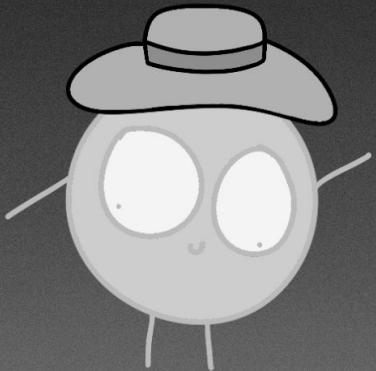


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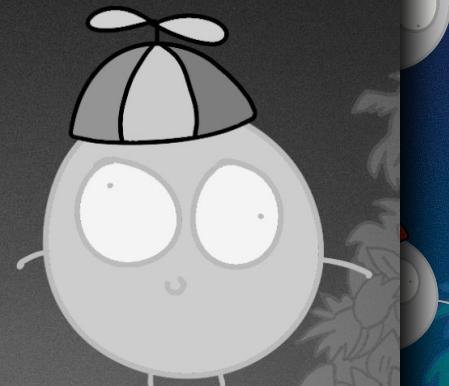
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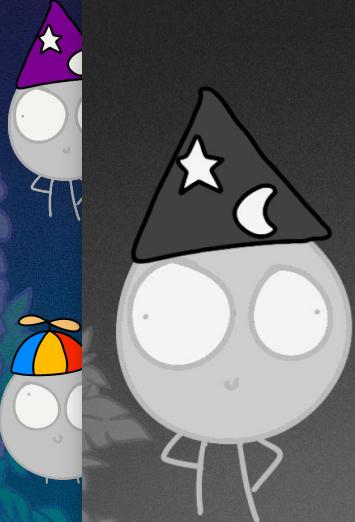
2 ETH



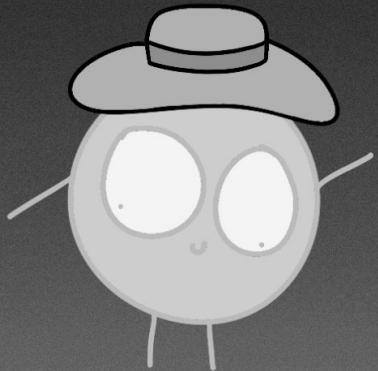
0 ETH

Ordering is critical!

What even is a blockchain?



1 ETH



2 ETH



0 ETH

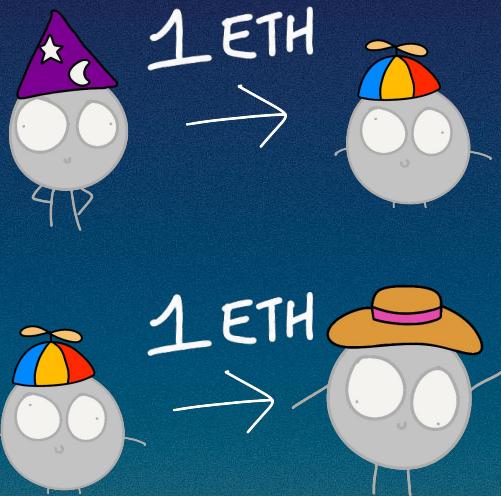
Ordering is critical!



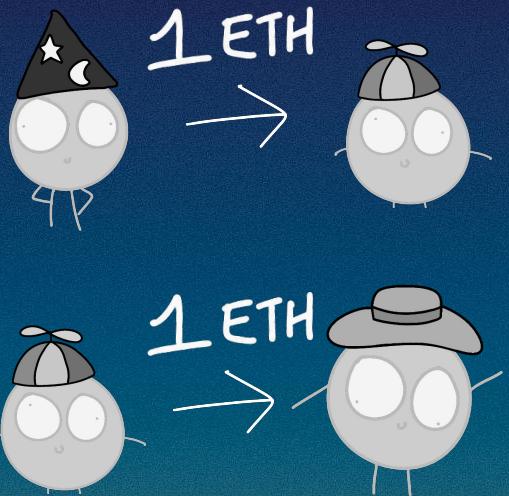
No ordering, no blockchain!

Data availability is critical!

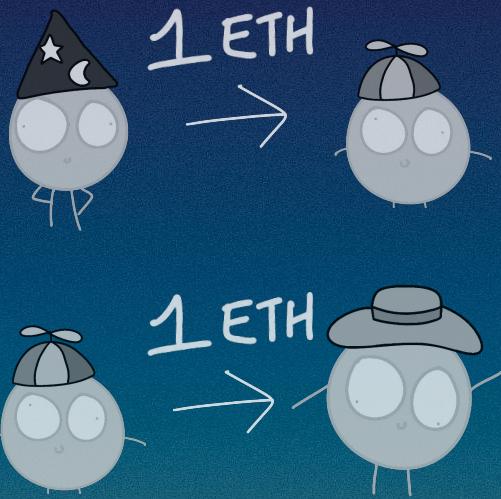
Data availability is critical!



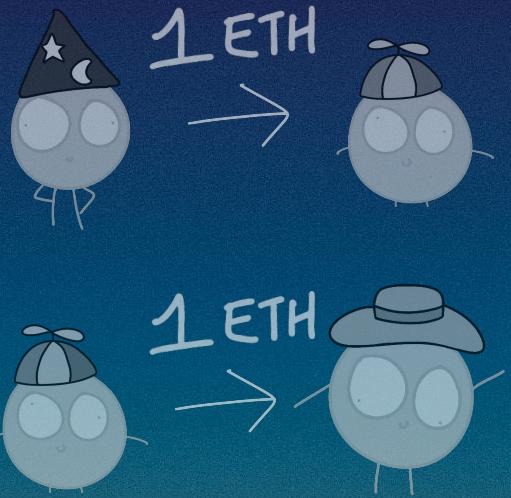
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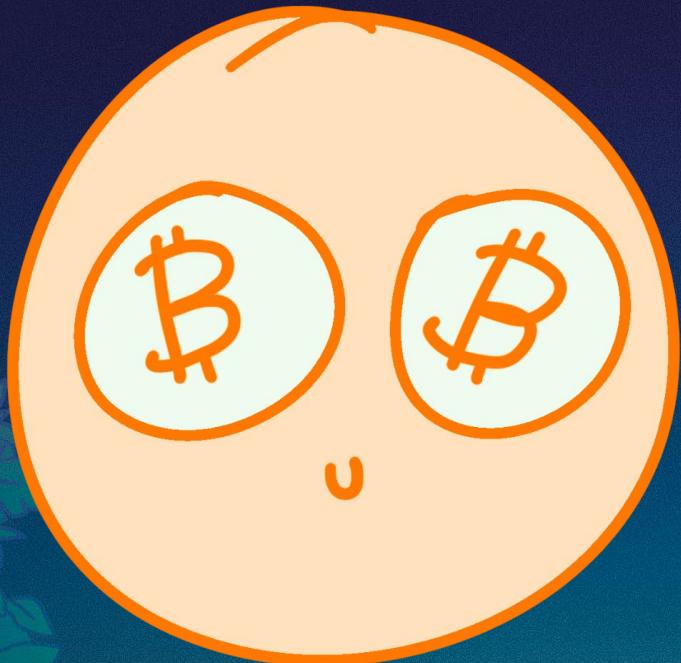
**No transactions, no
blockchain!**

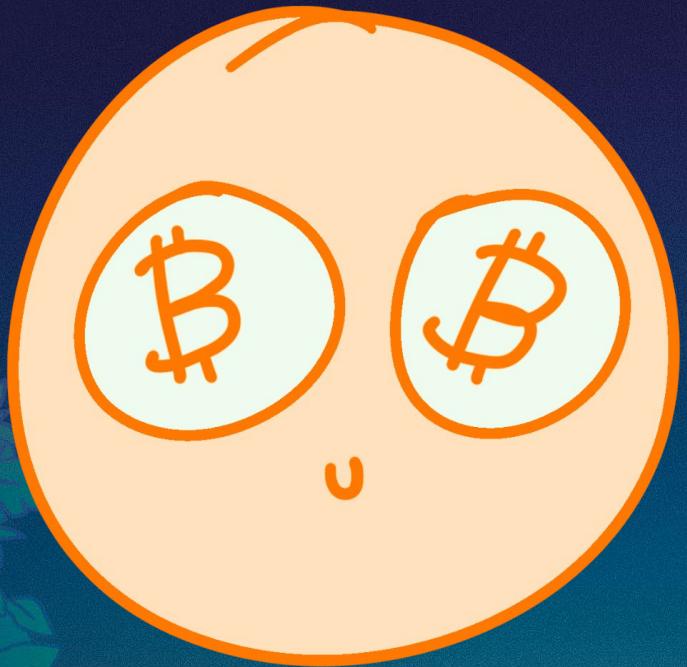


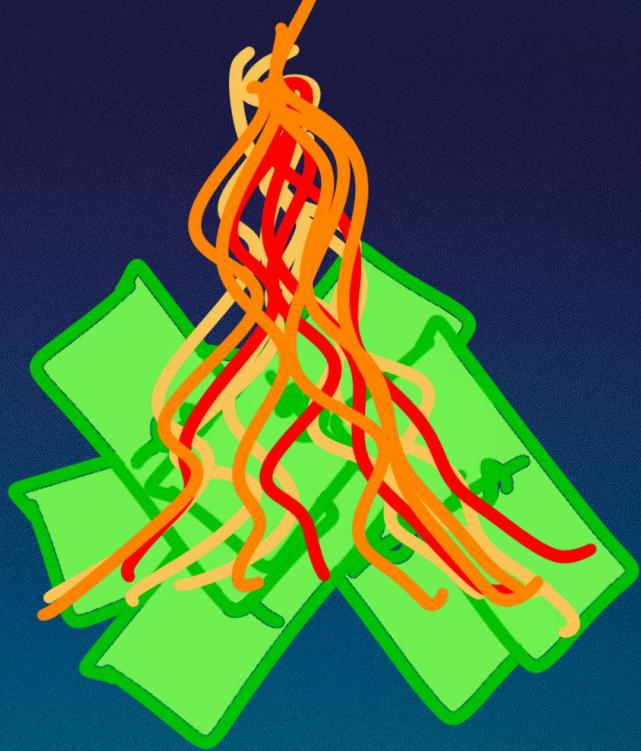
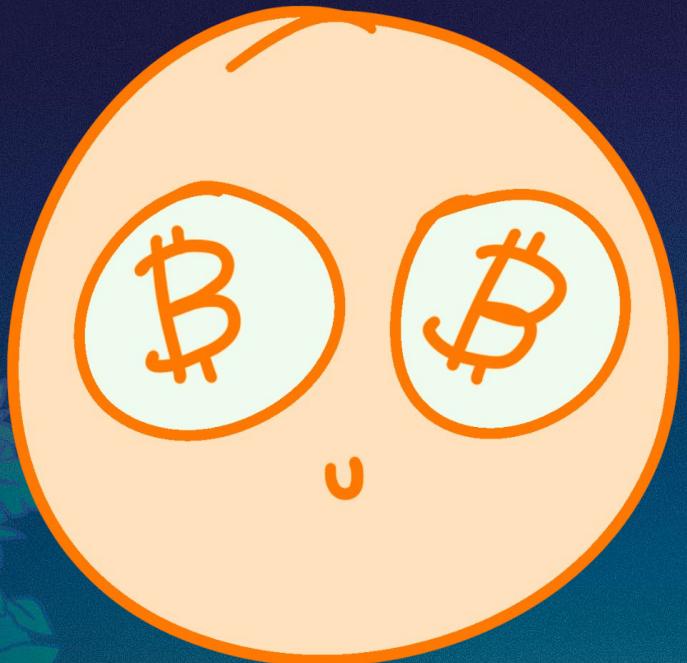
**Blockchains use
consensus mechanisms
to establish ordering and
data availability.**

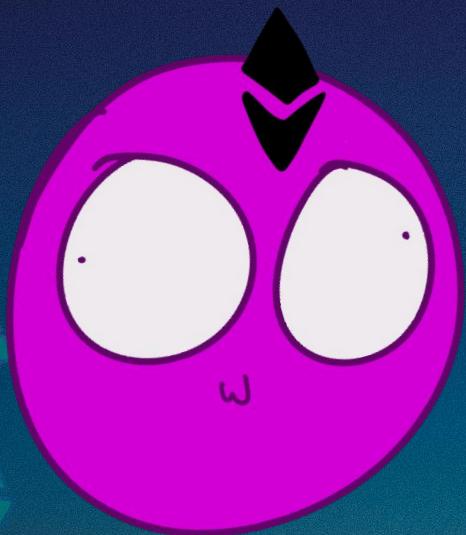
**Blockchains use
consensus mechanisms
to establish ordering and
data availability.***

* ok technically consensus is mostly for ordering and the idea of protocol-guaranteed data availability is relatively new but it's hard to make this distinction in a 20 minute talk and you can basically get away with saying this most of the time and people will understand what you mean

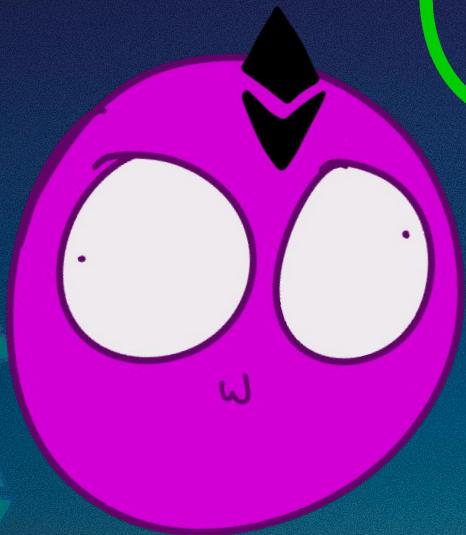












**Very human mechanism
design, yes, very good, no
plutocracy here!**

Consensus is complicated and costly

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- Straight up difficult and expensive to build

Consensus is complicated and costly

- Straight up difficult and expensive to build
- Challenging to maintain

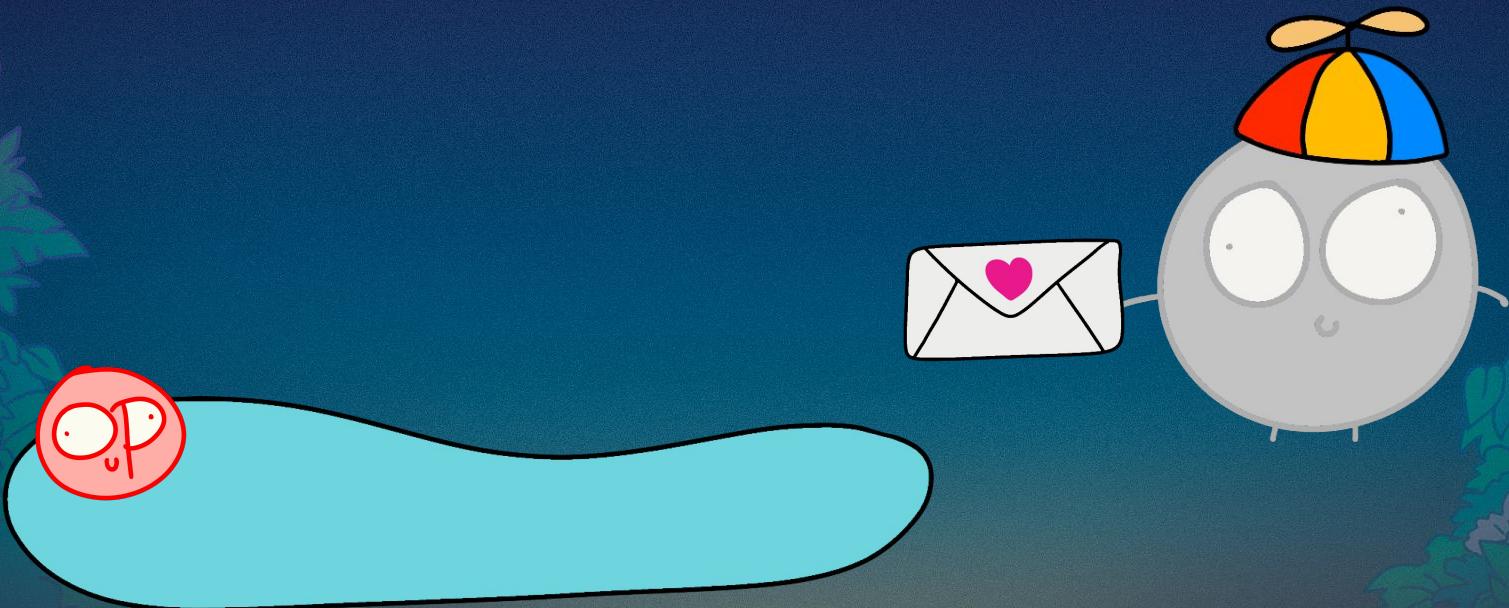
Consensus is complicated and costly

- Straight up difficult and expensive to build
- Challenging to maintain
- Usually need some sort of token to reward participants

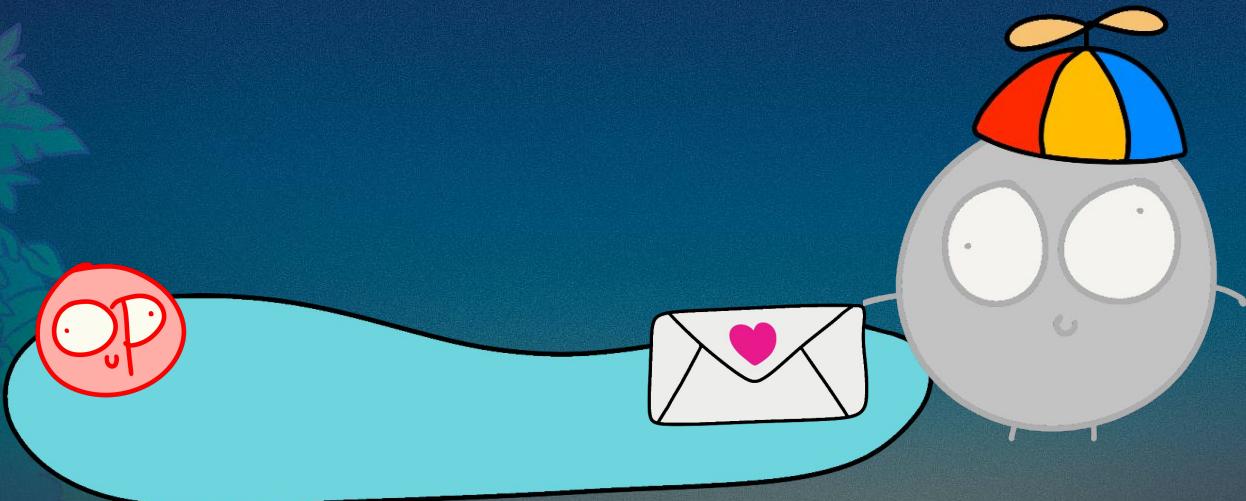
**Rollups solve this problem by
outsourcing consensus to
another blockchain.**

Here's how a Rollup works!

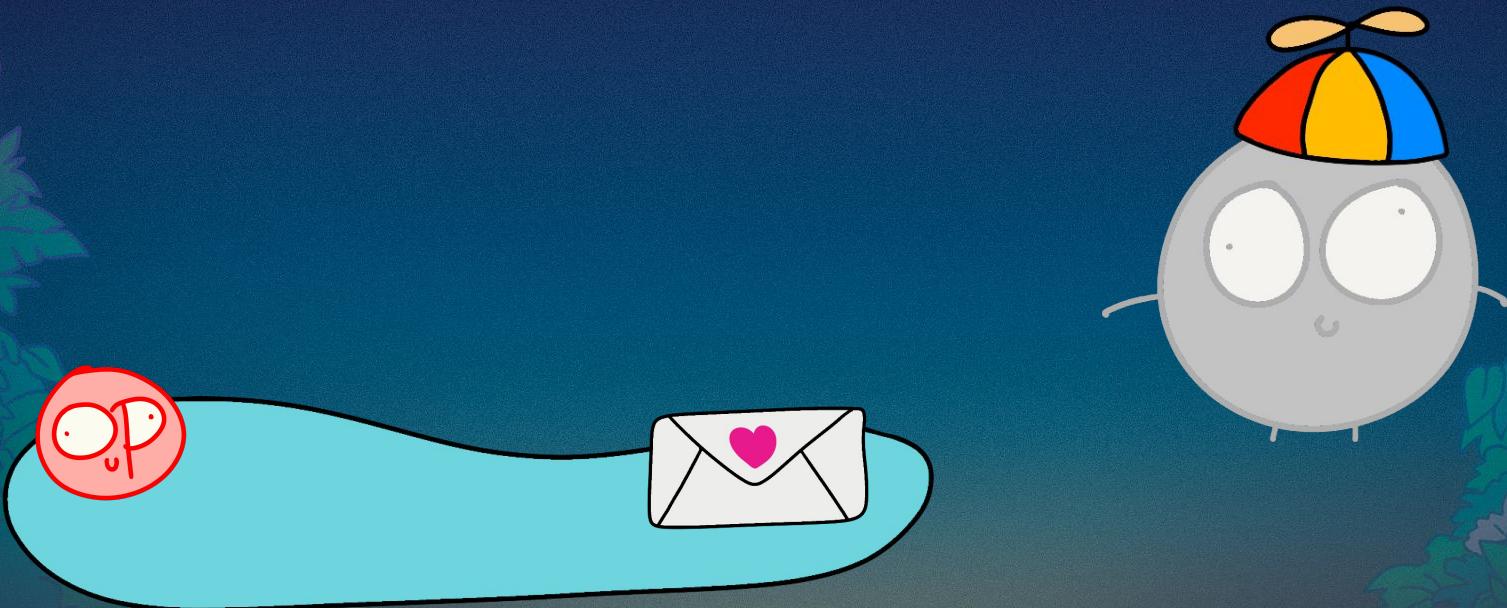
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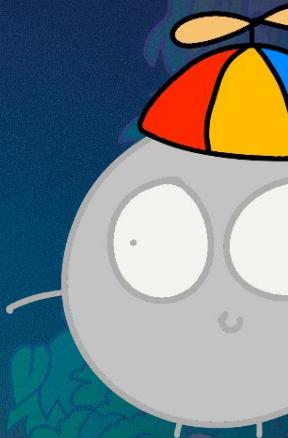
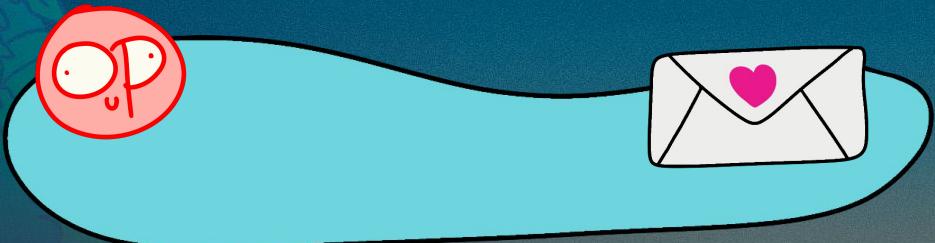
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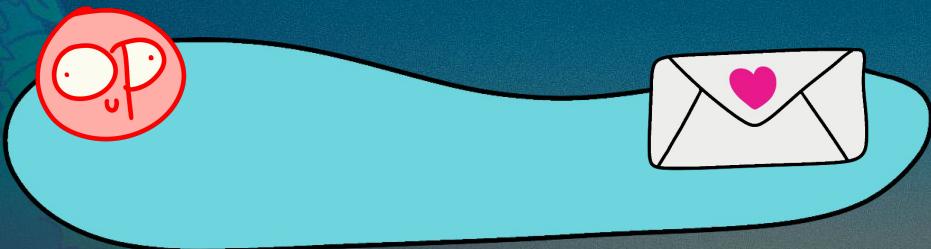
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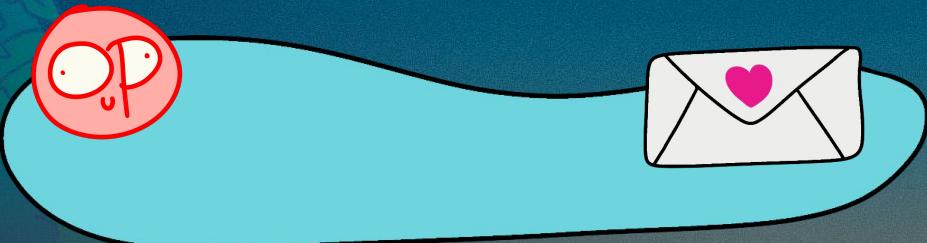
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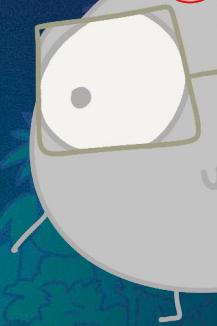
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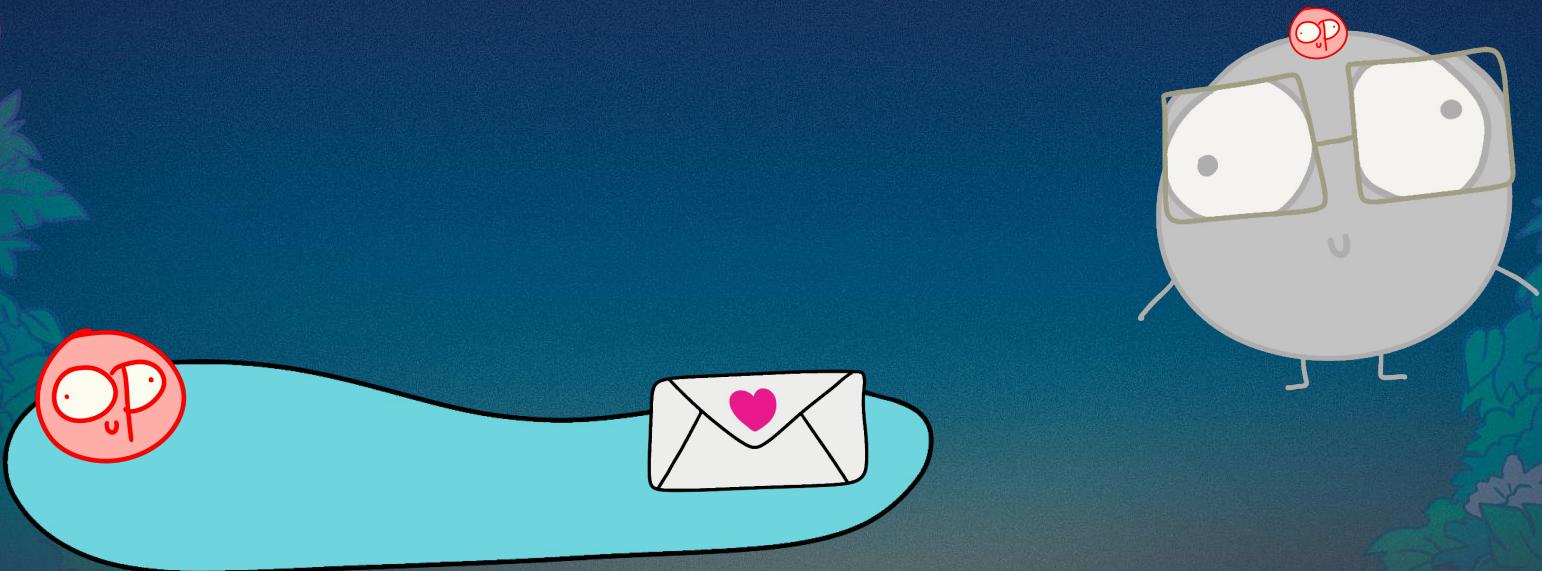


OP

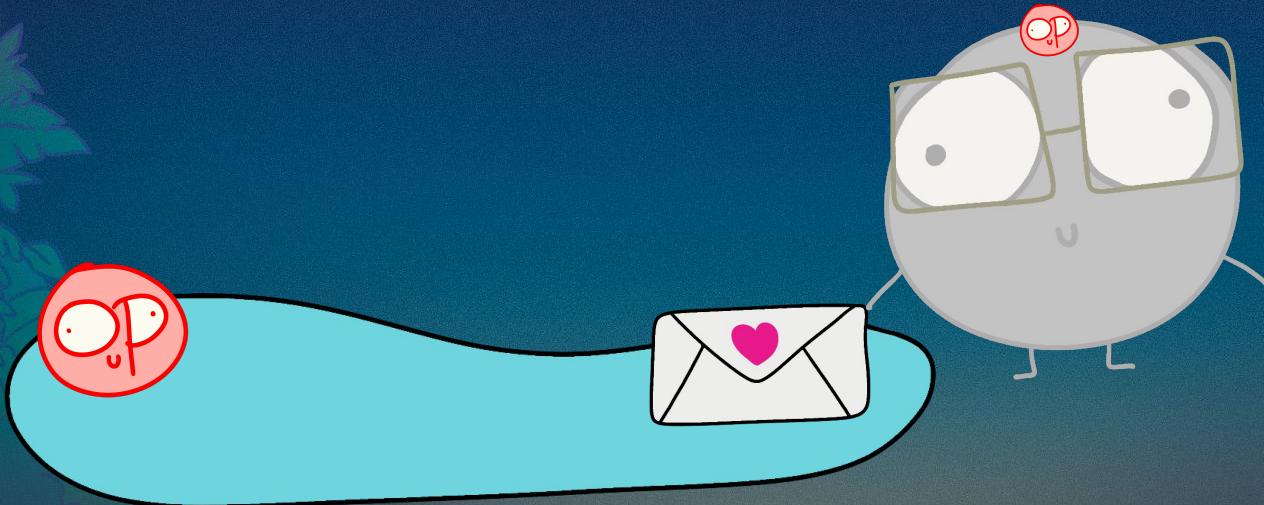


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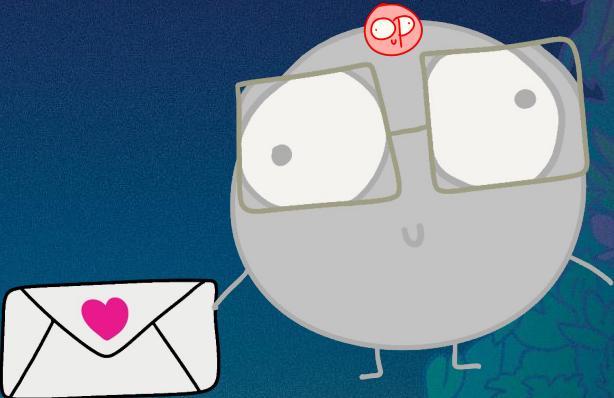
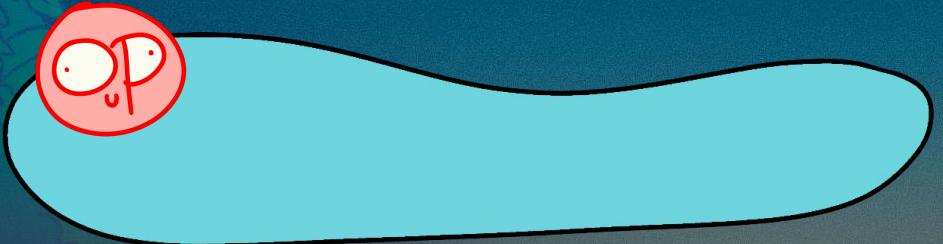
Here's how a Rollup works!



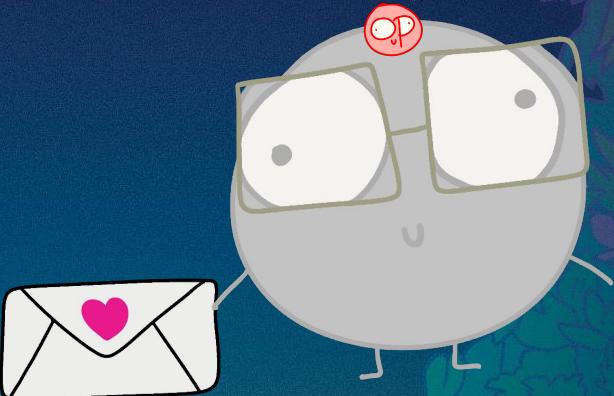
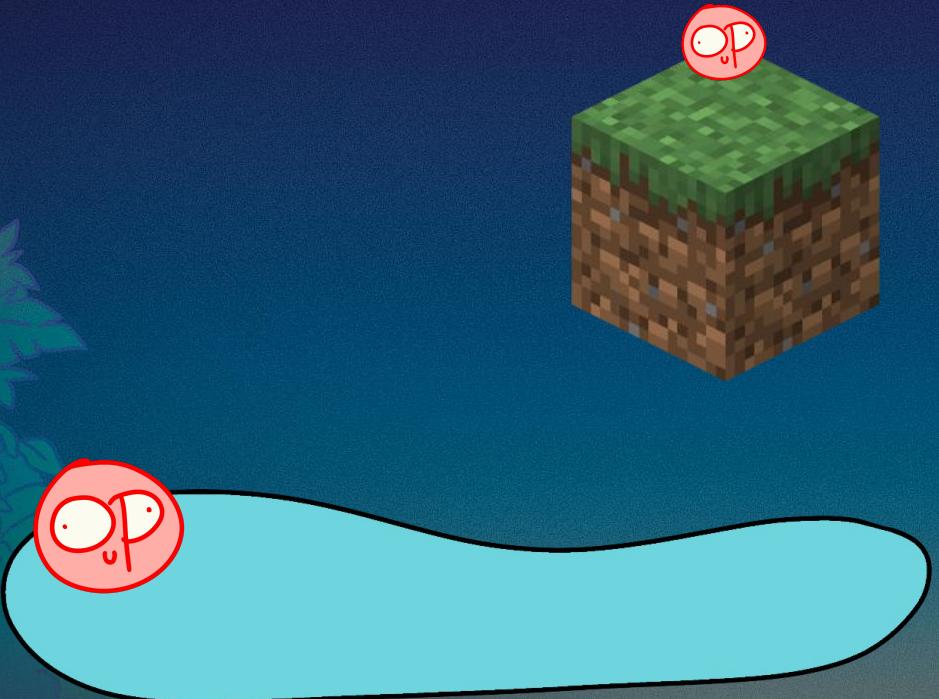
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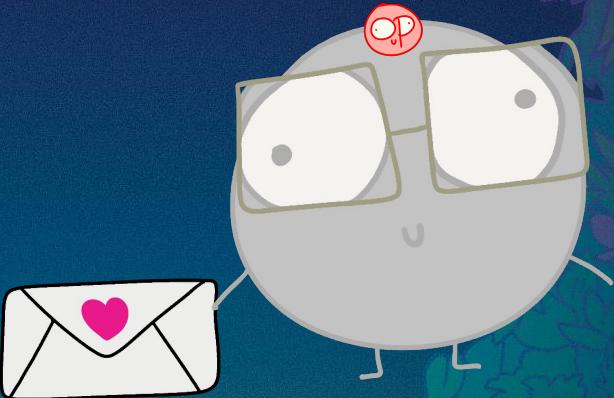
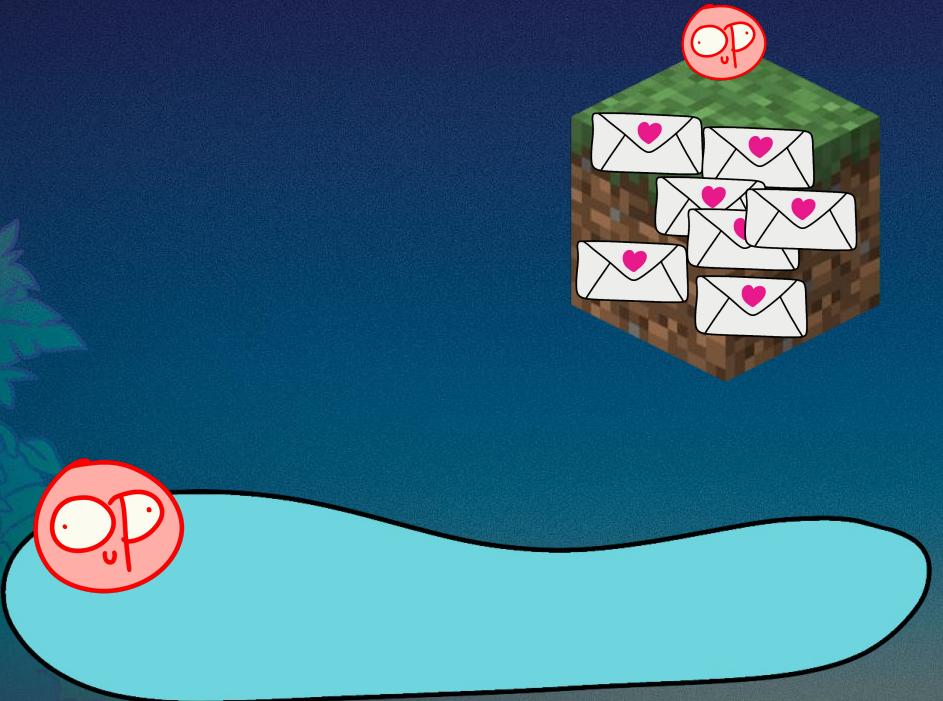
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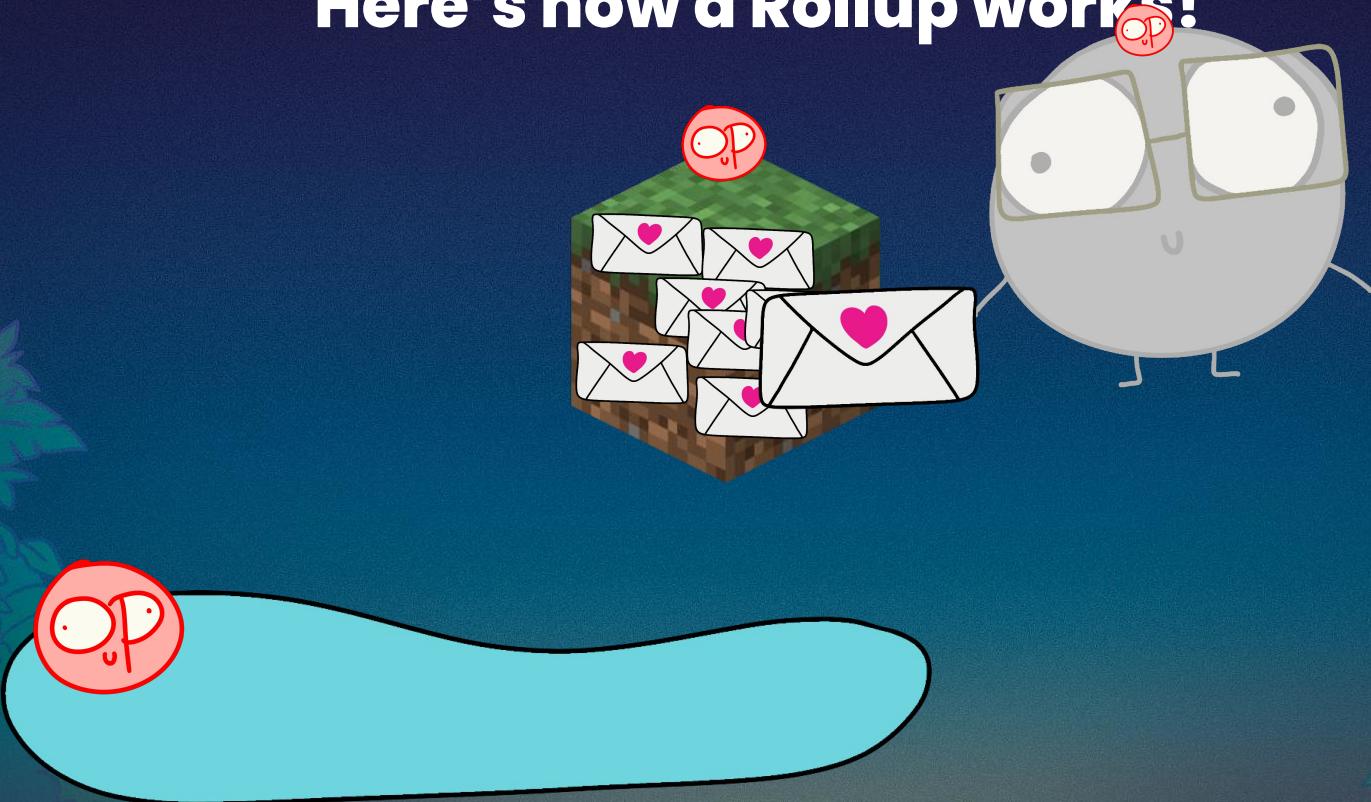
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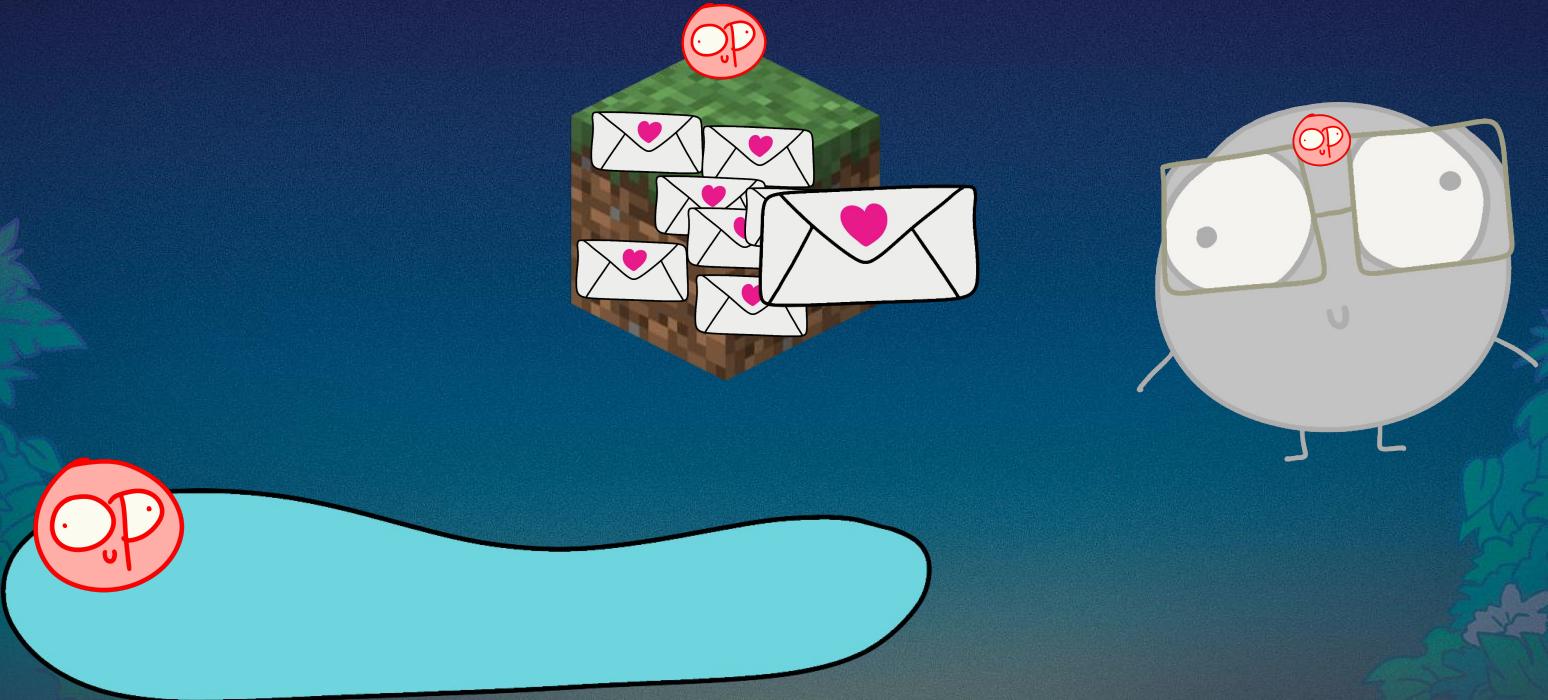
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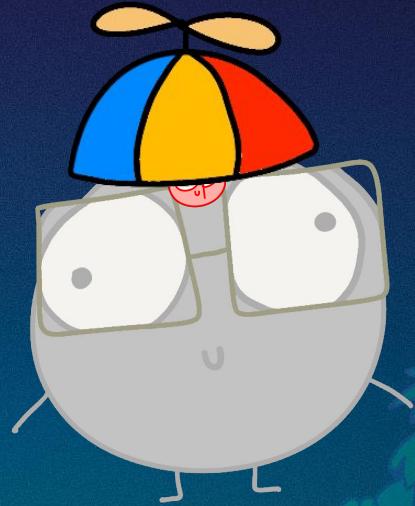
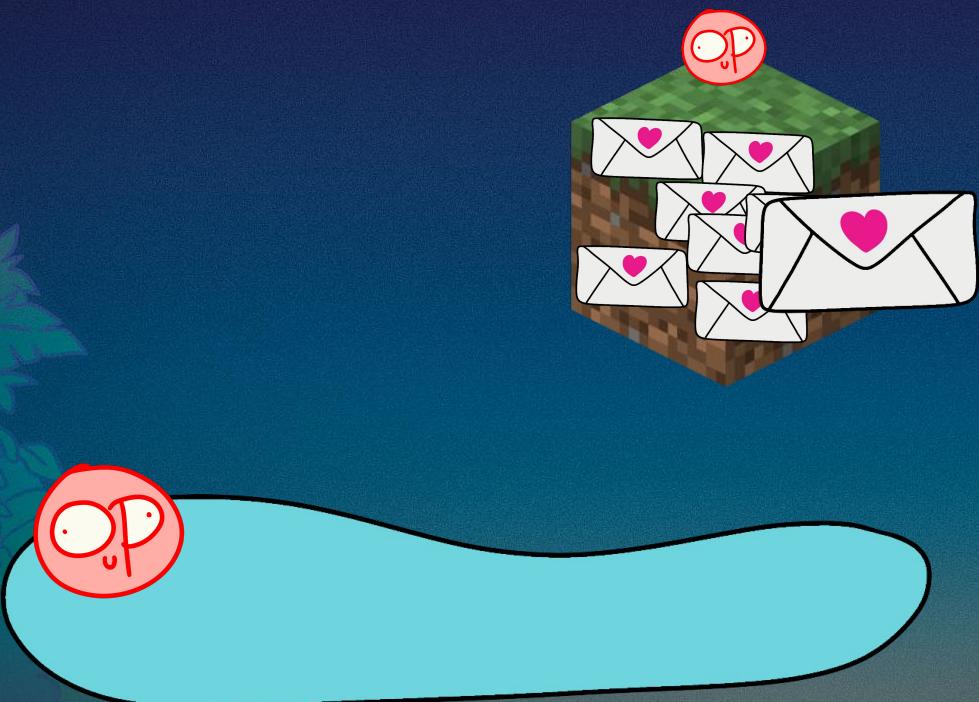
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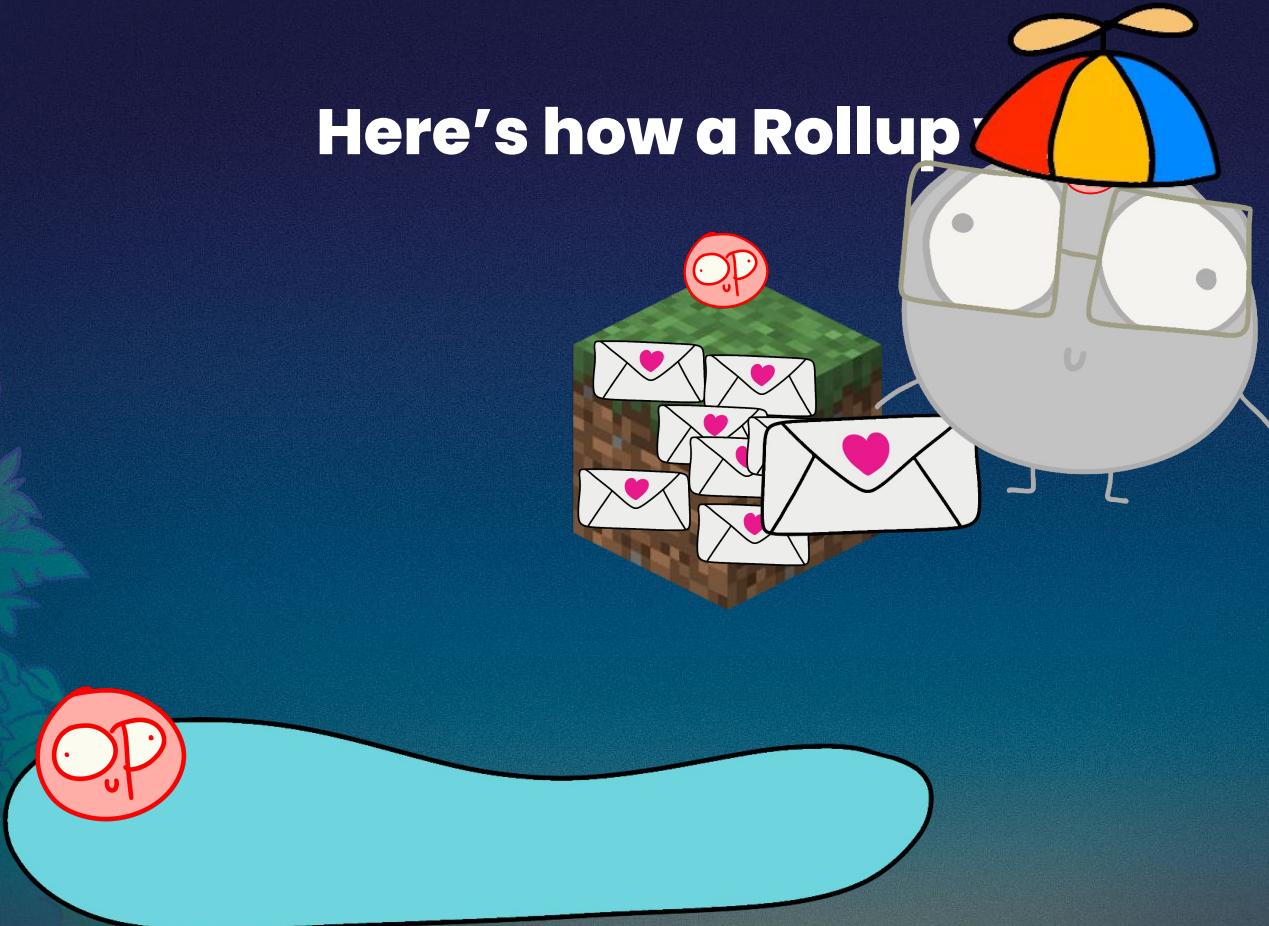
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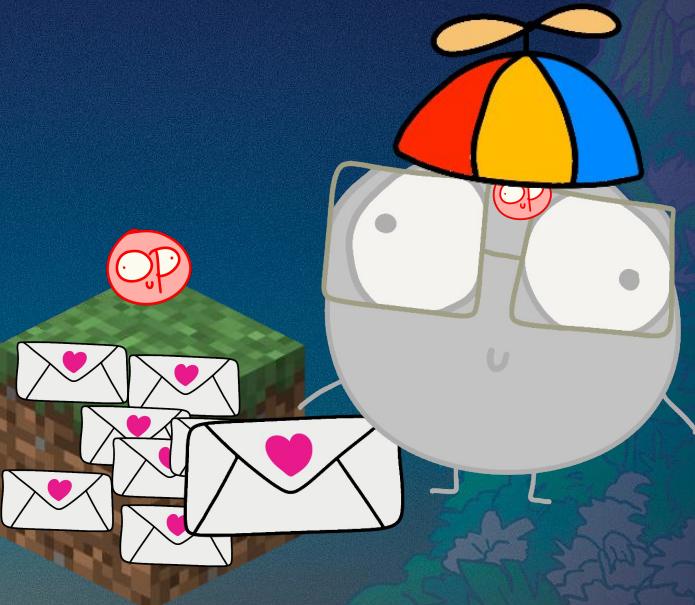
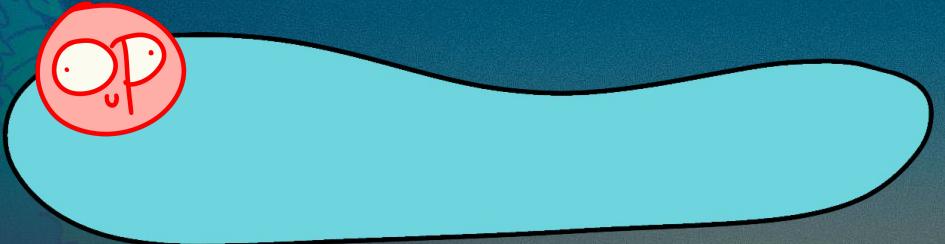
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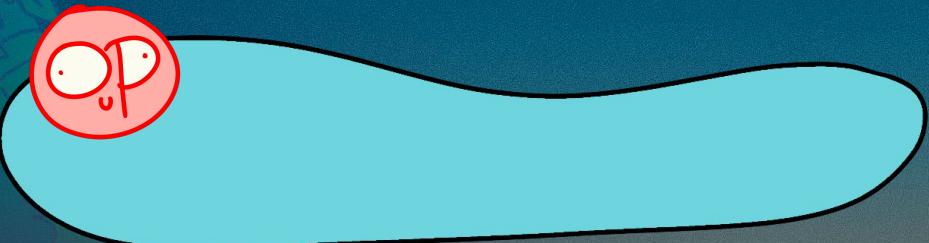
Here's how a Rollup works



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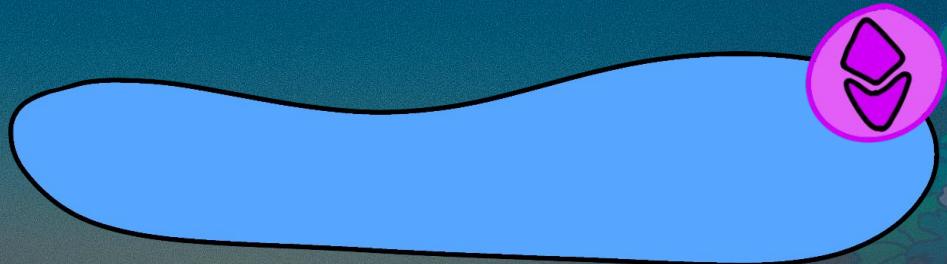


Here's how a Rollup works!

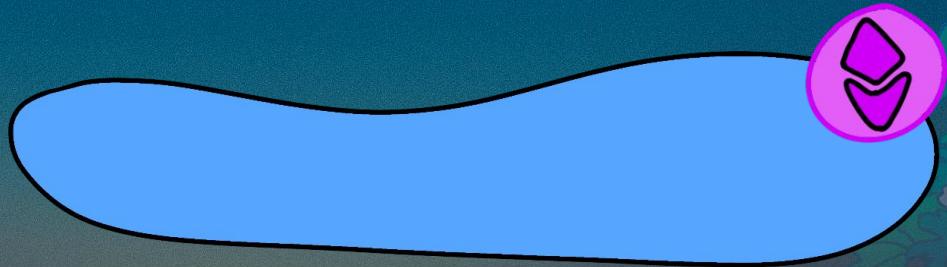
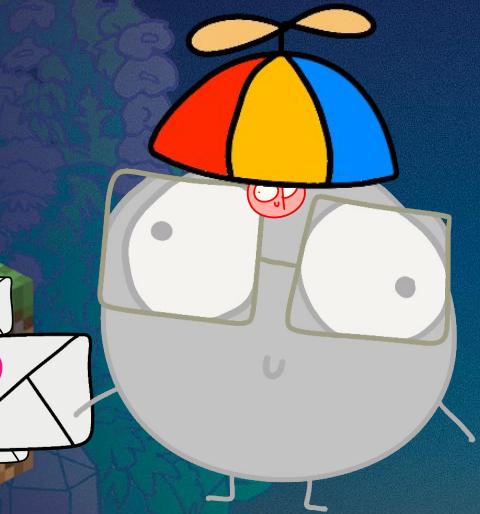


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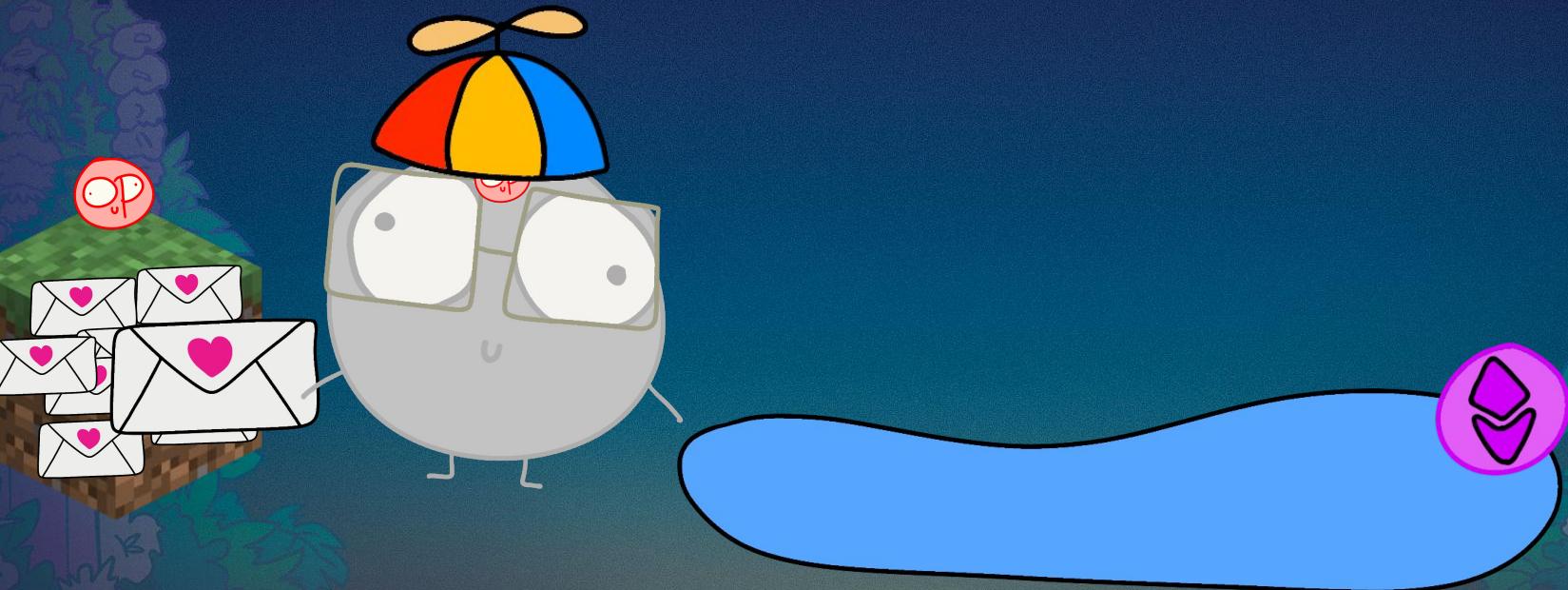
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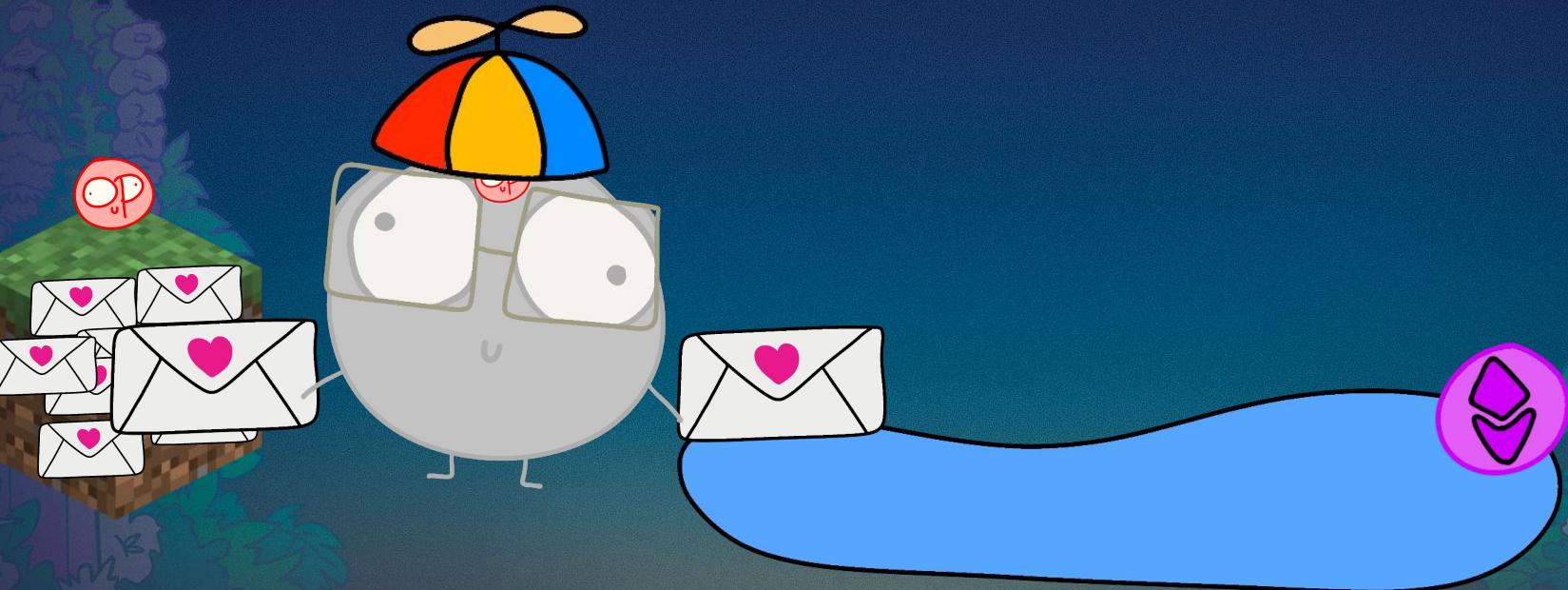
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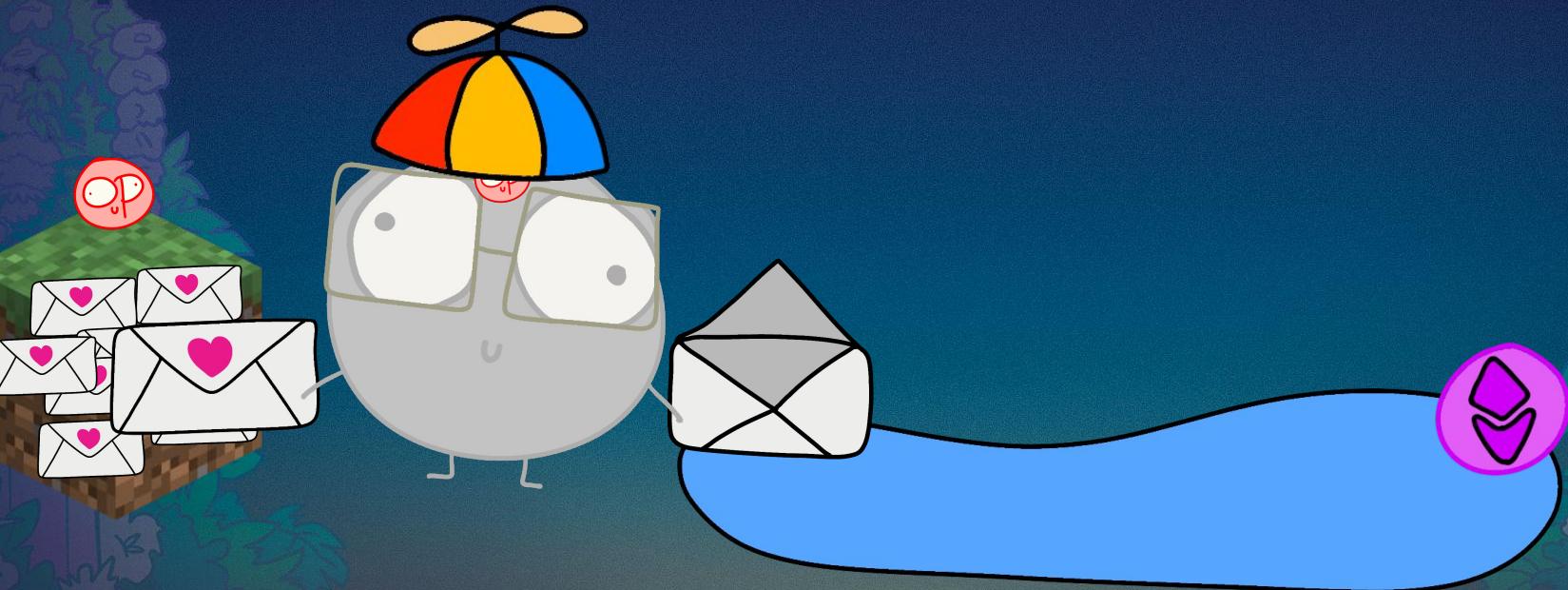
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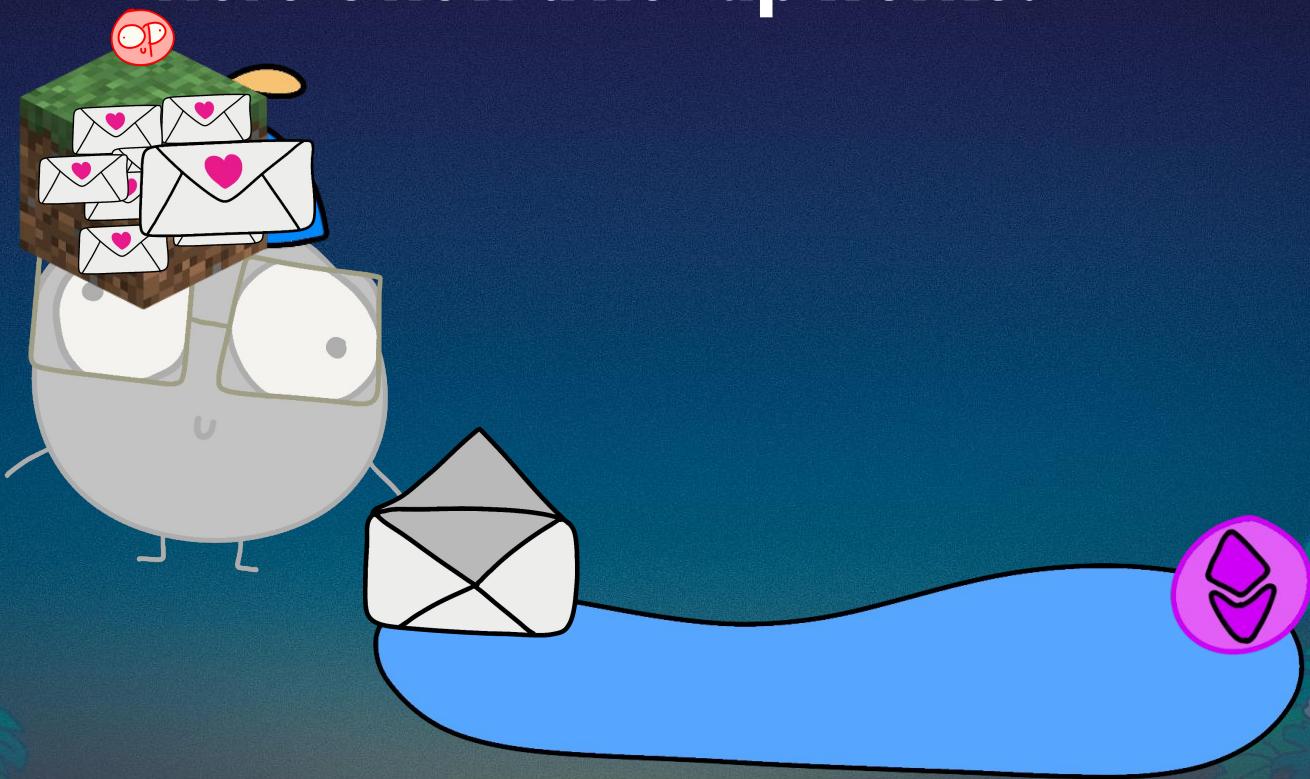
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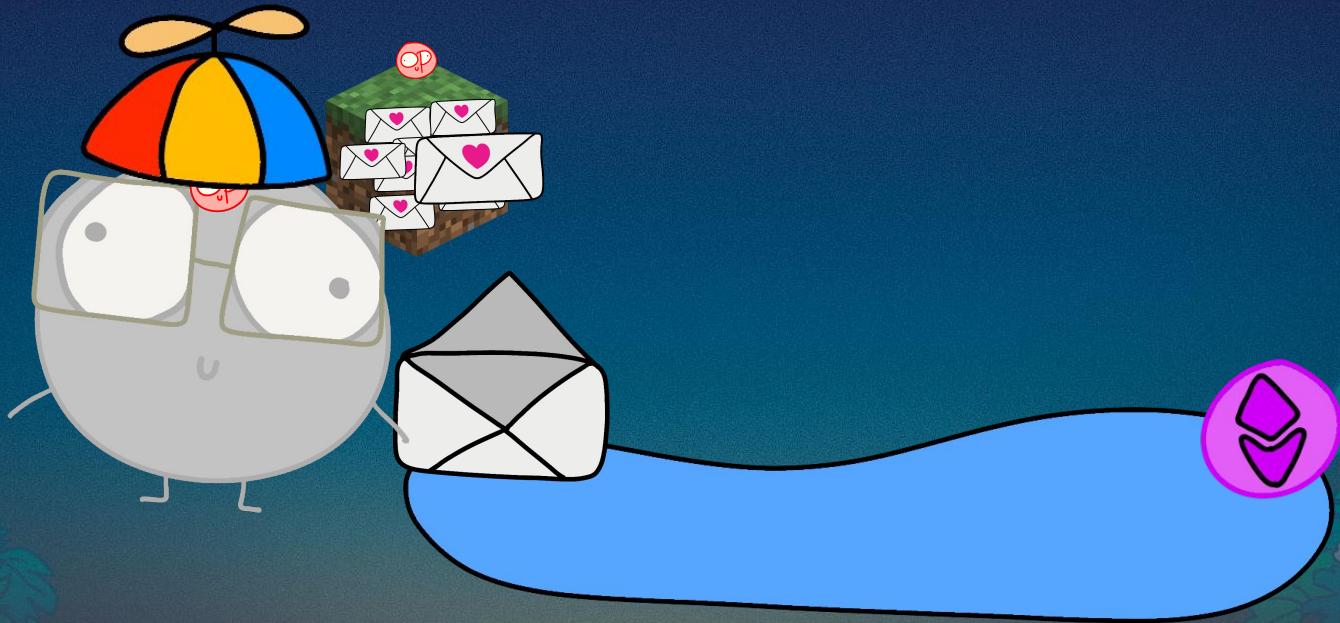
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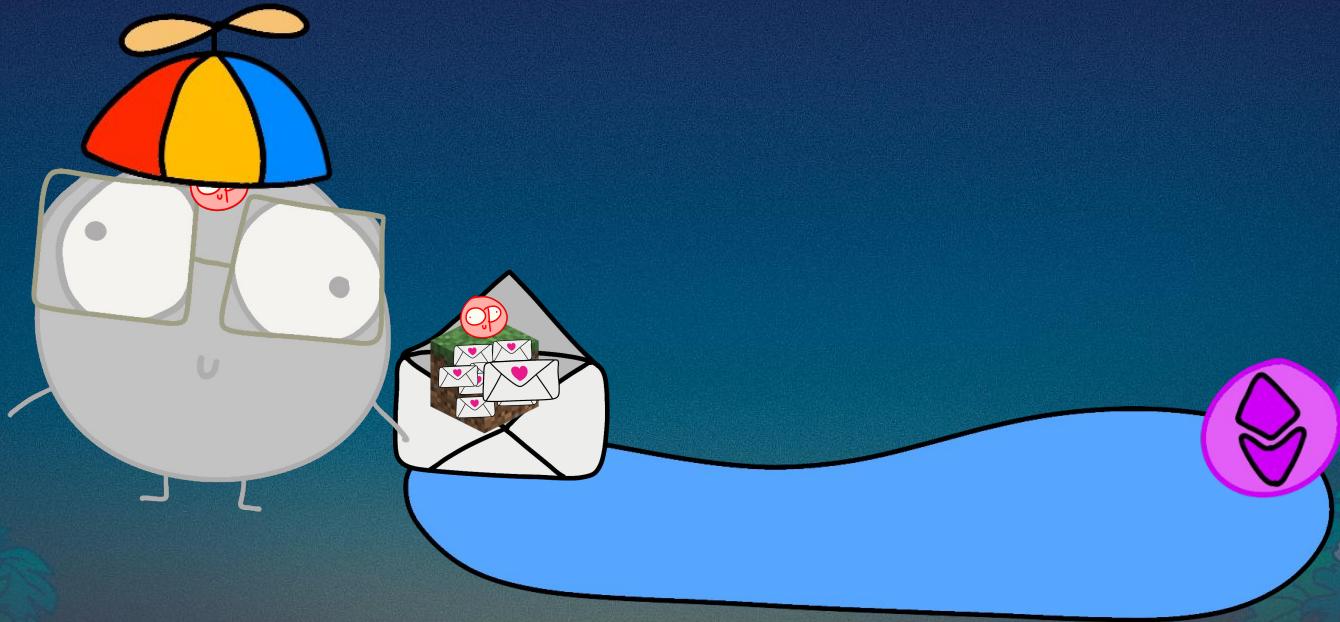
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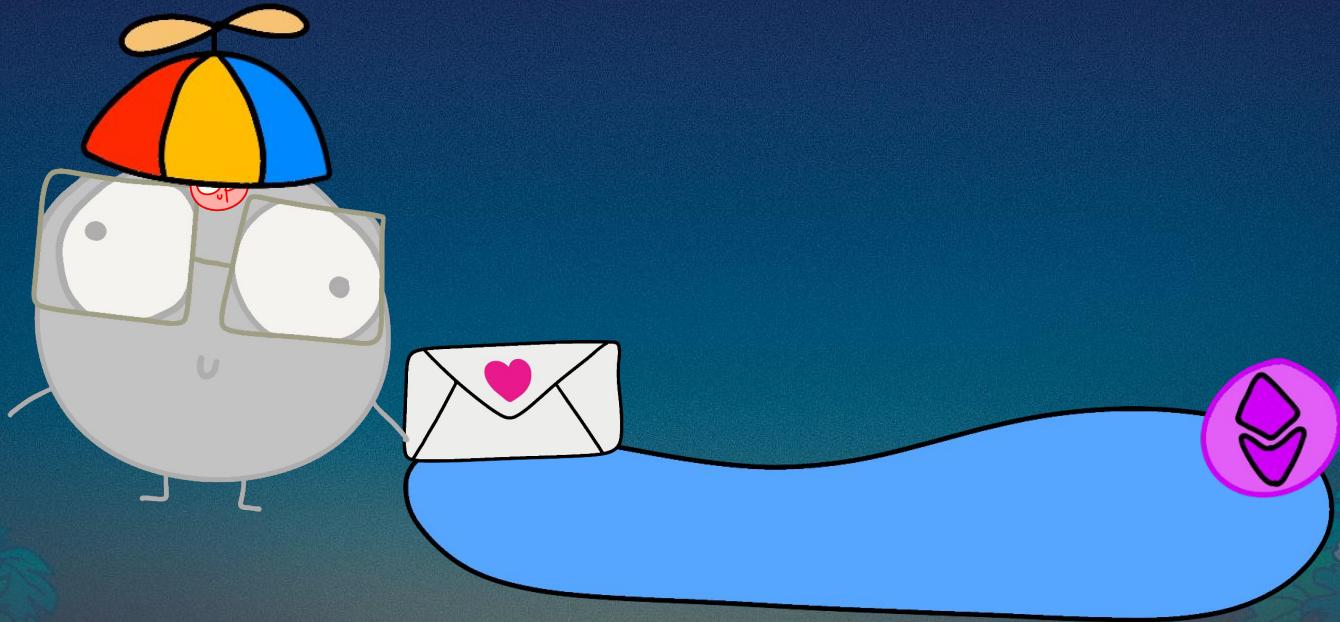
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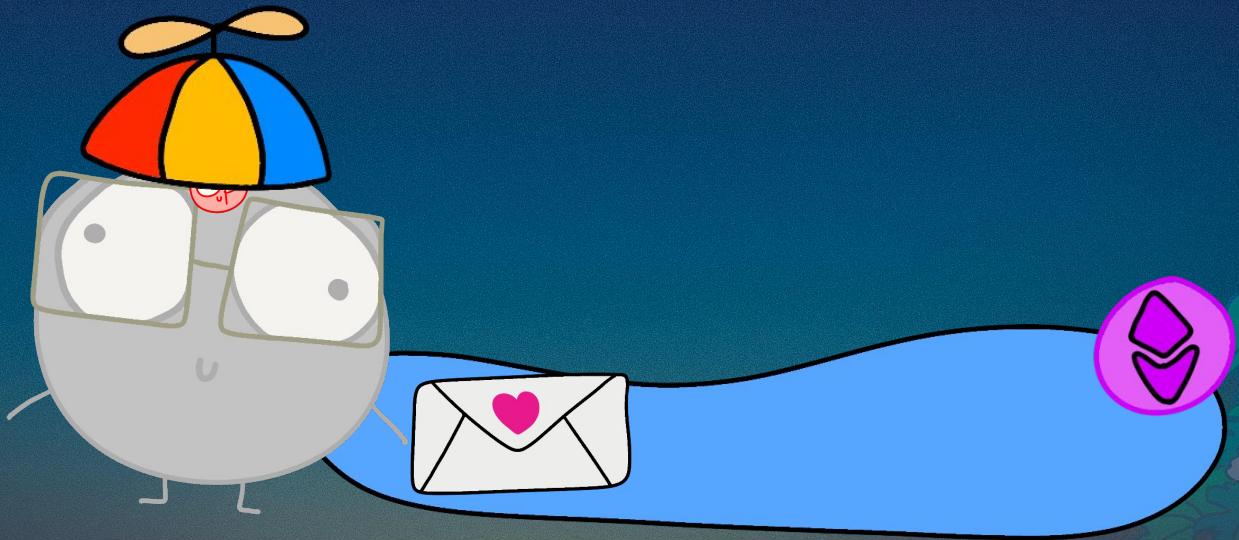
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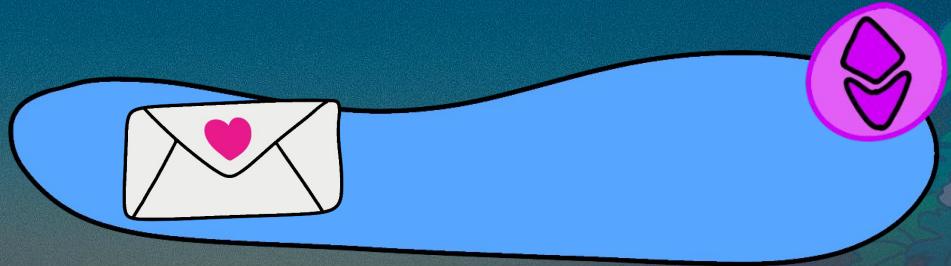
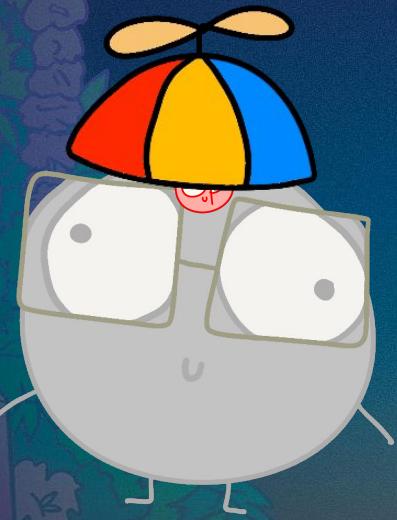
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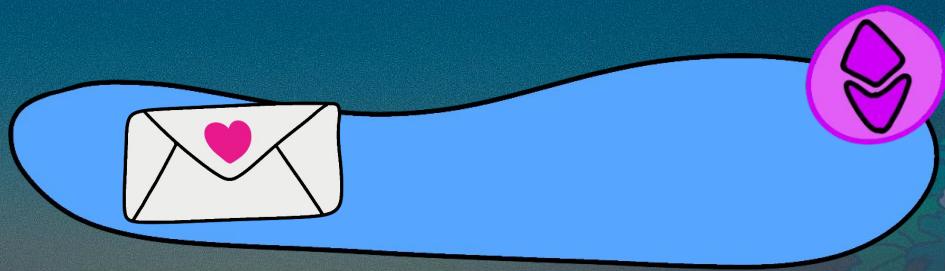
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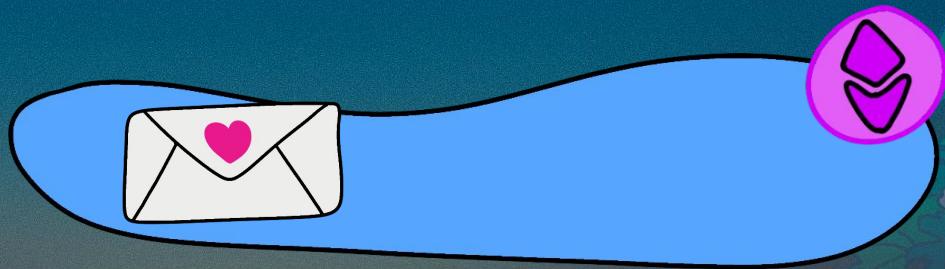
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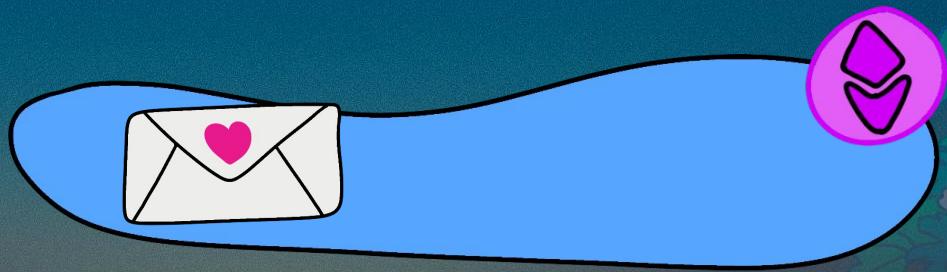
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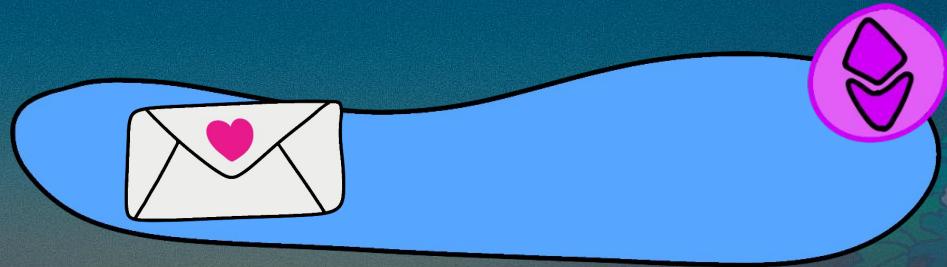
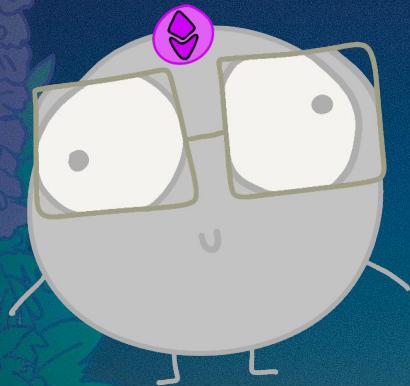
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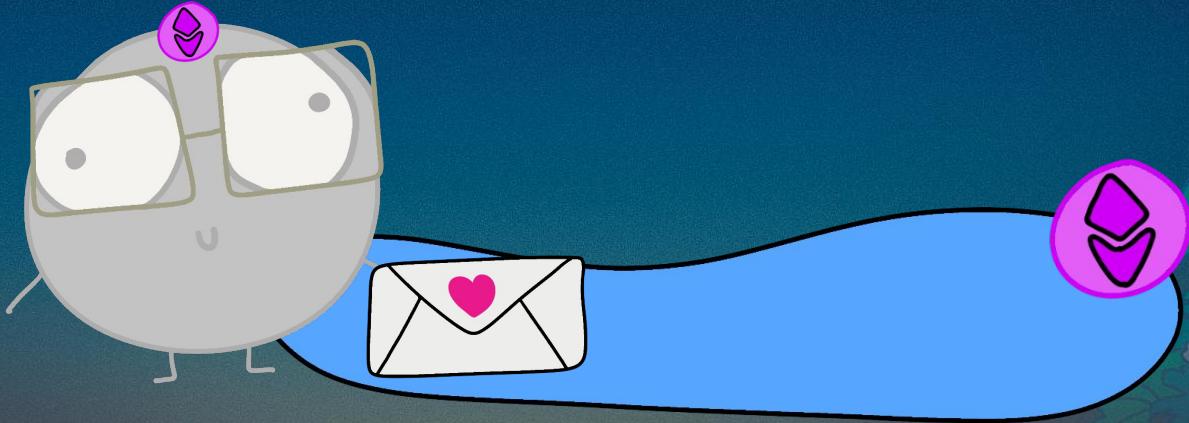
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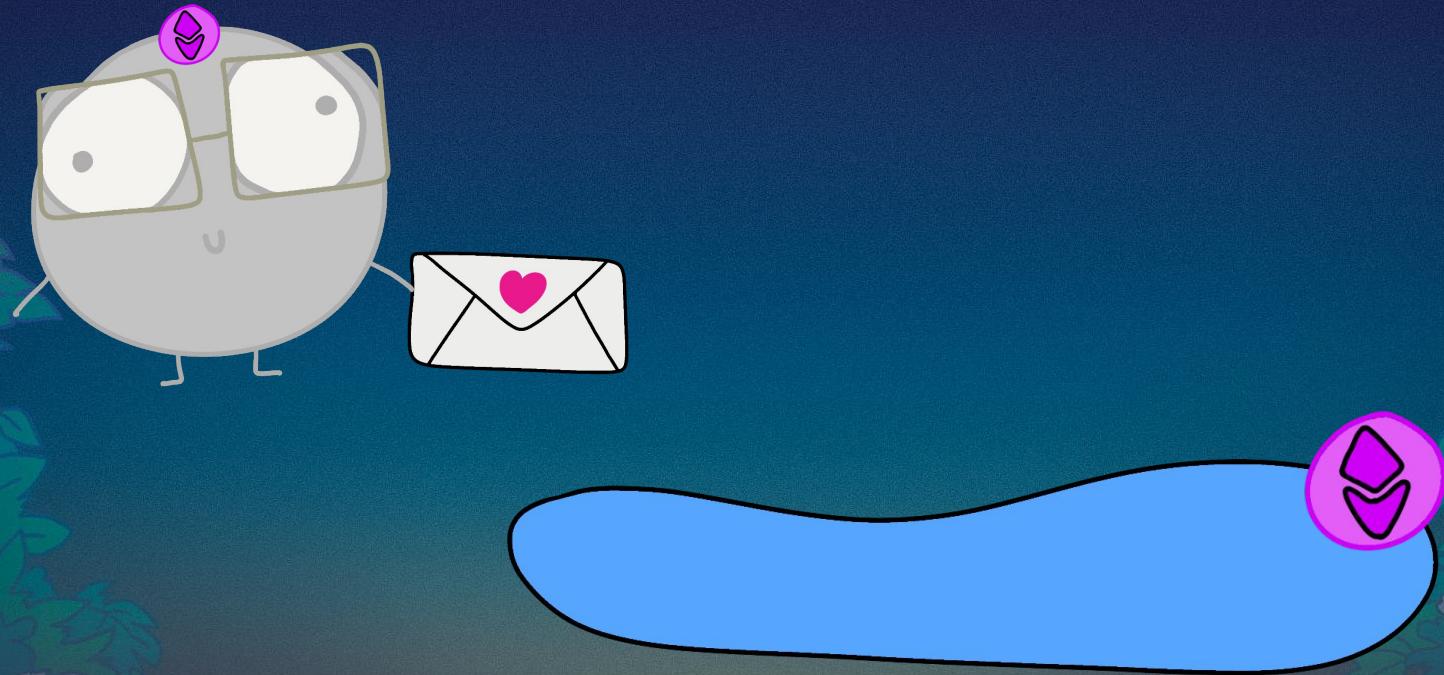
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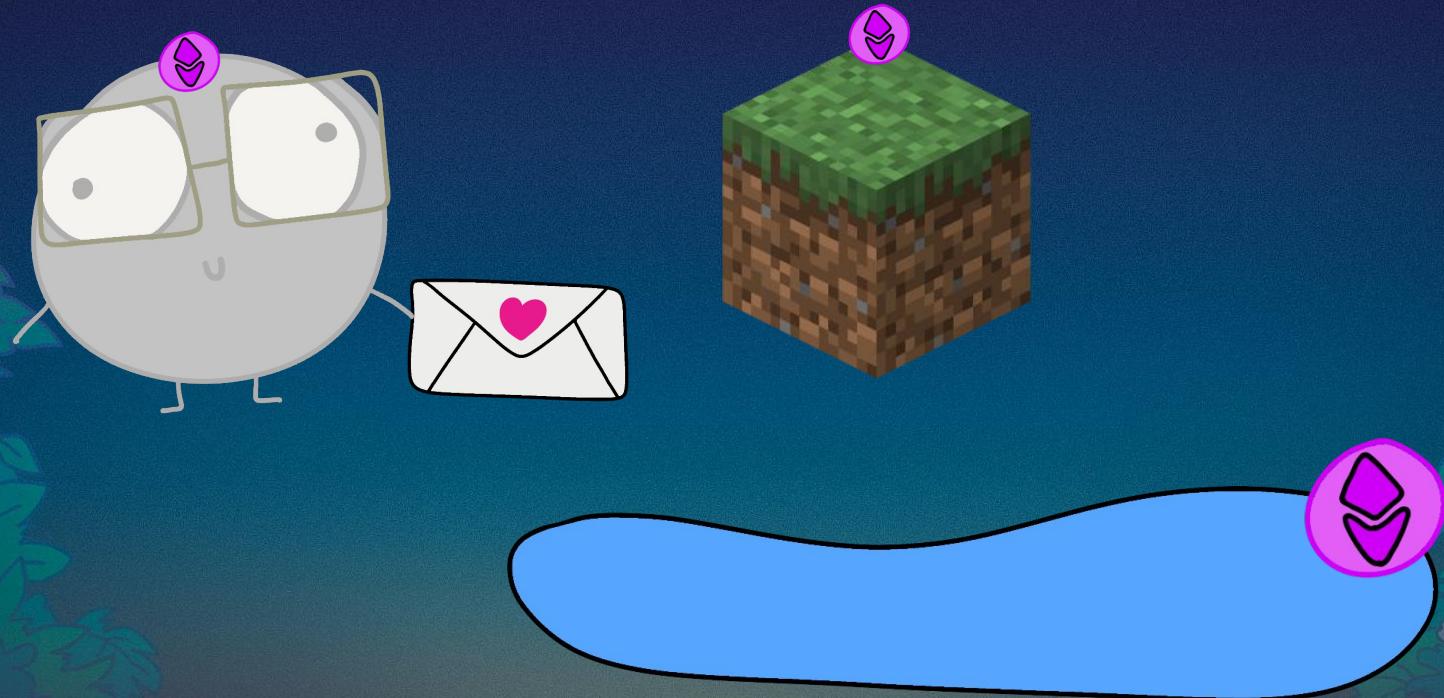
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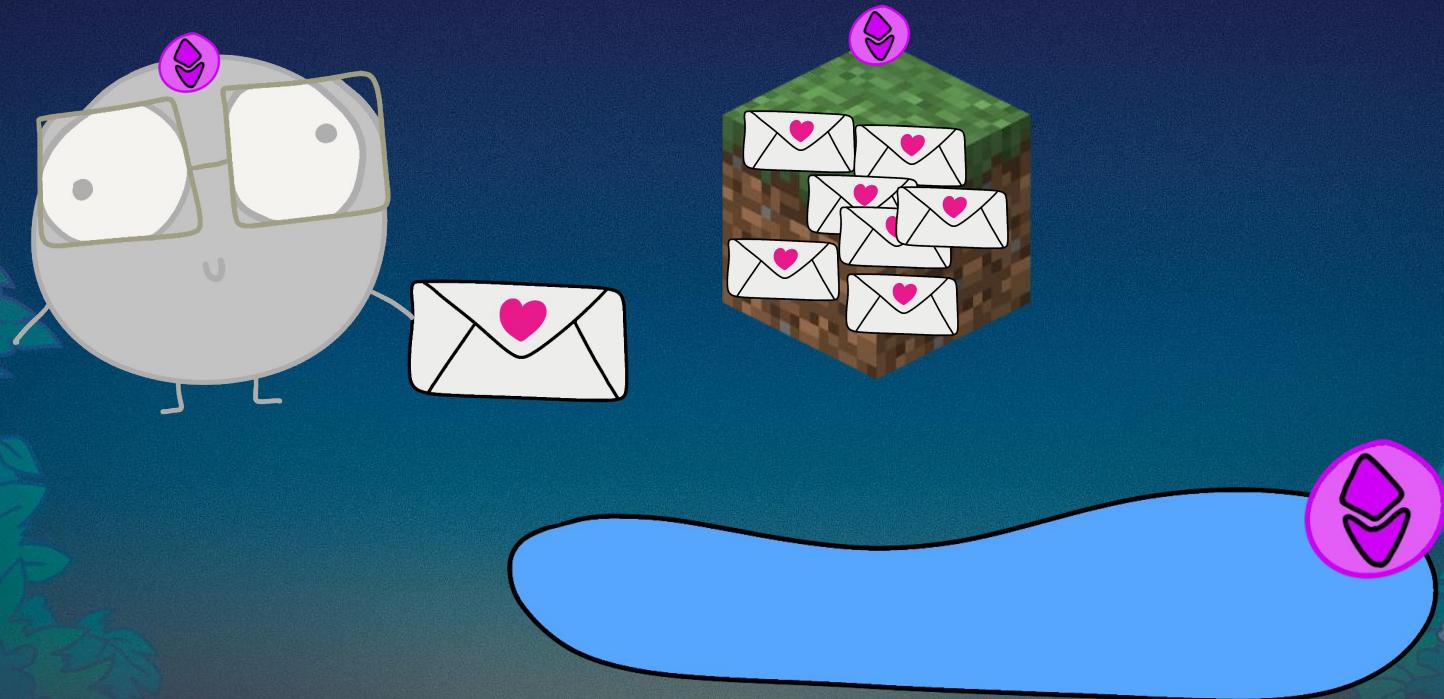
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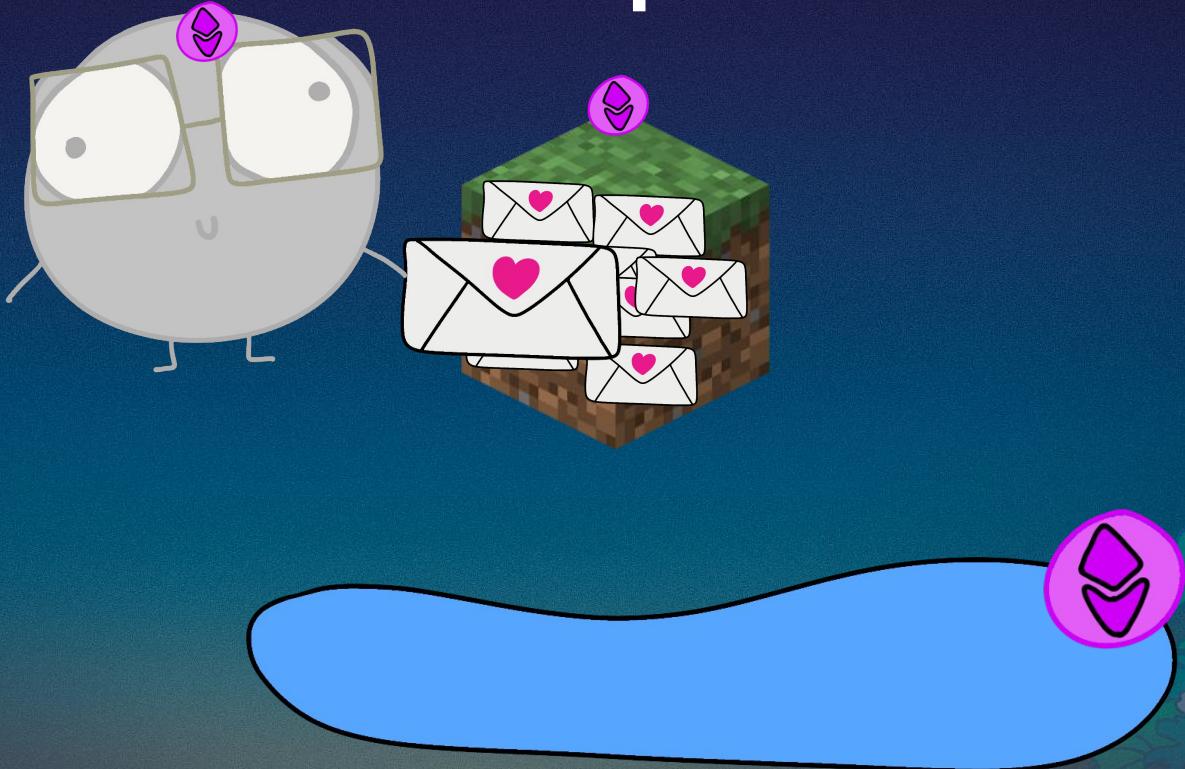
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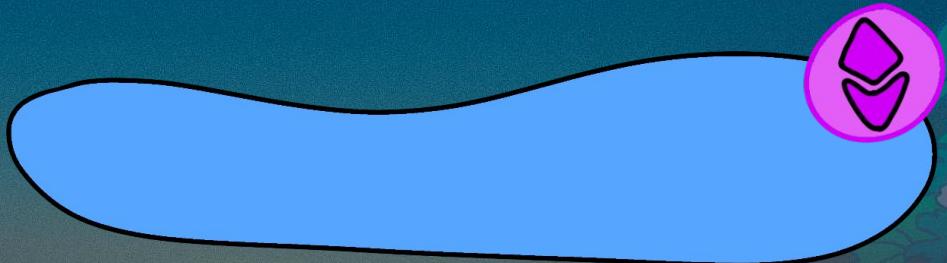
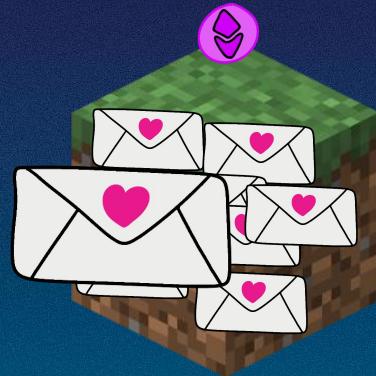
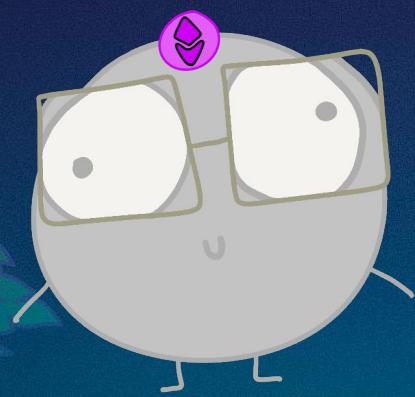
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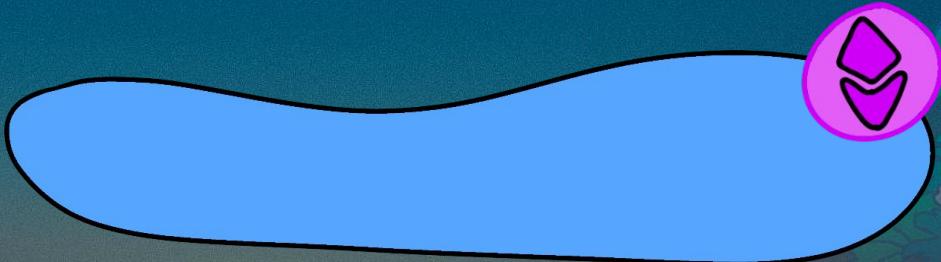
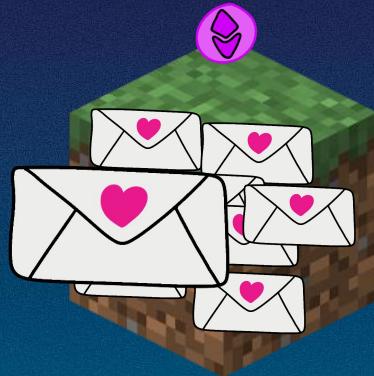
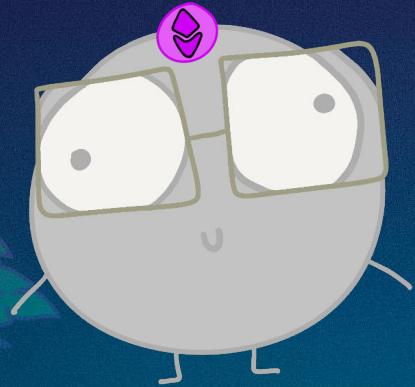
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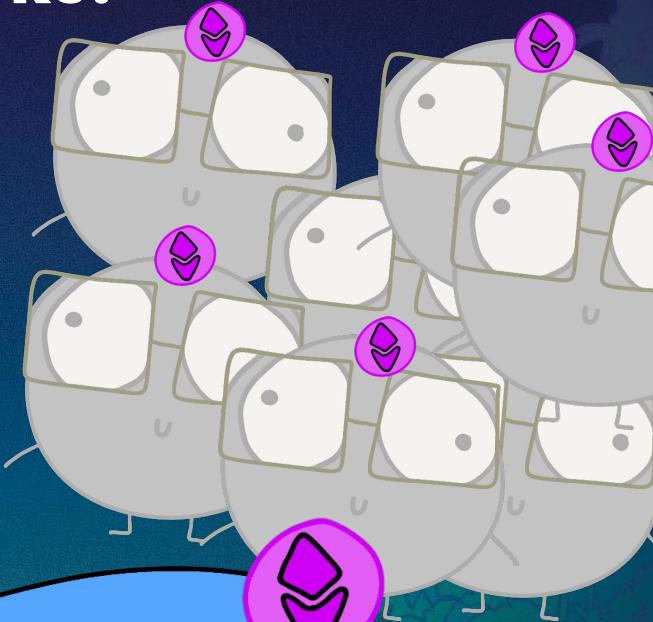
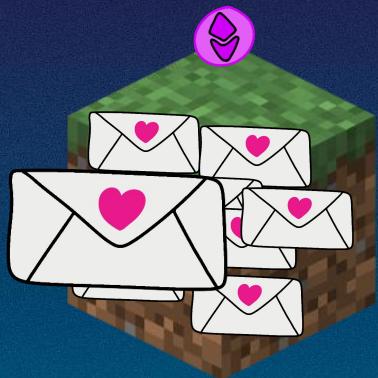
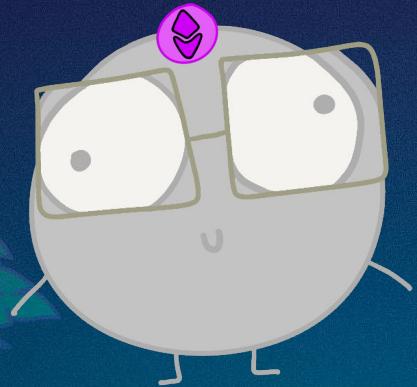
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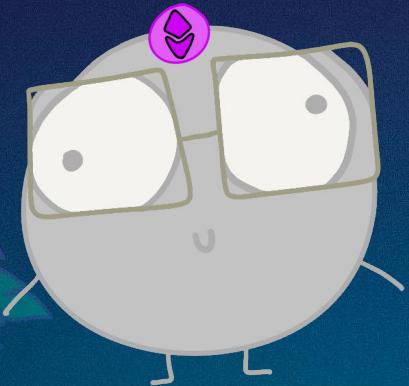
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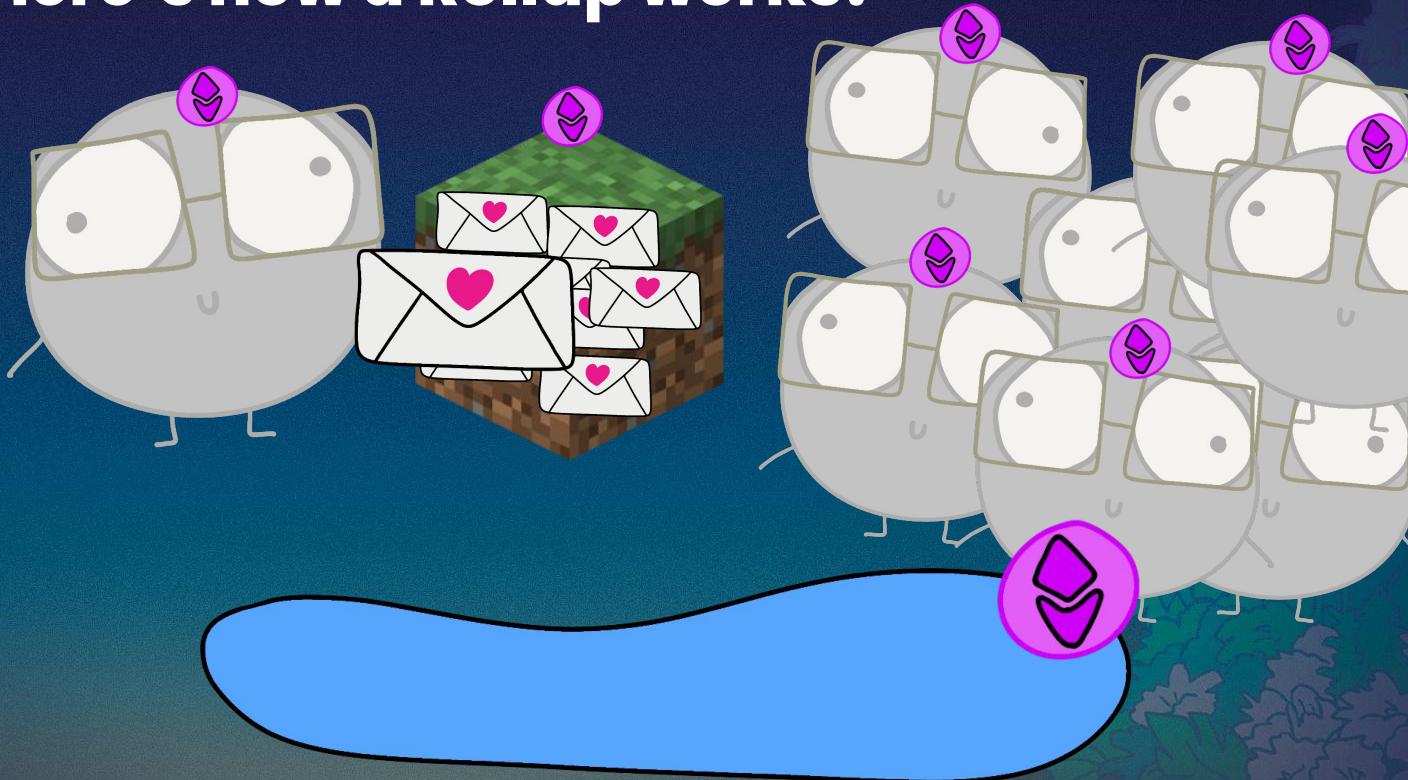
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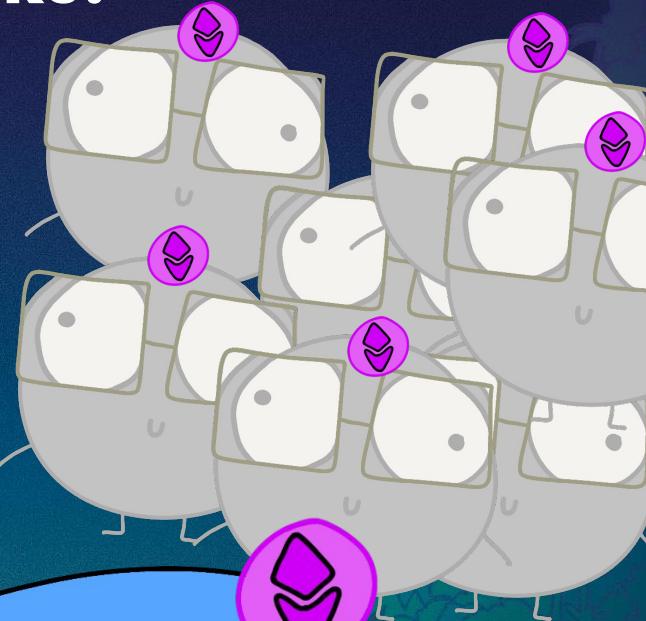
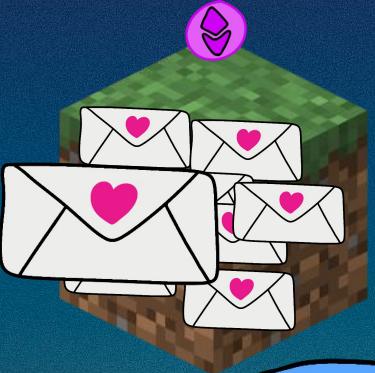
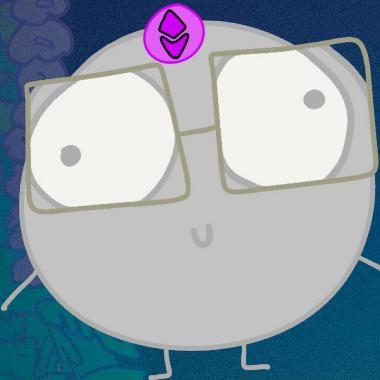
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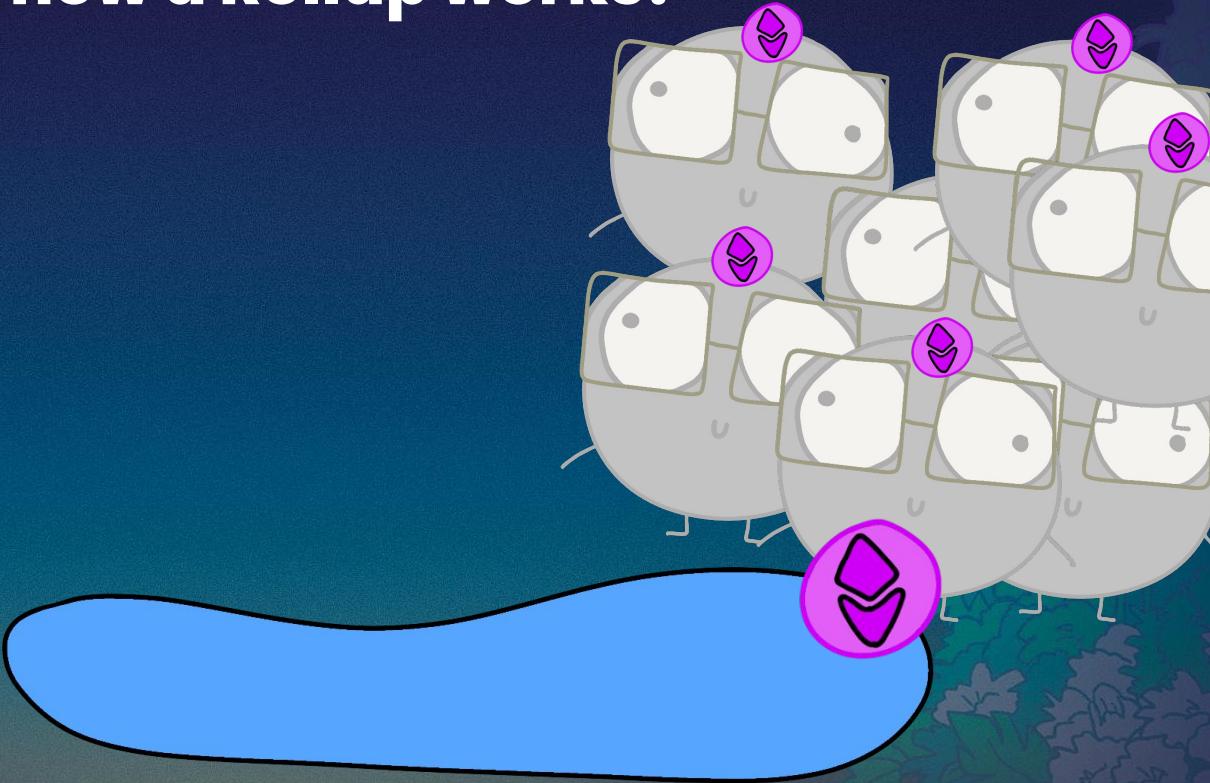
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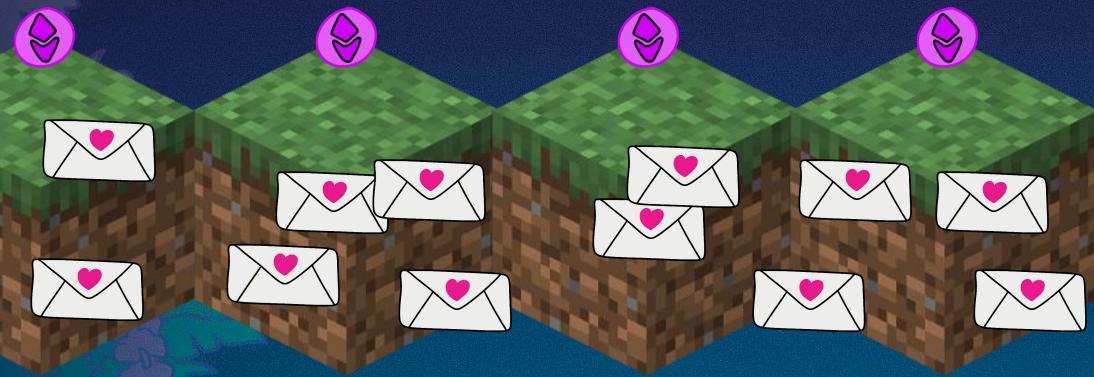
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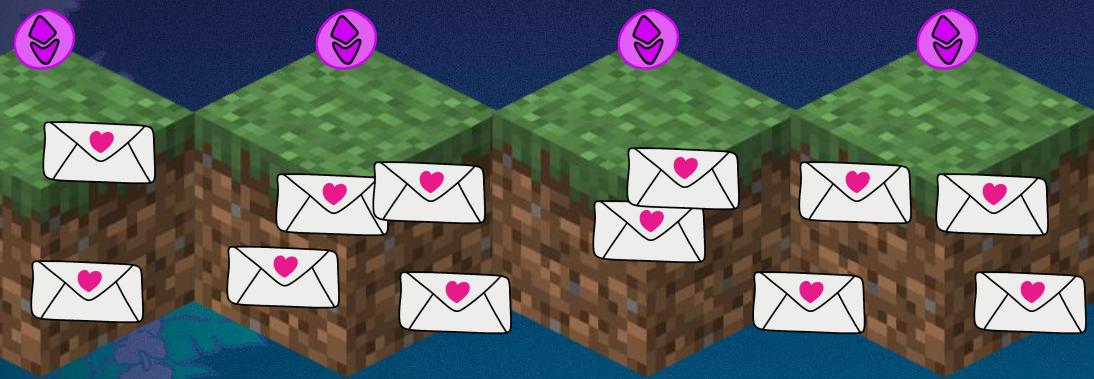
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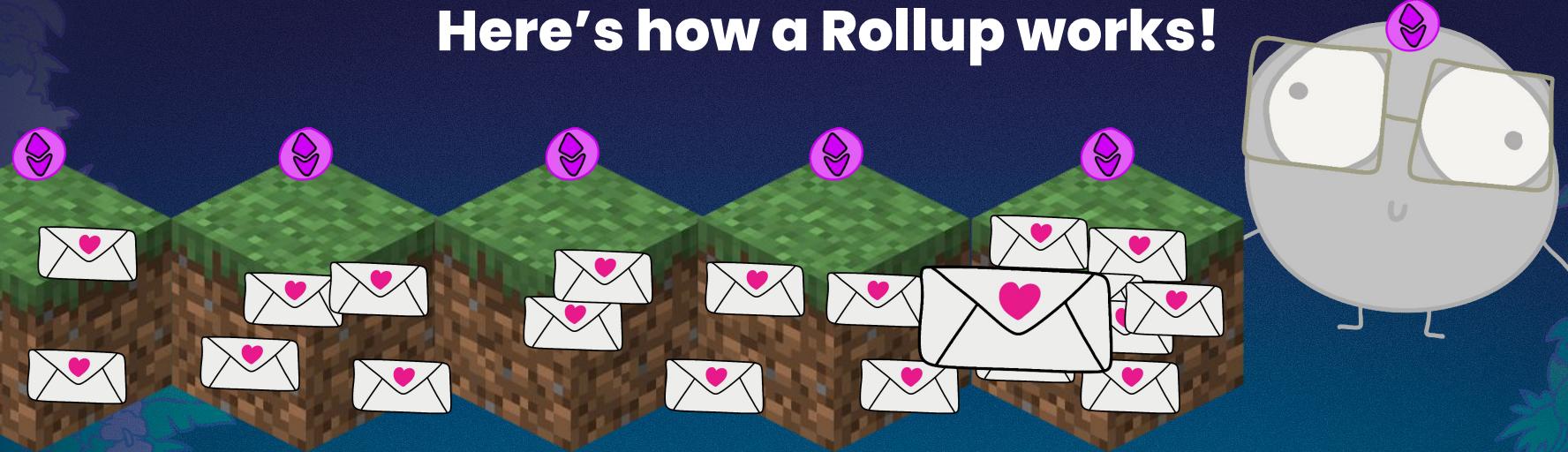
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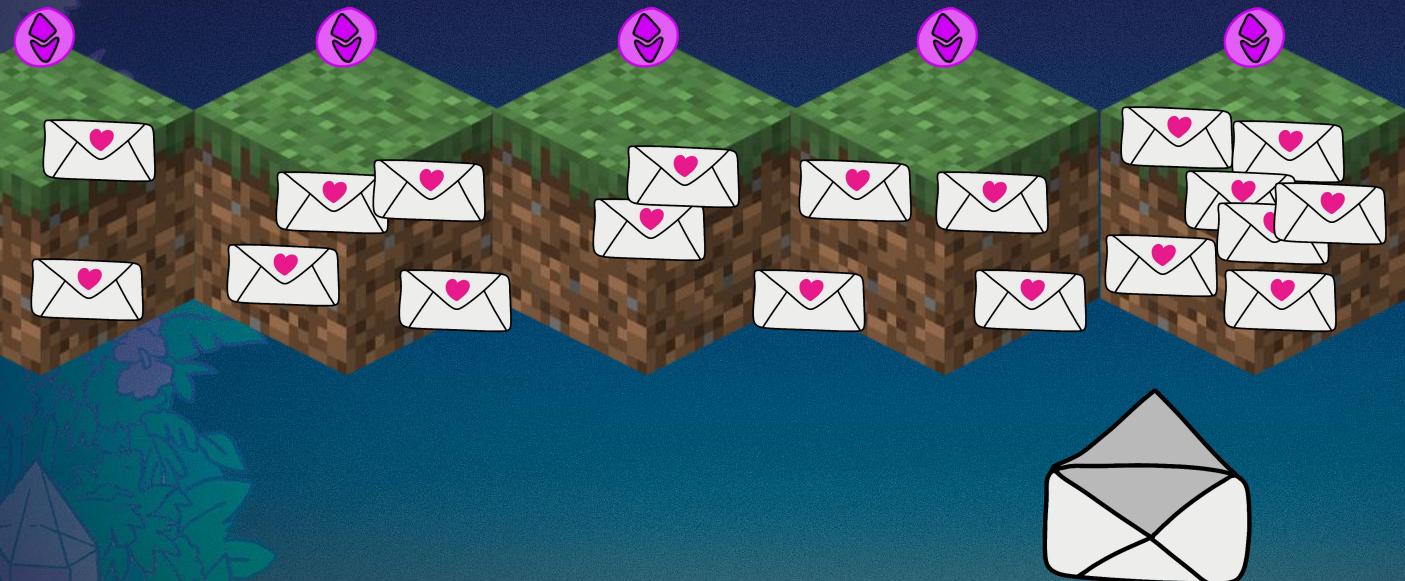
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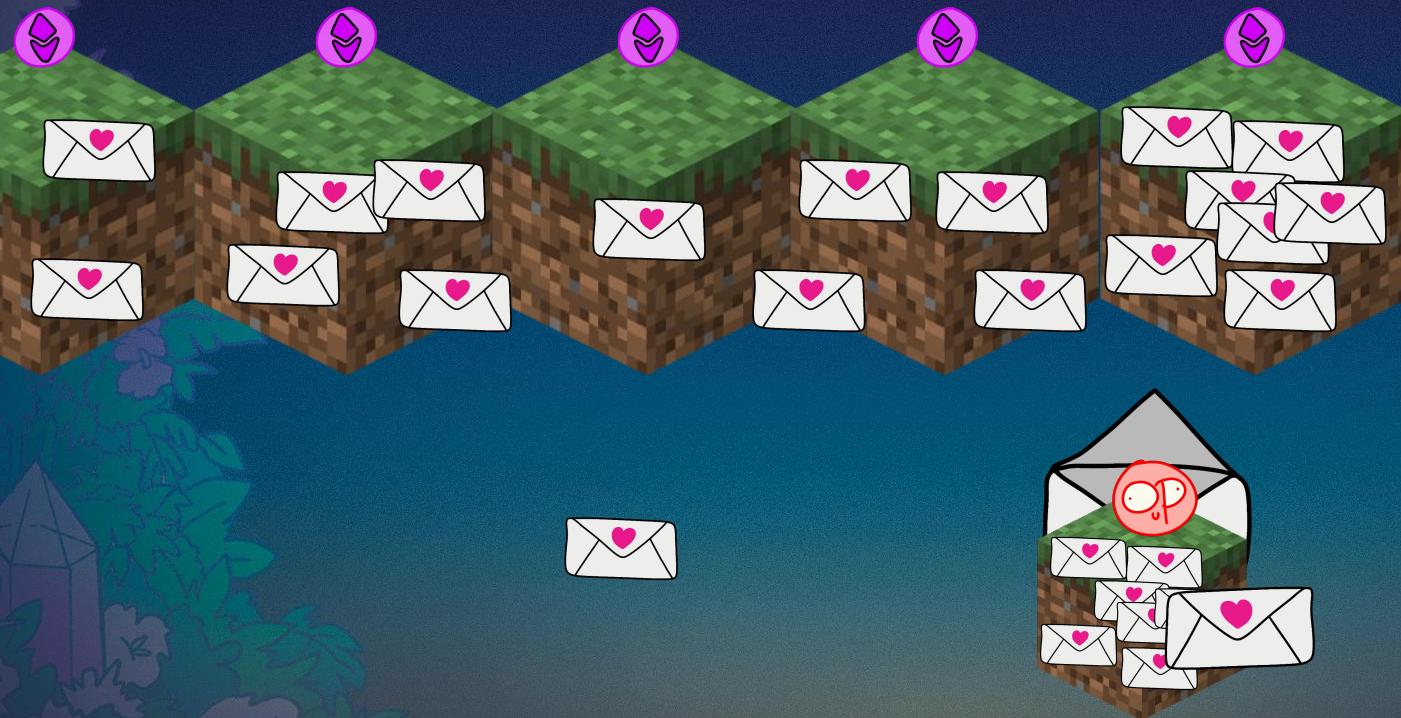
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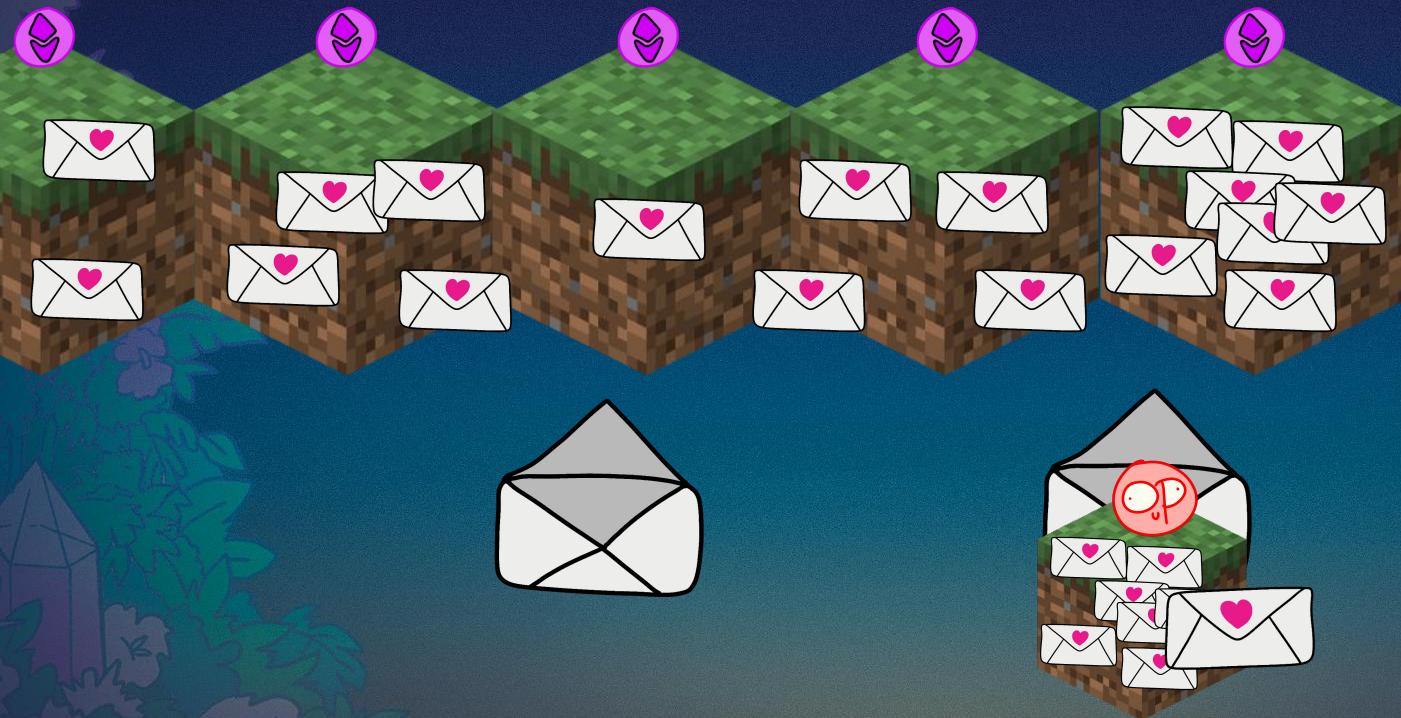
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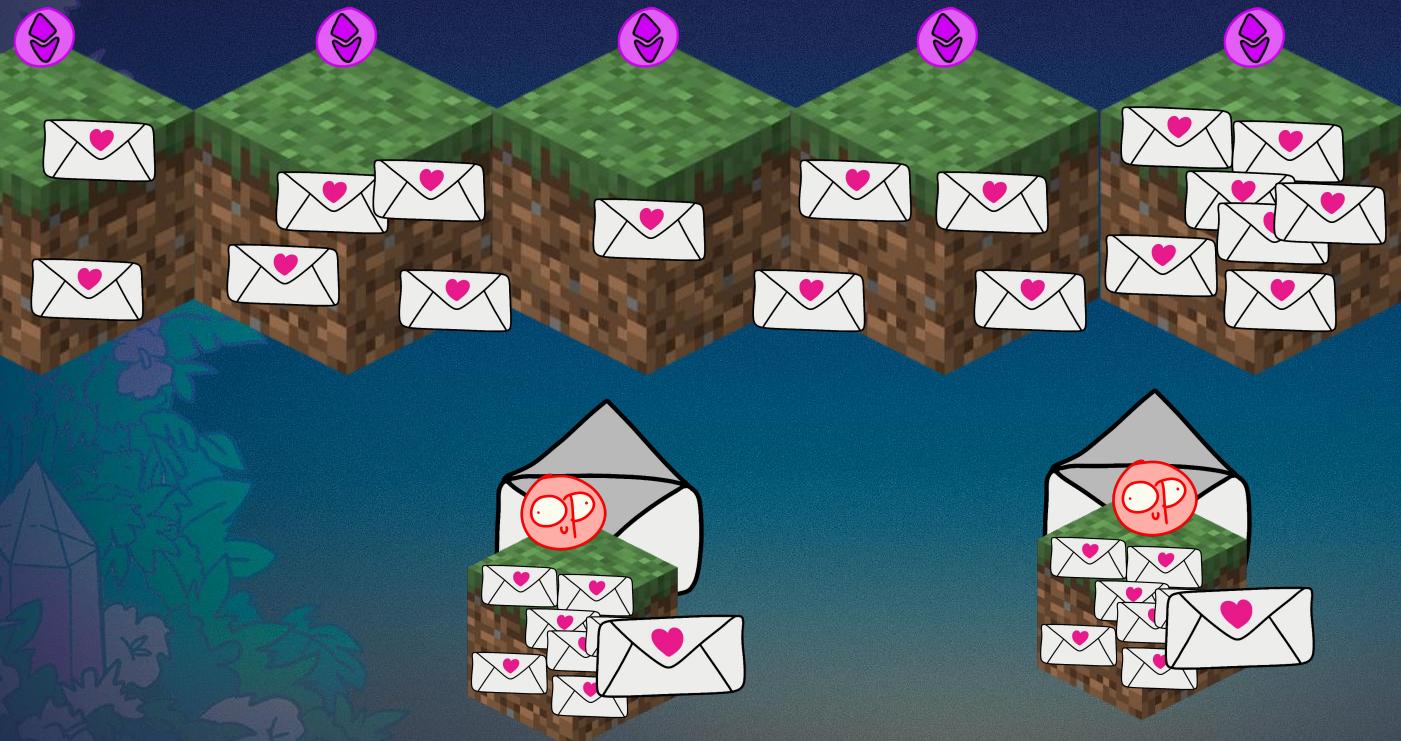
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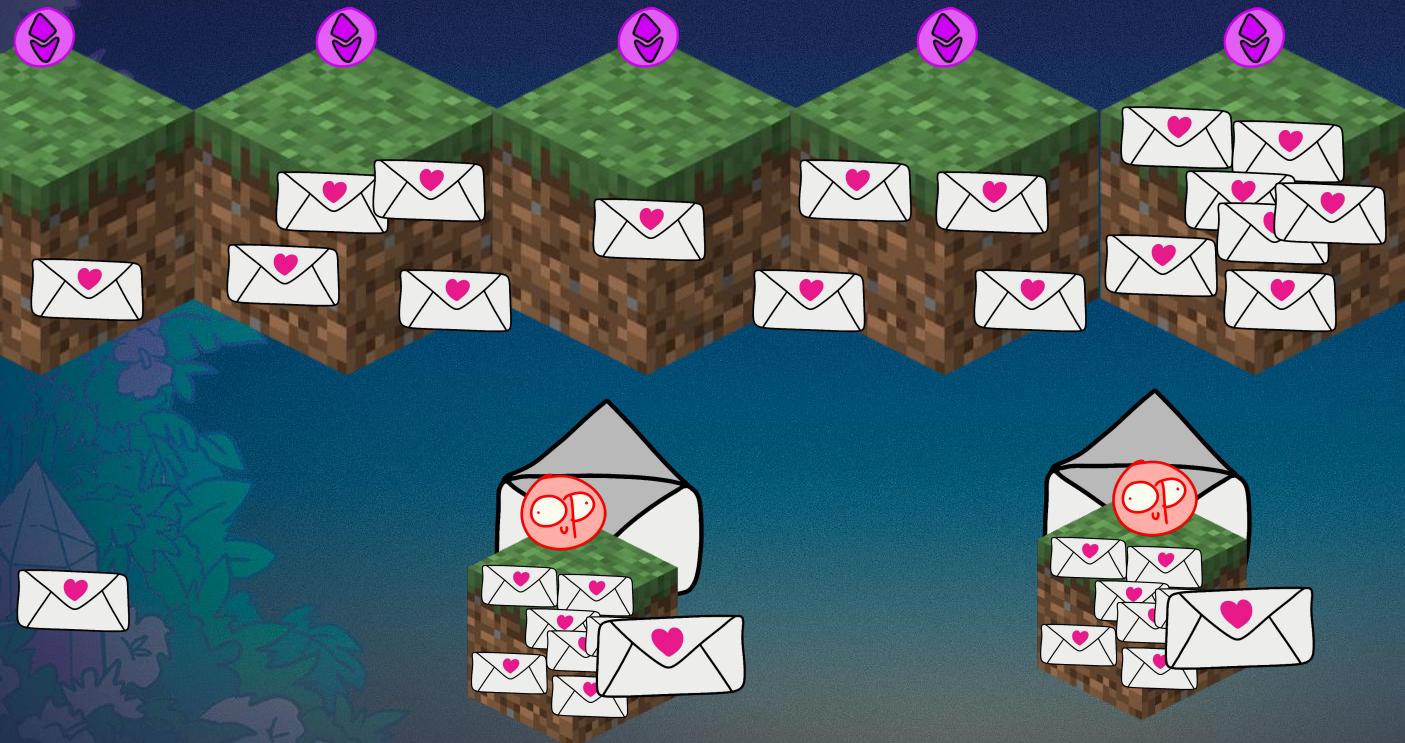
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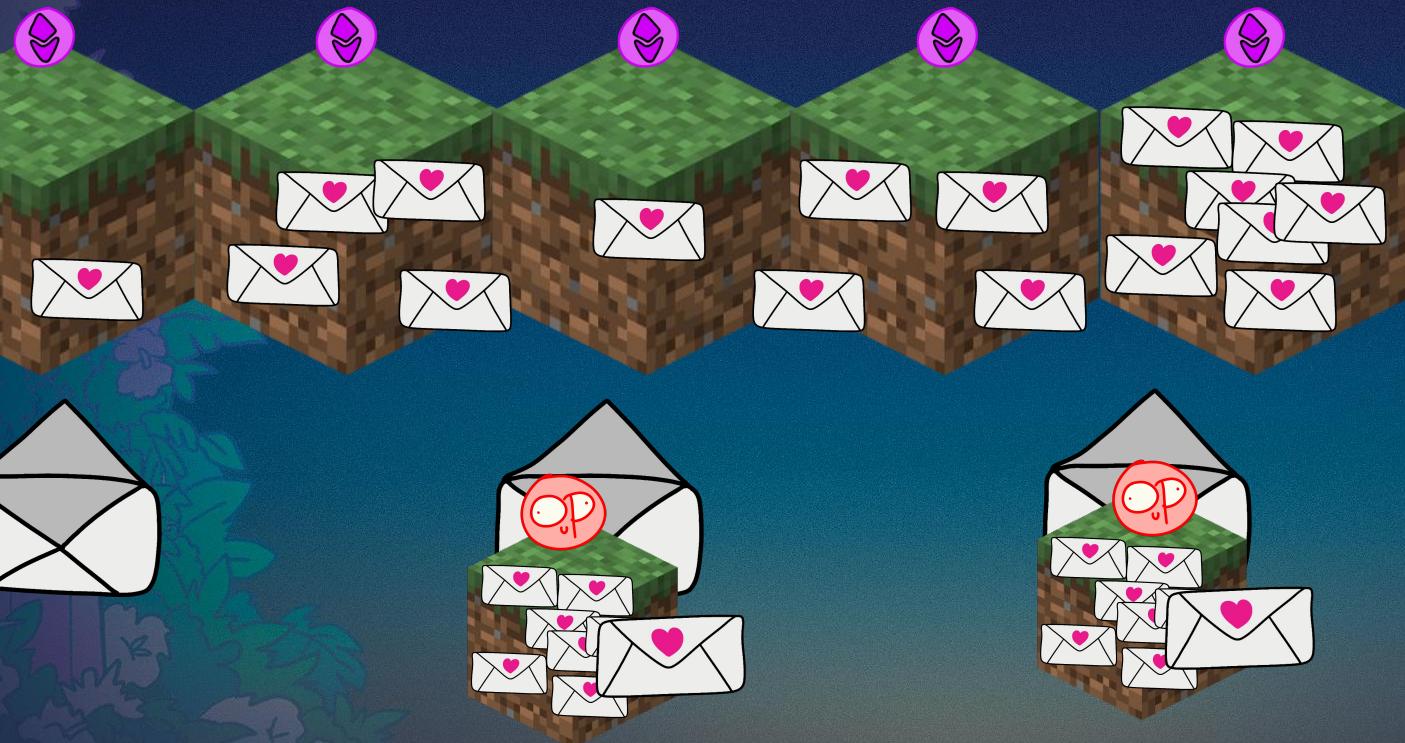
Here's how a Rollup works!



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**A Rollup is just a normal
blockchain that uses another
blockchain for ordering and
data availability.**

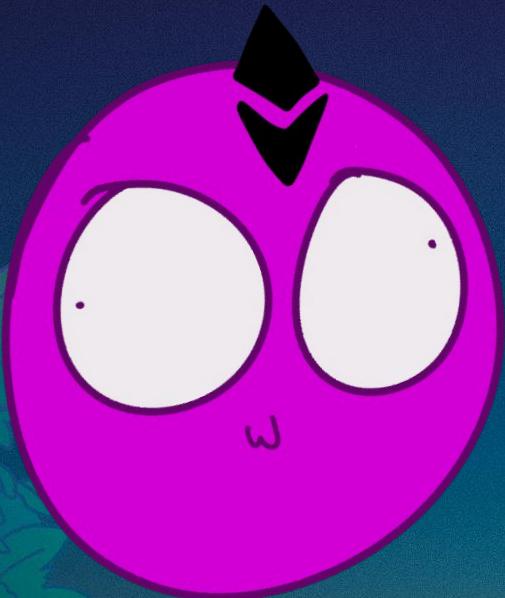
So where does ZK or Optimistic come in???



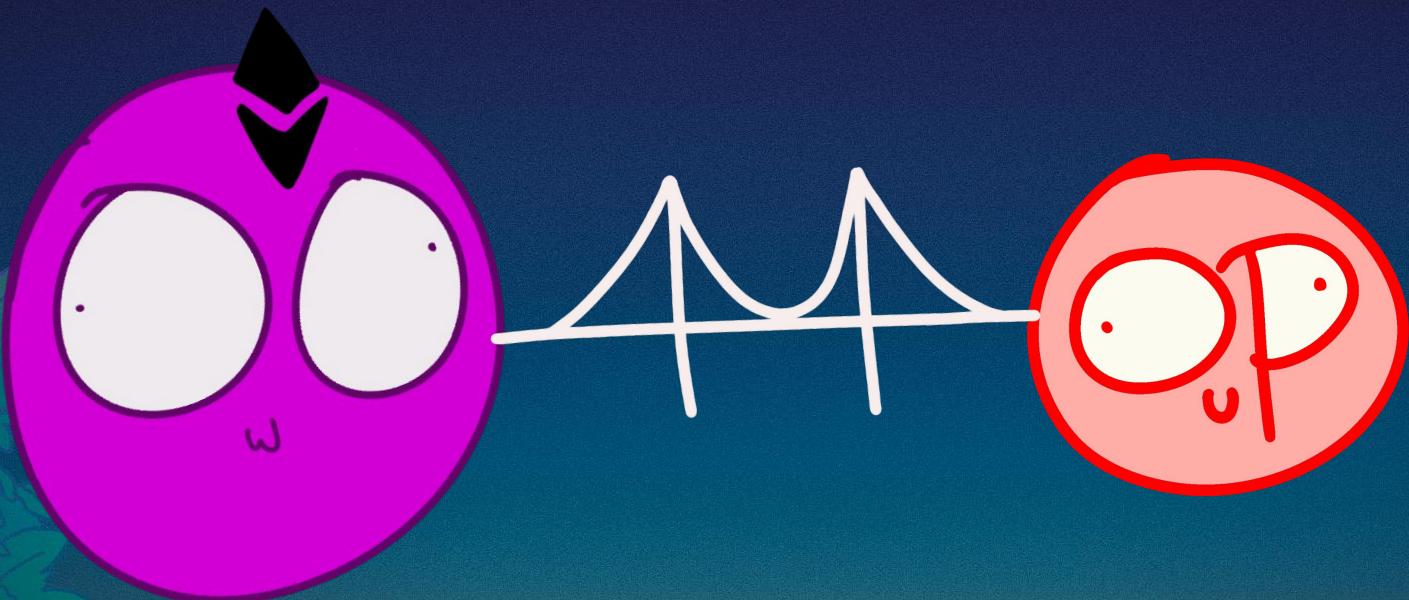
We need to talk about bridges.

What even are bridges?

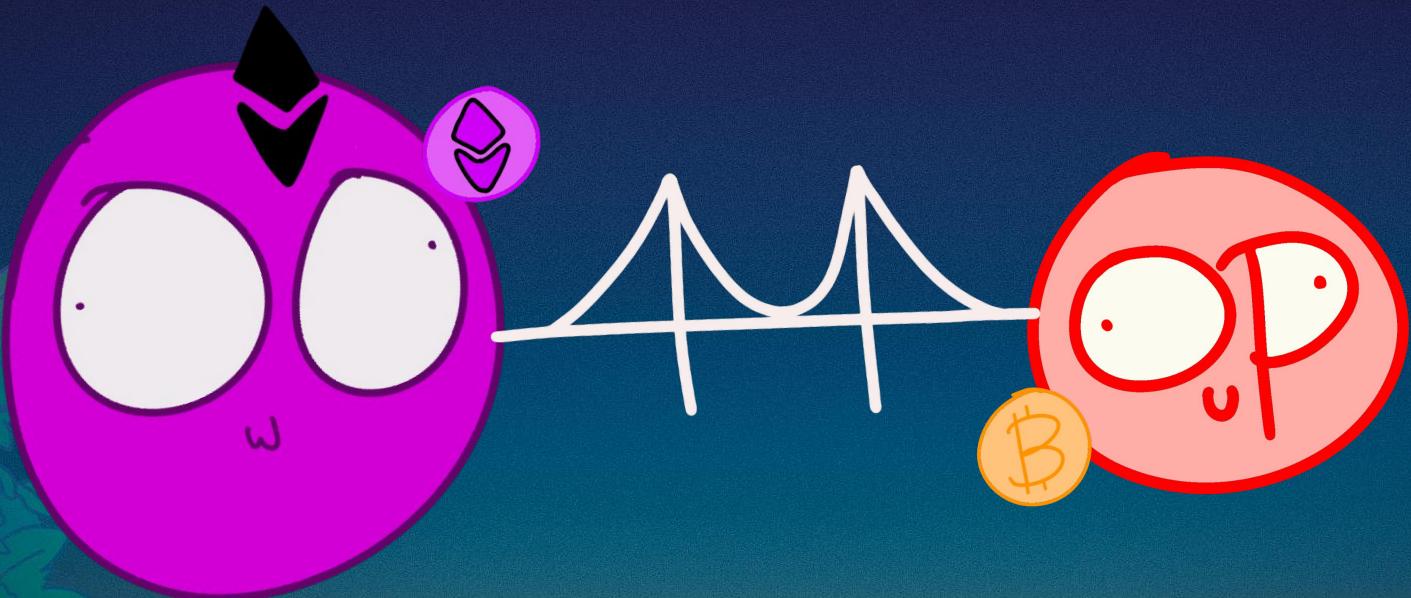
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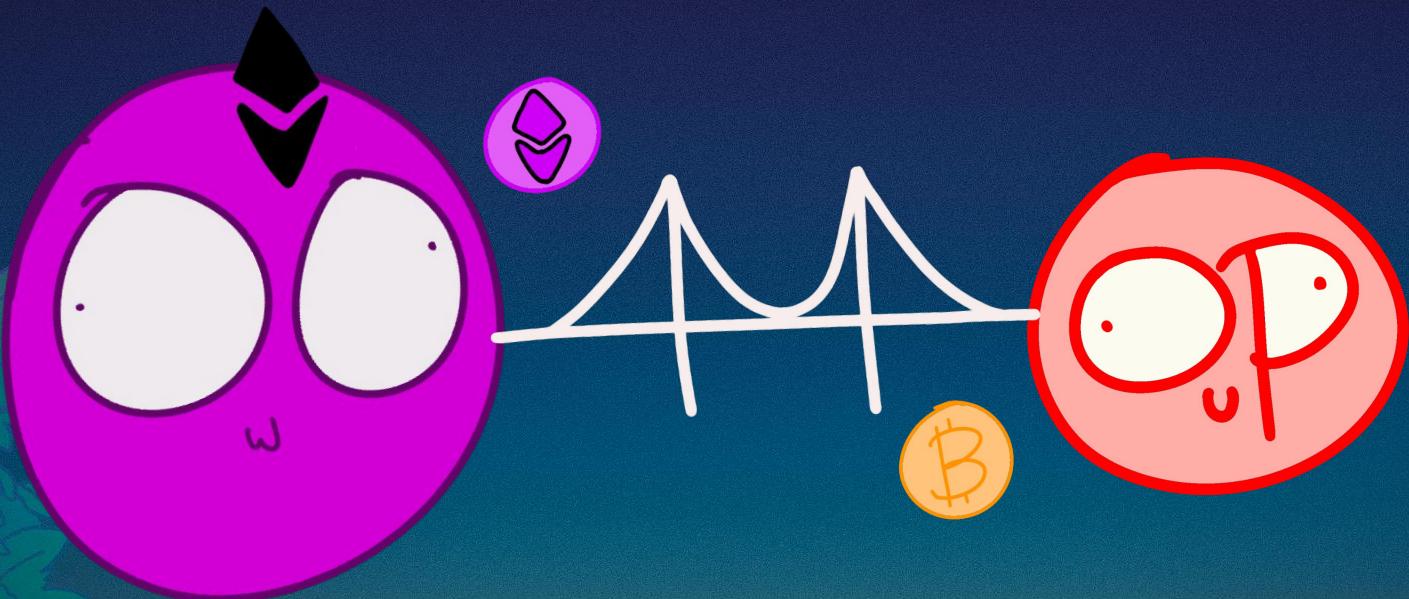
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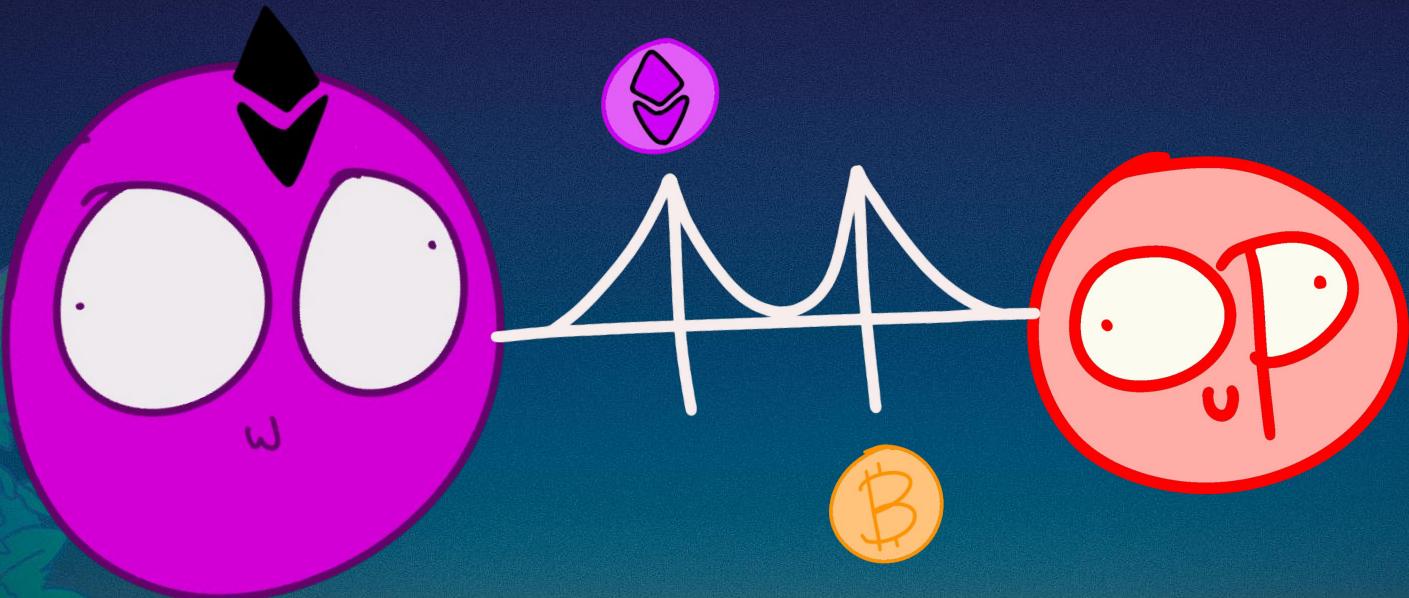
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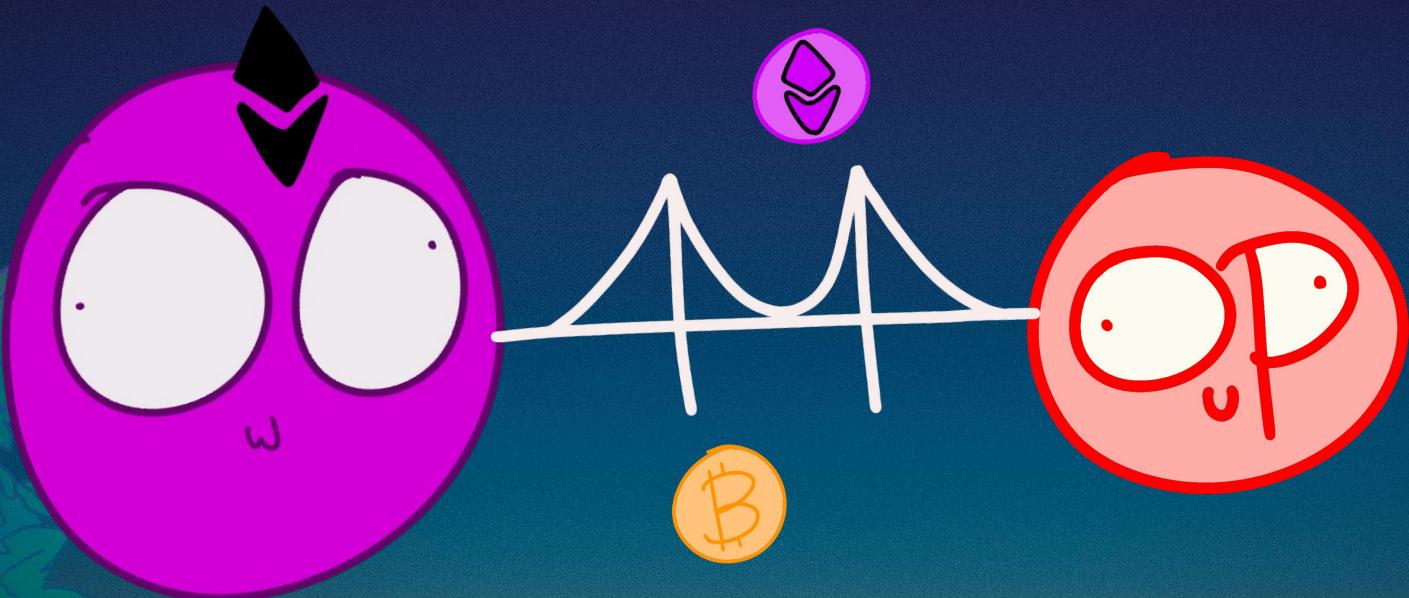
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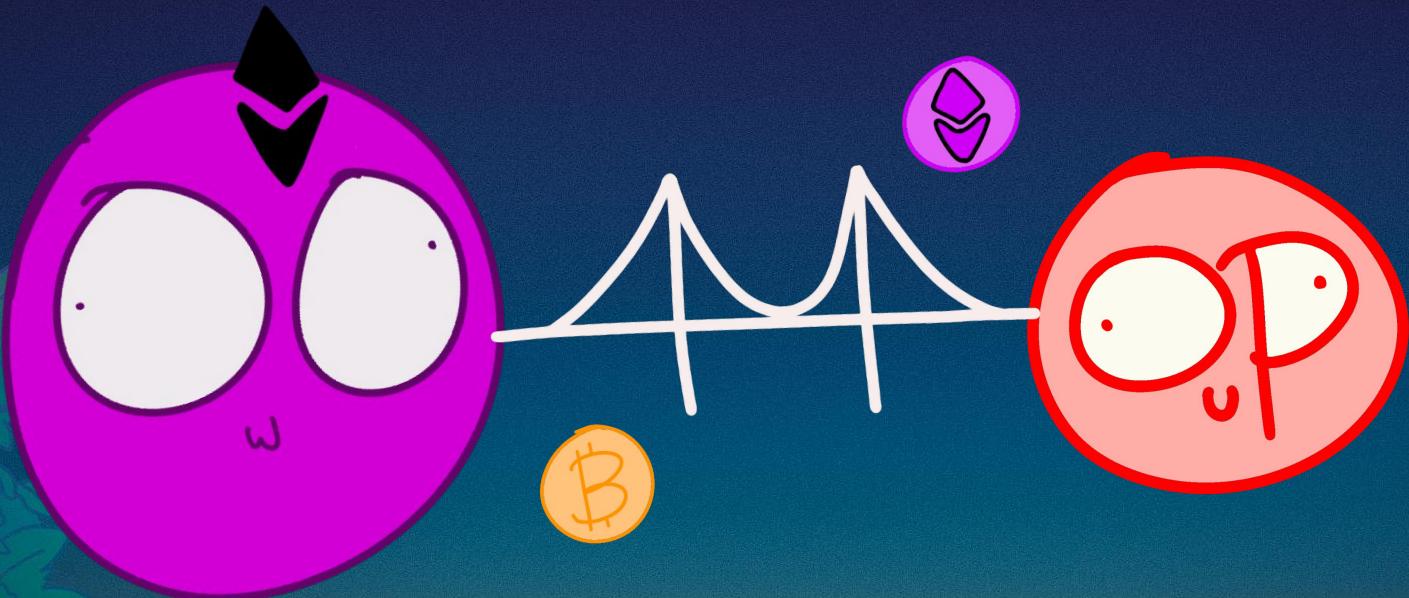
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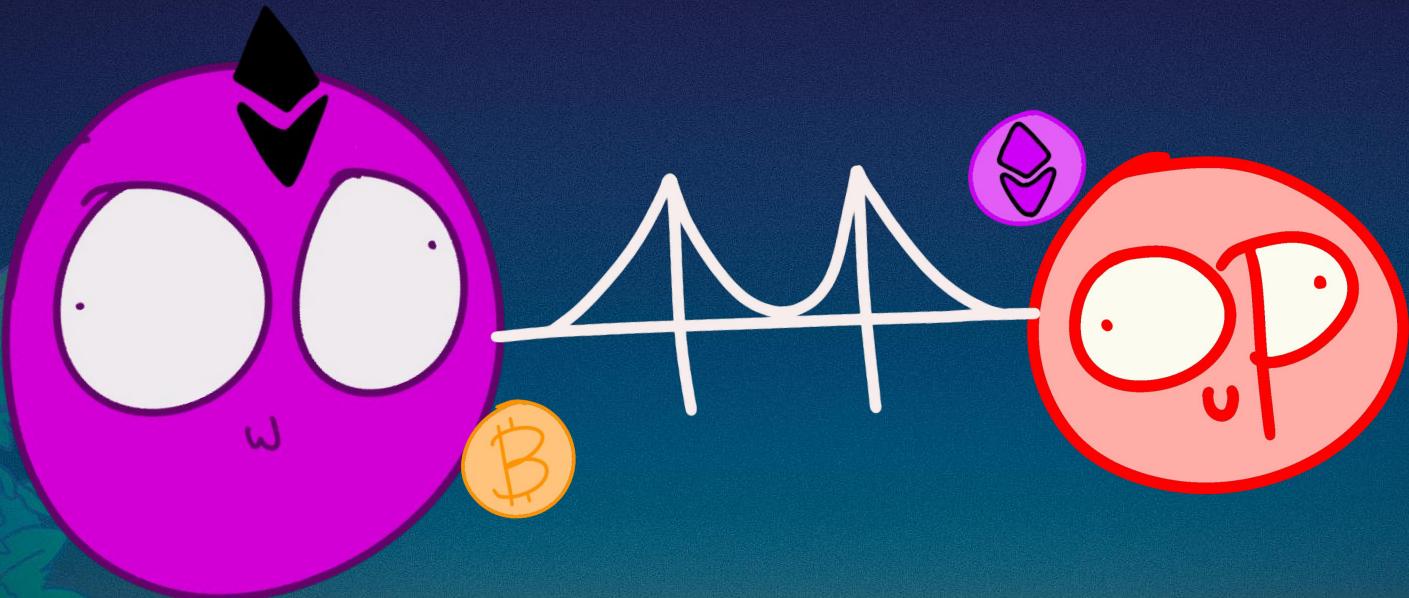
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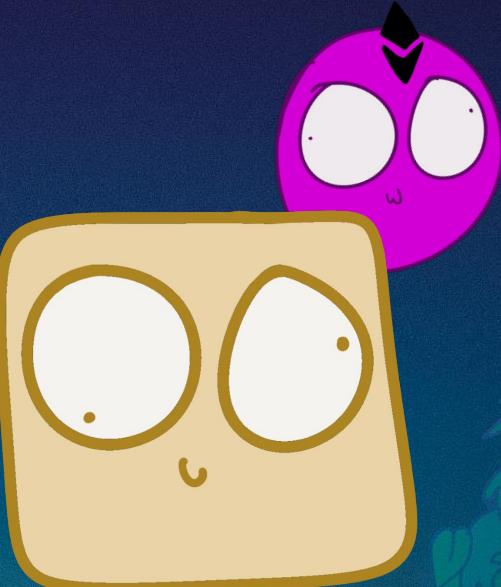
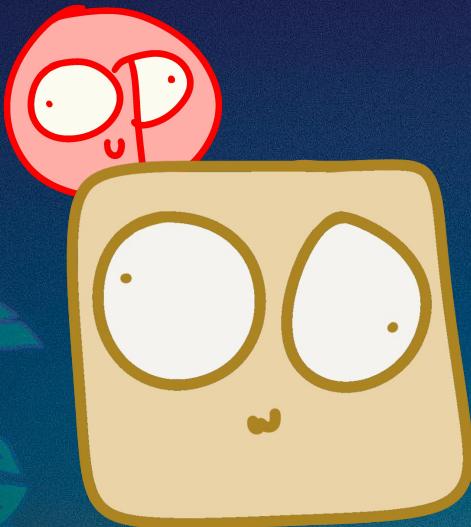


How do bridges work?

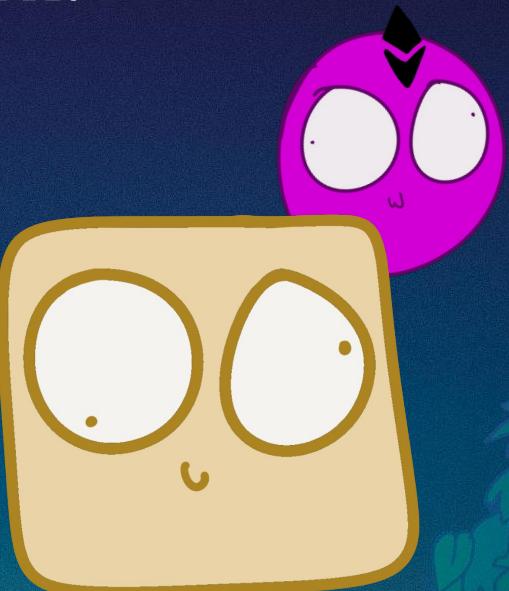
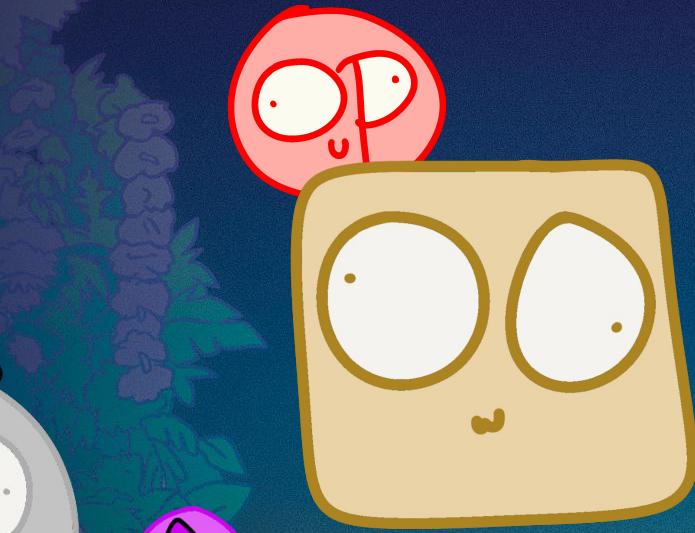
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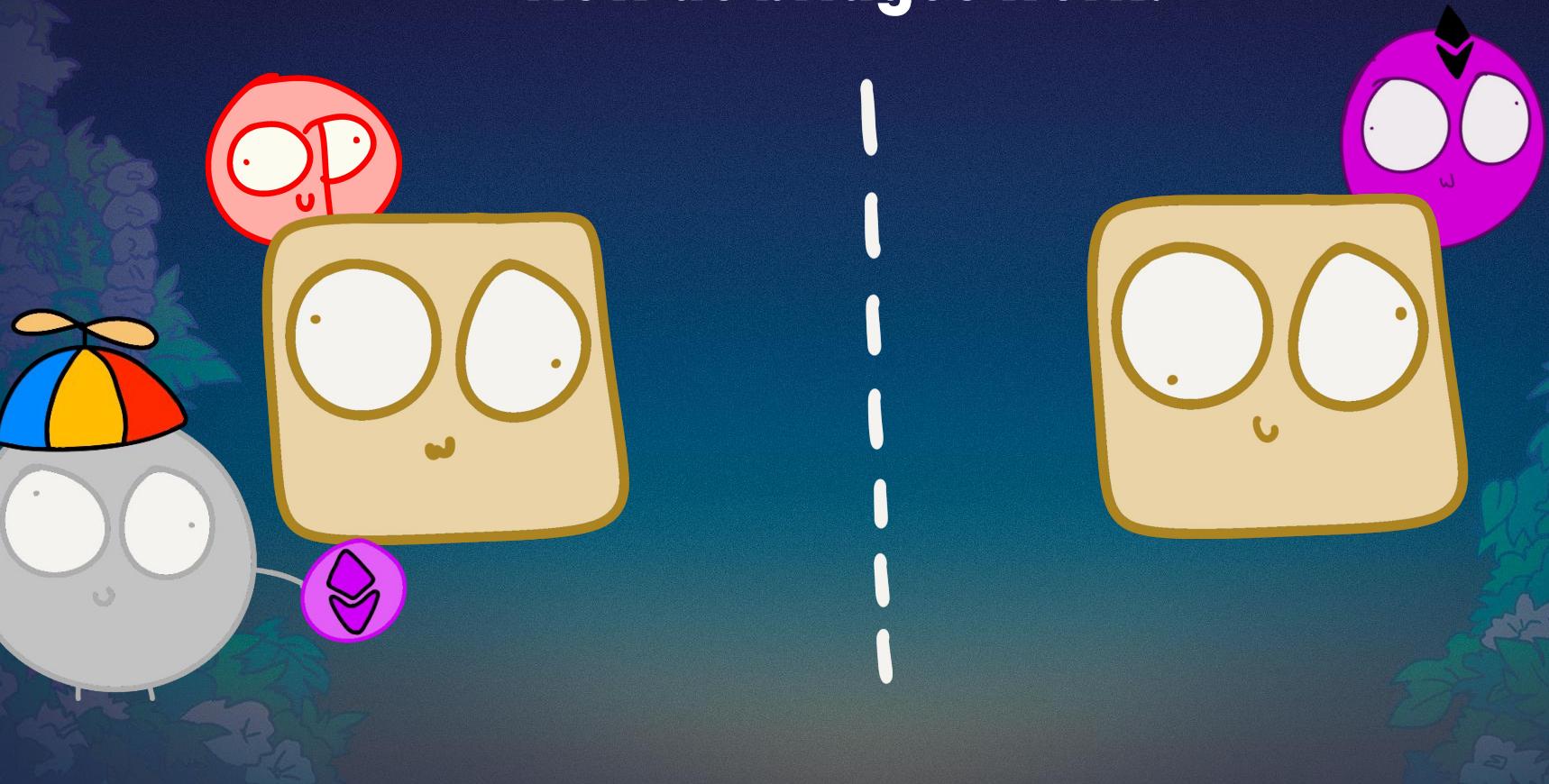
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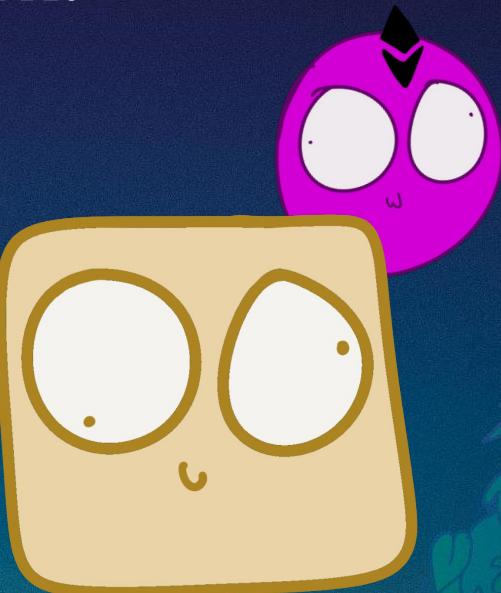
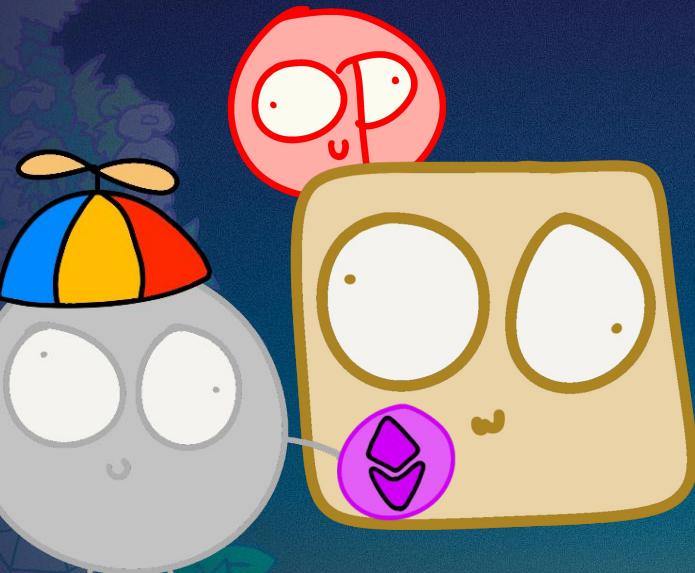
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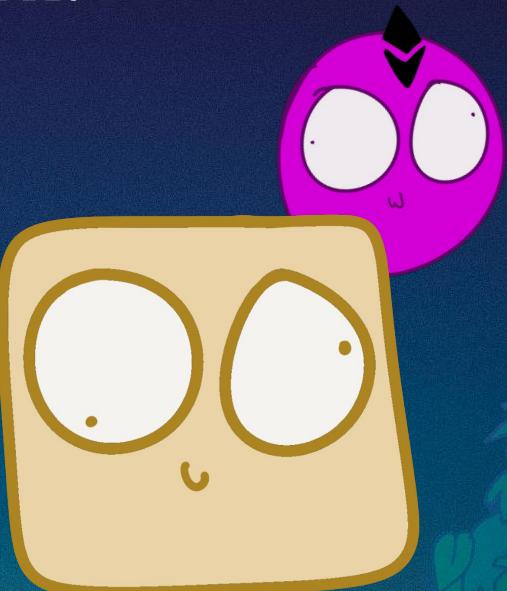
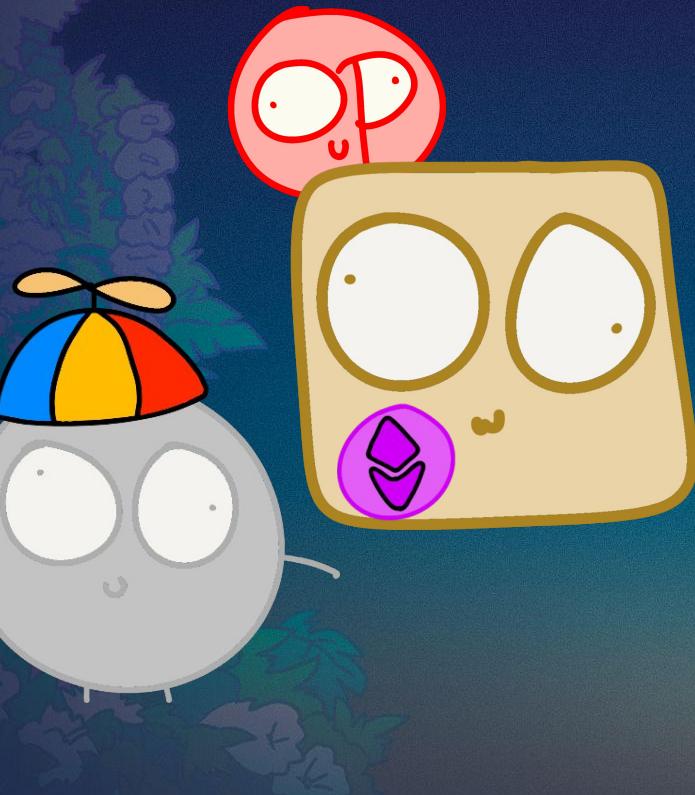
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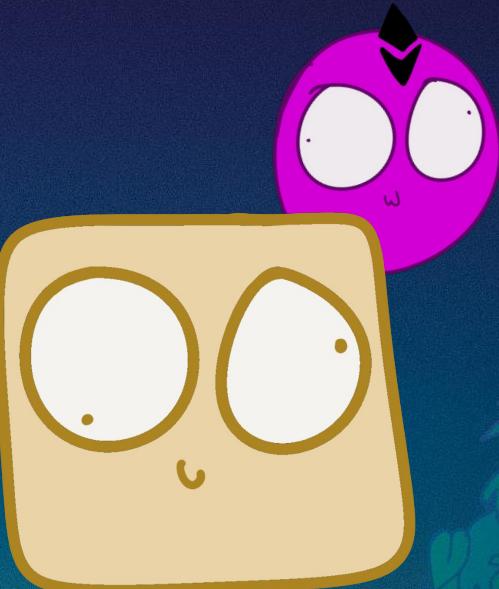
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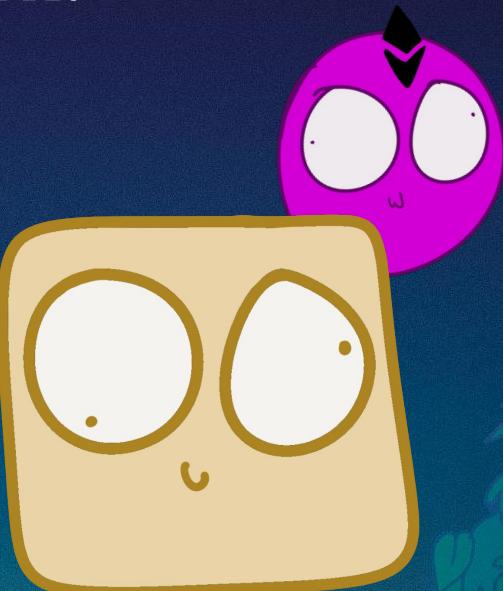
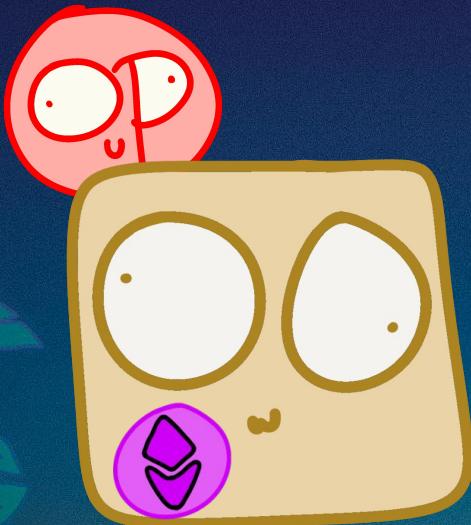
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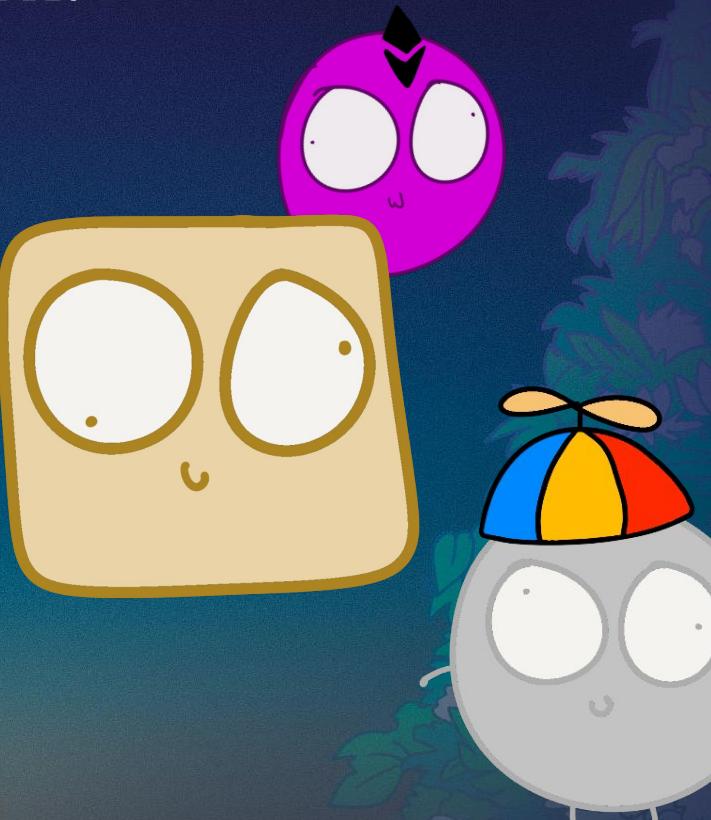
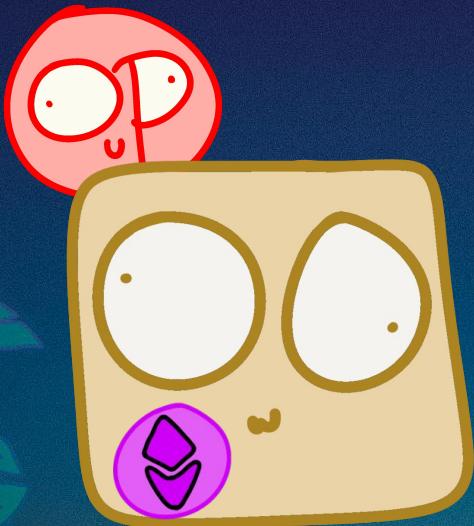
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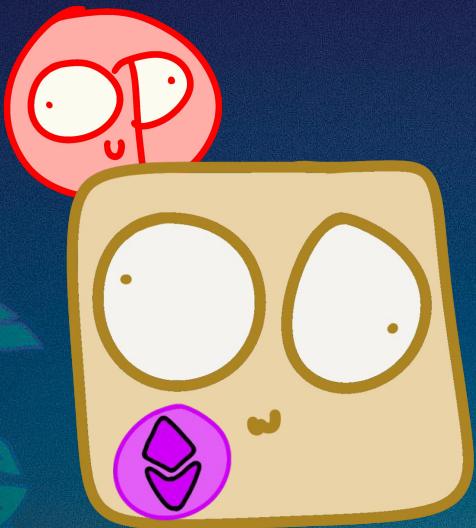
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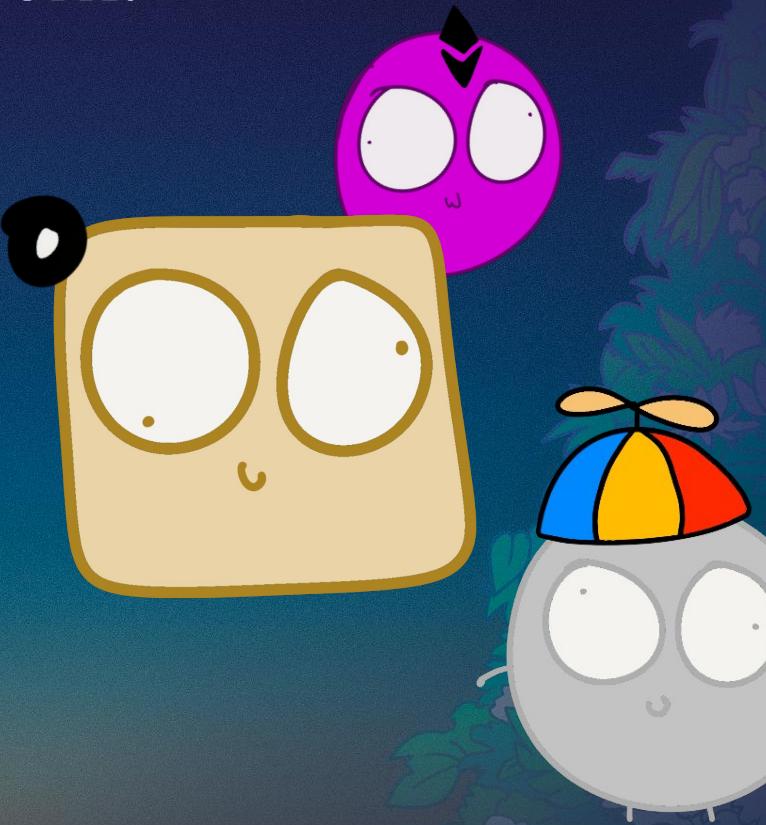
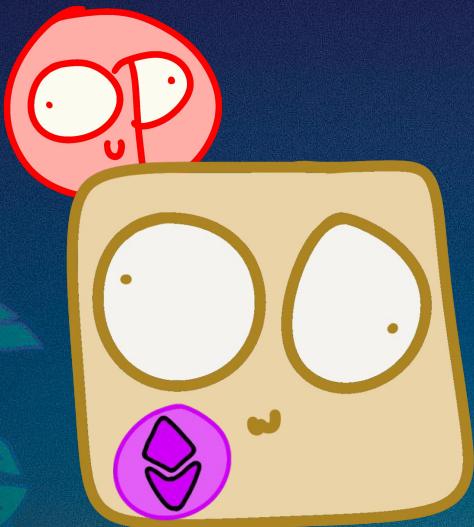
How do bridges work?



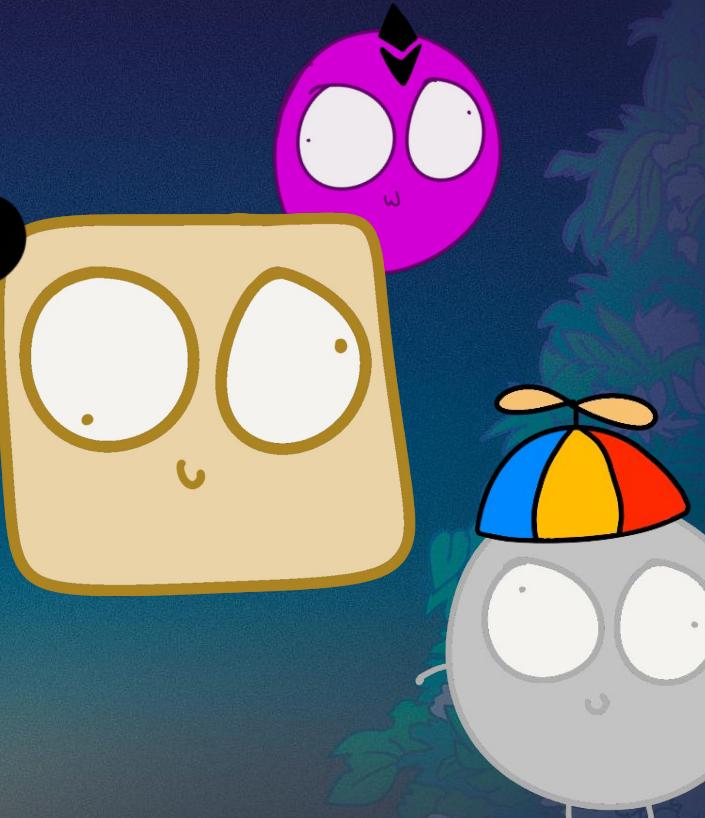
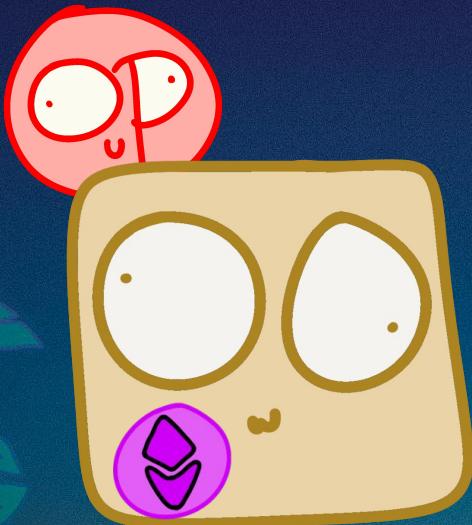
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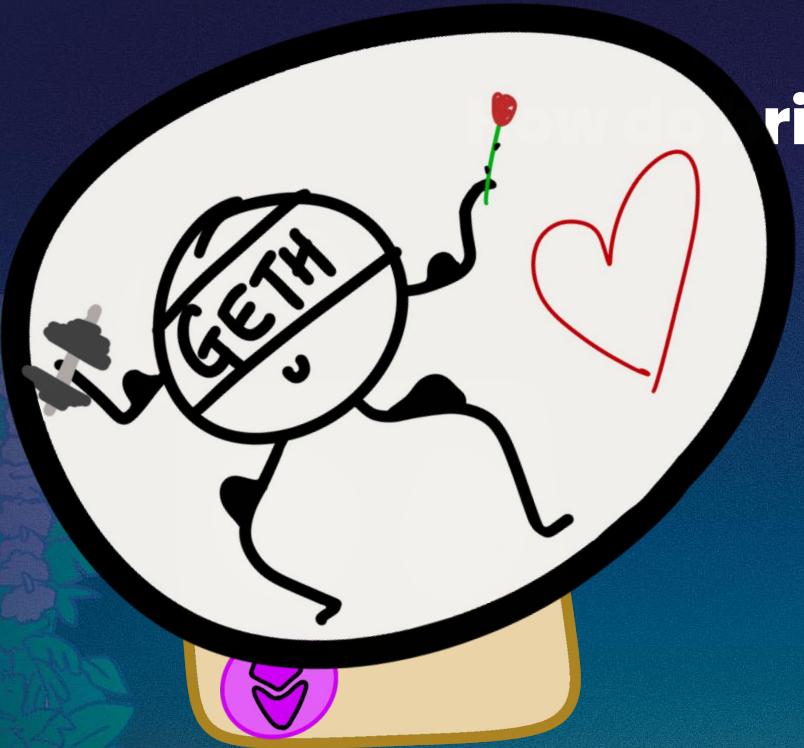
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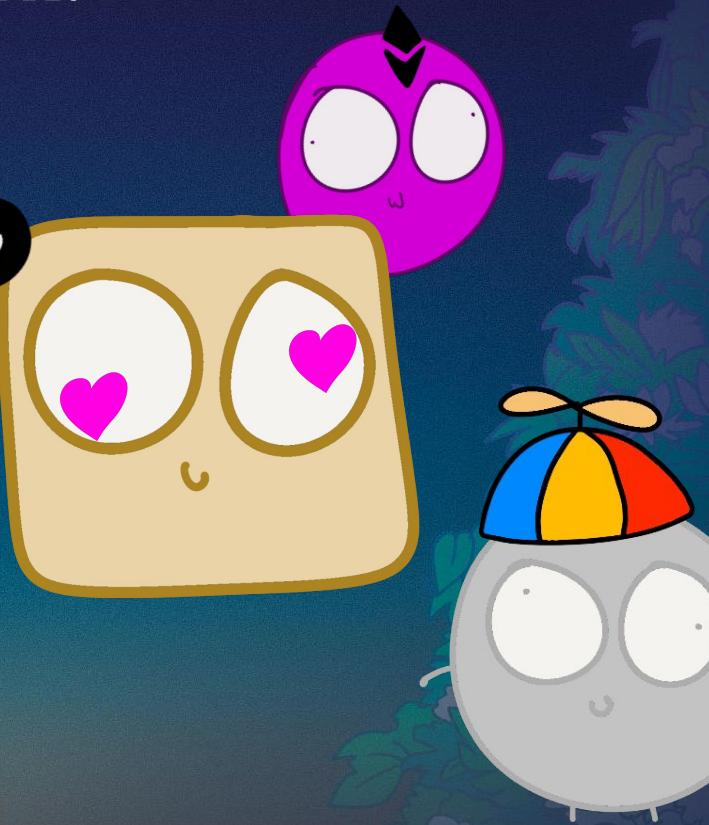


How do bridges work?

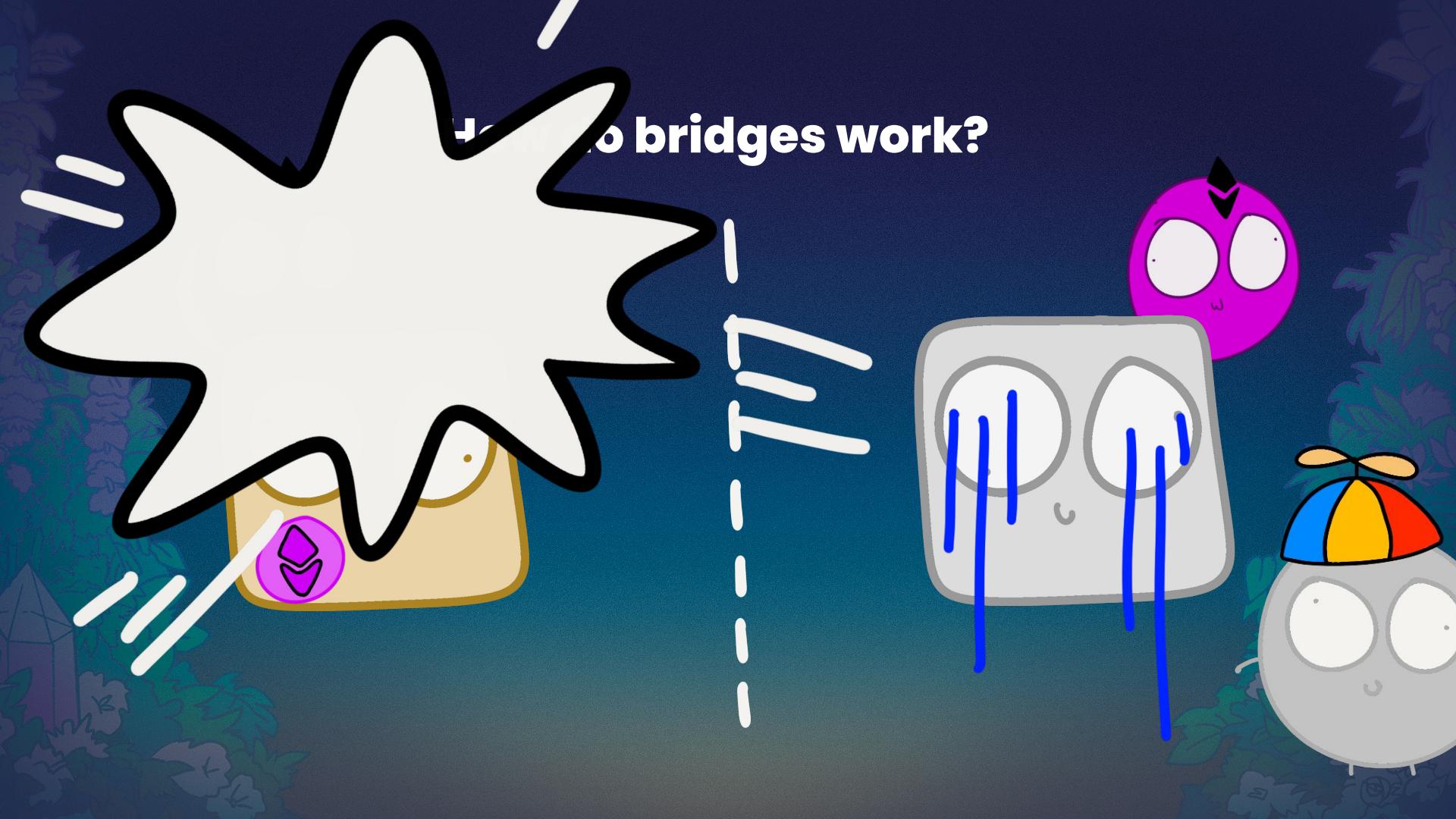


ridges work?

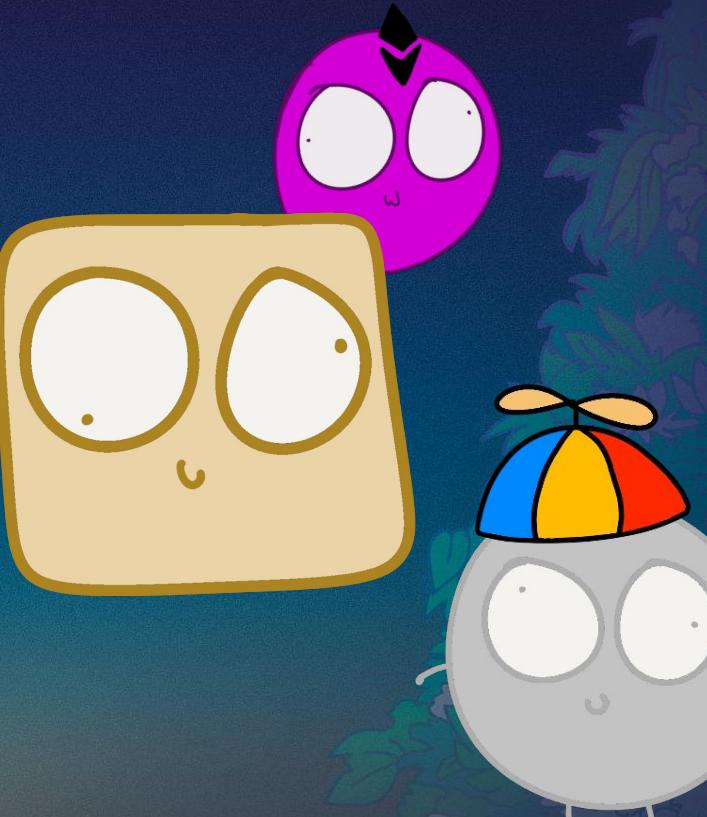




How do bridges work?



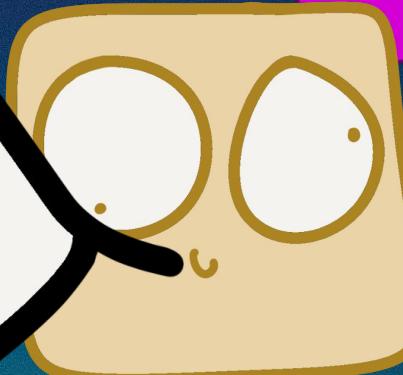
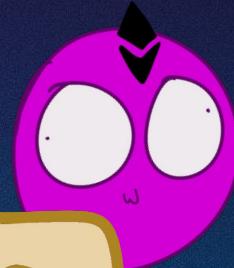
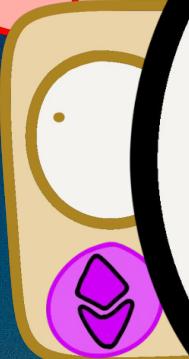
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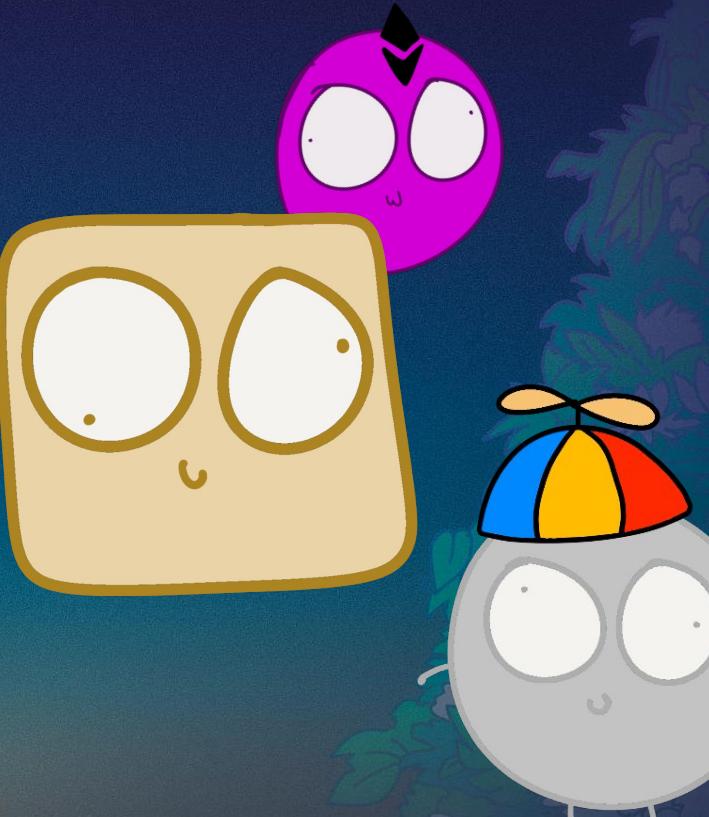
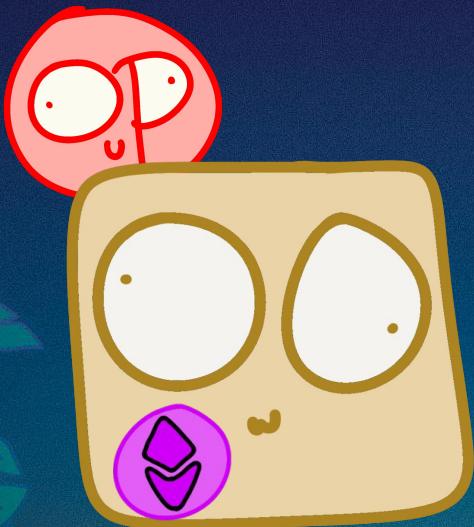
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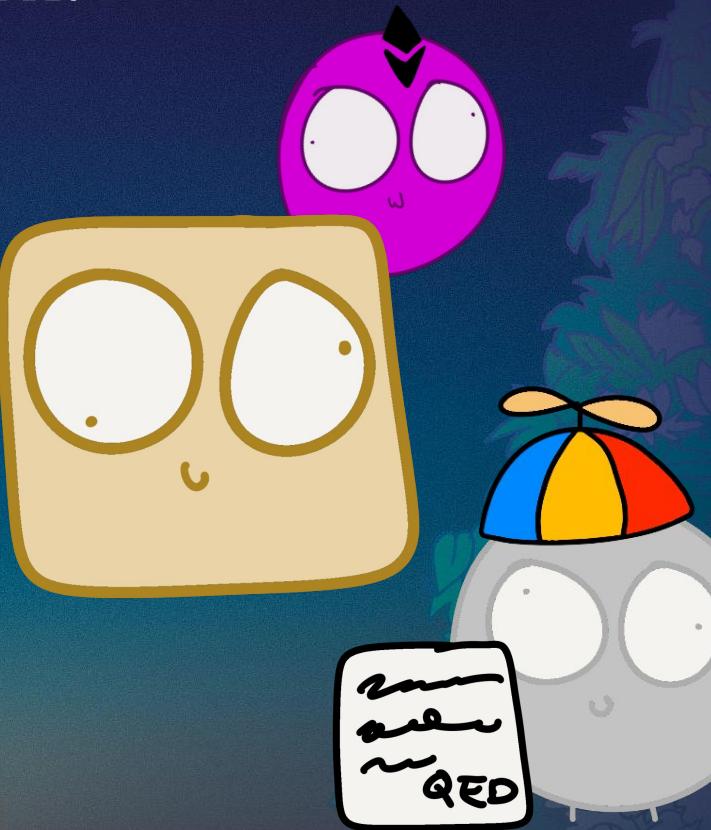
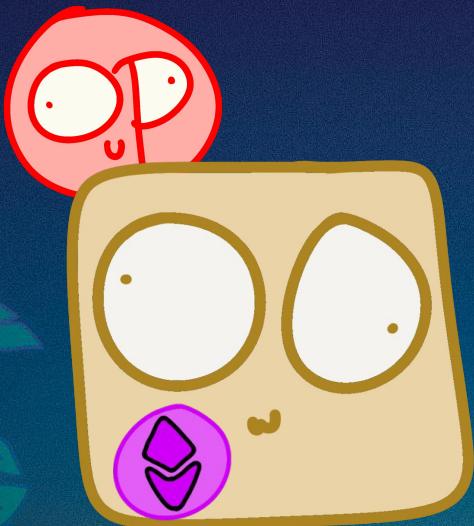
PROVE
IT!



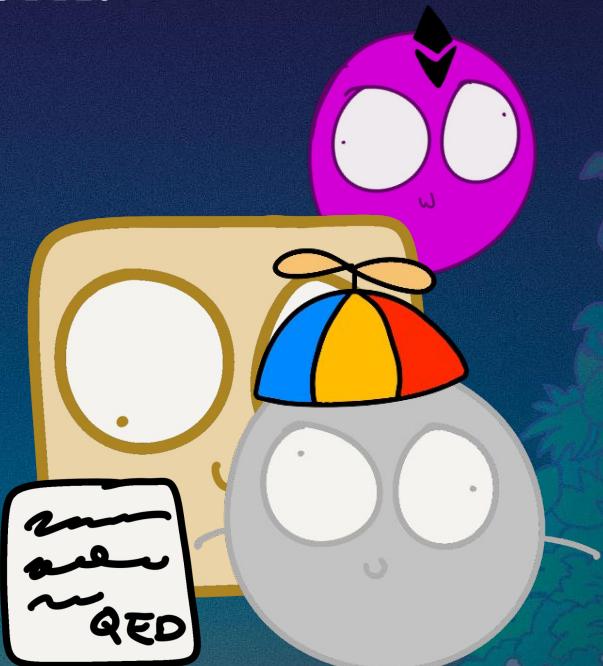
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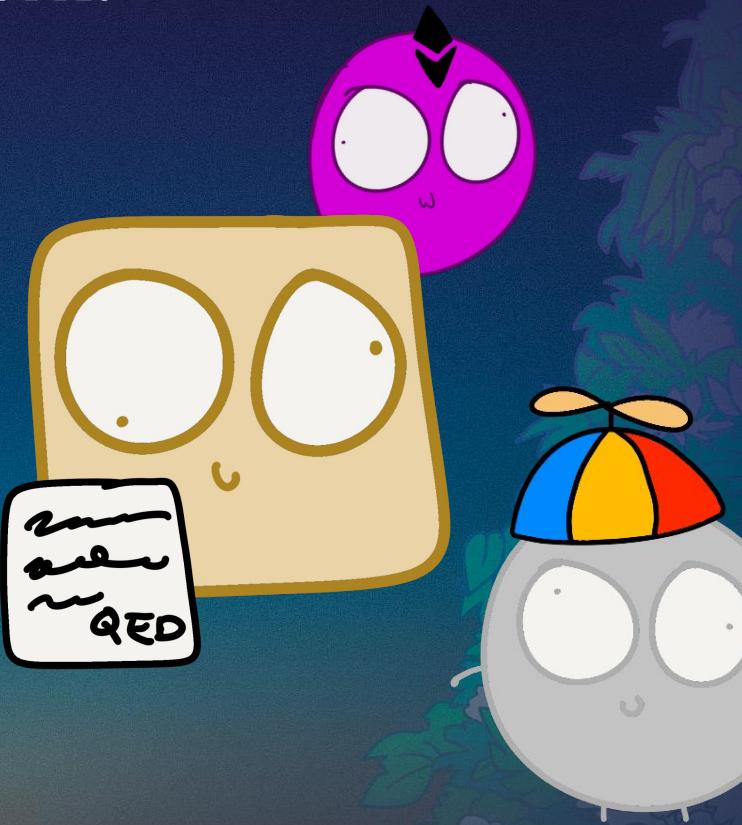
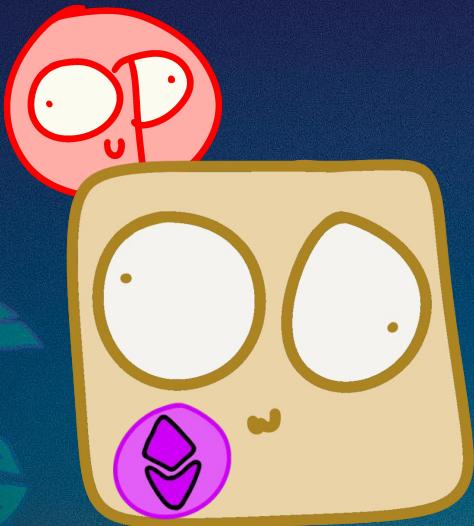
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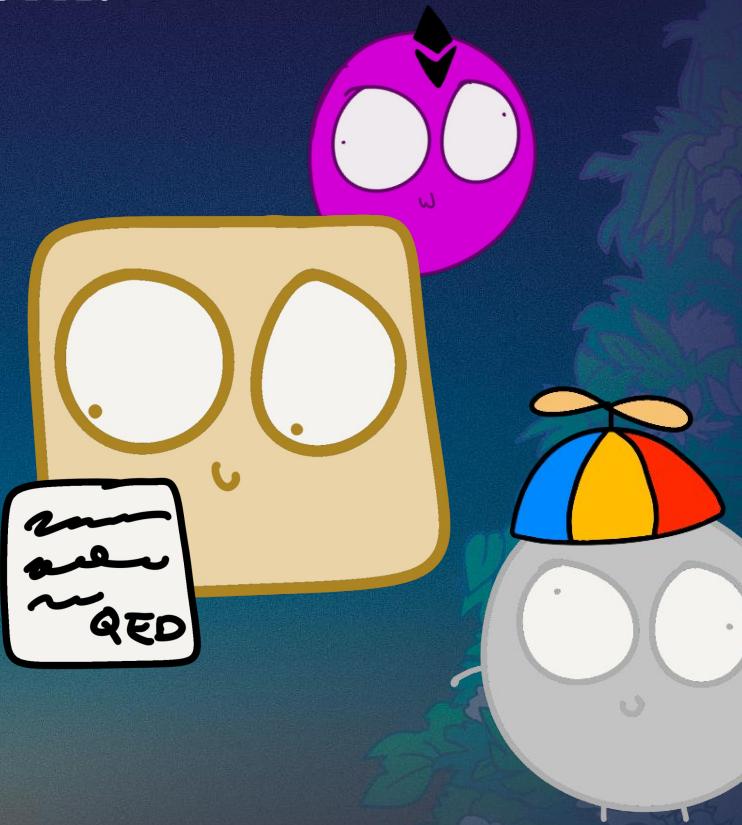
How do bridges work?



How do bridges work?



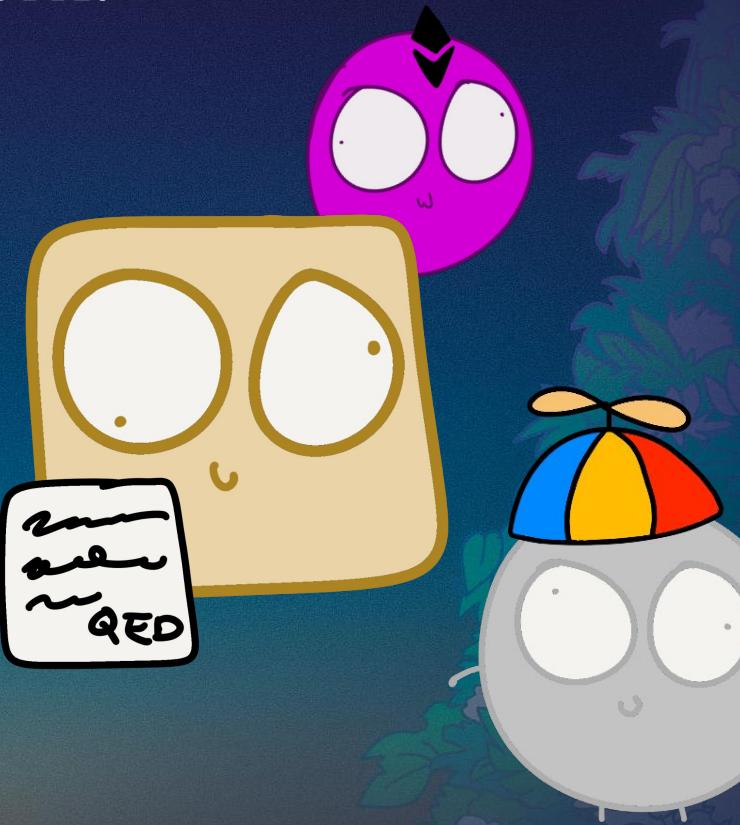
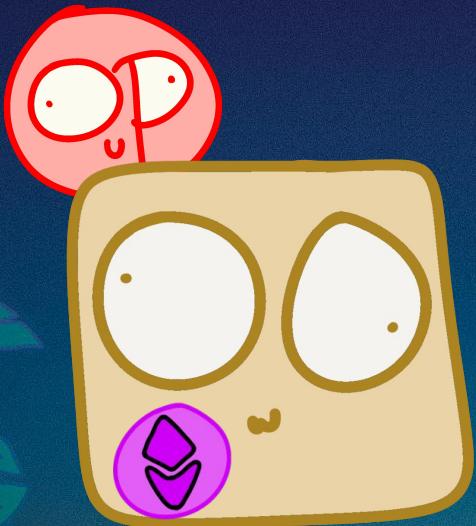
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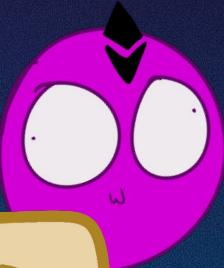
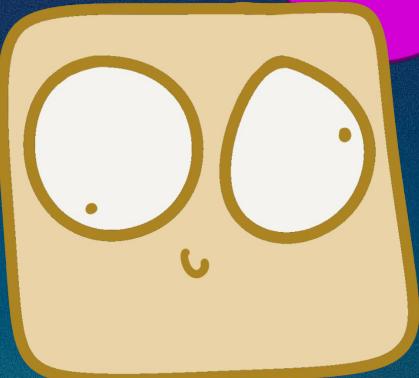
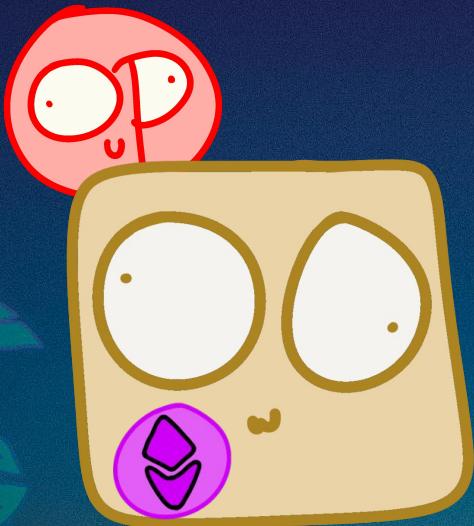
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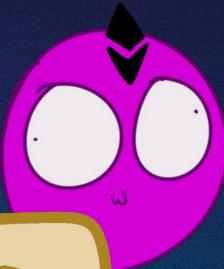
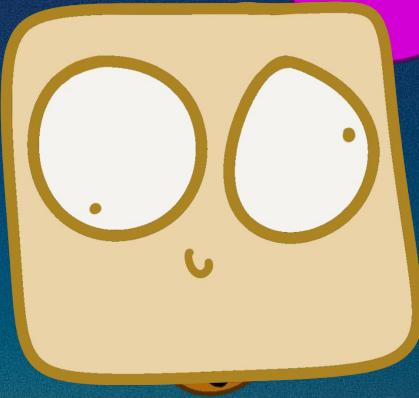
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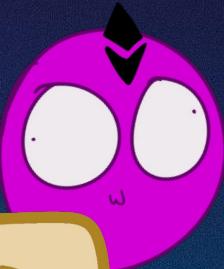
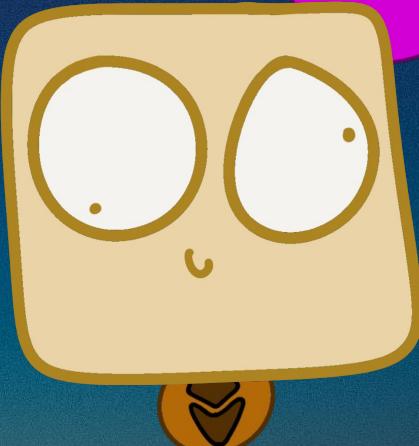
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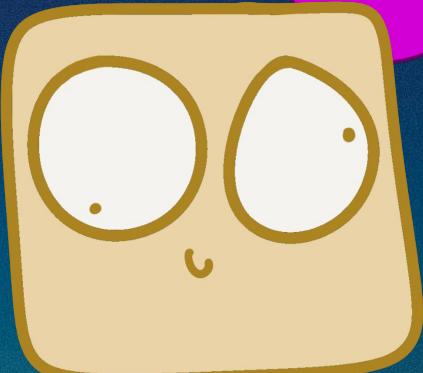
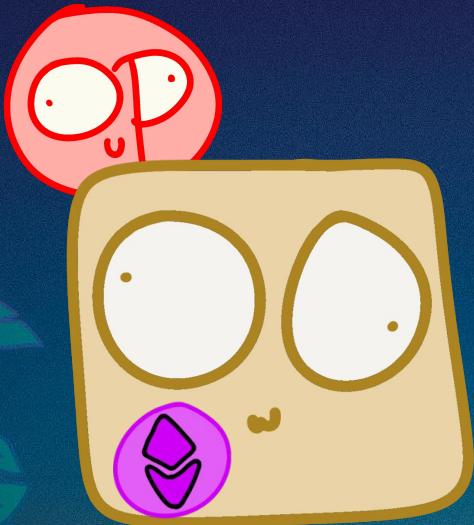
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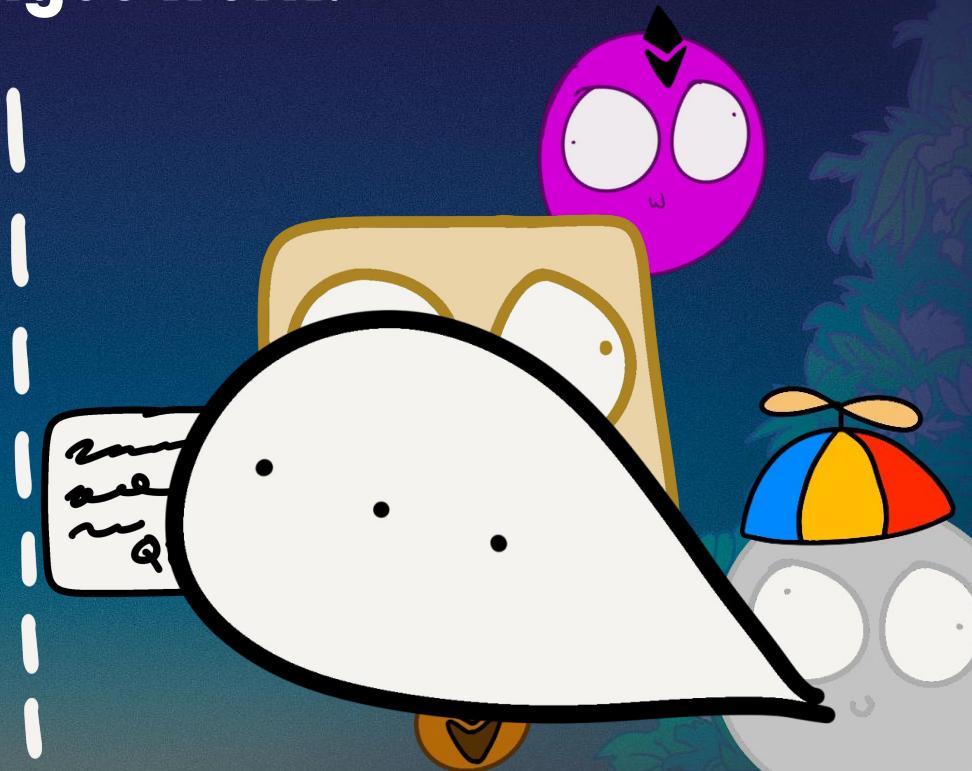
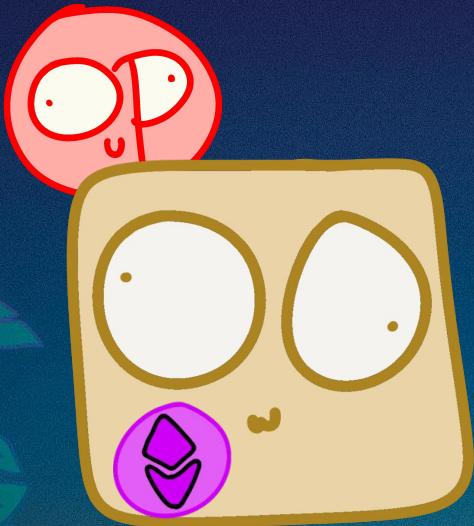
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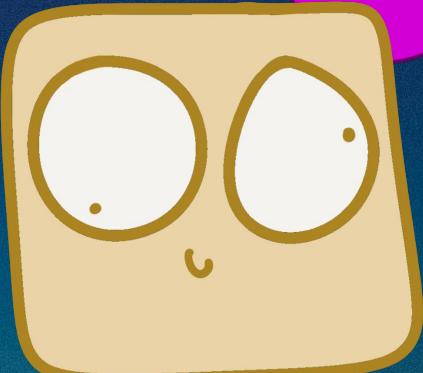
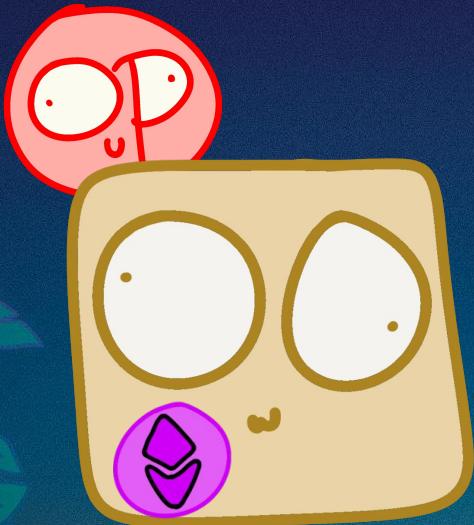
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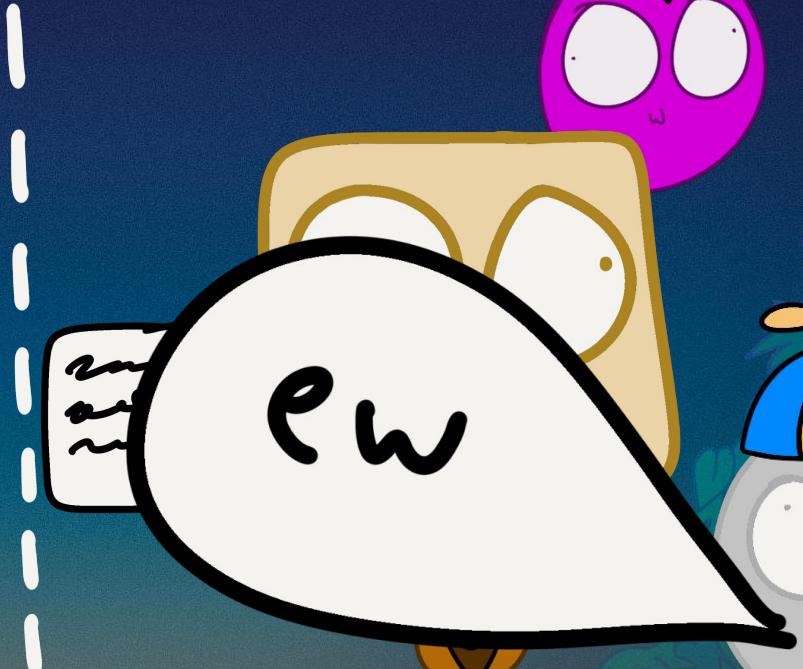
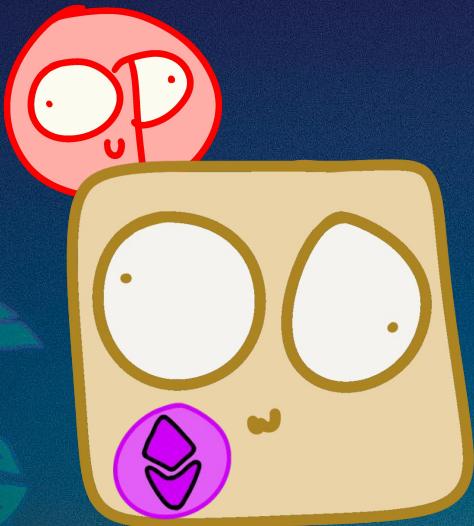
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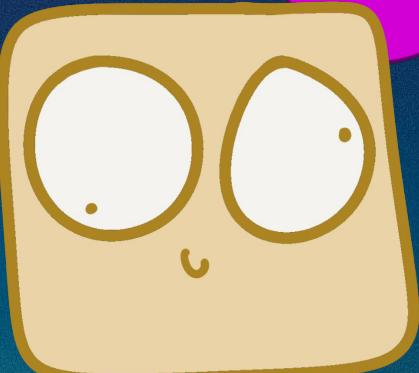
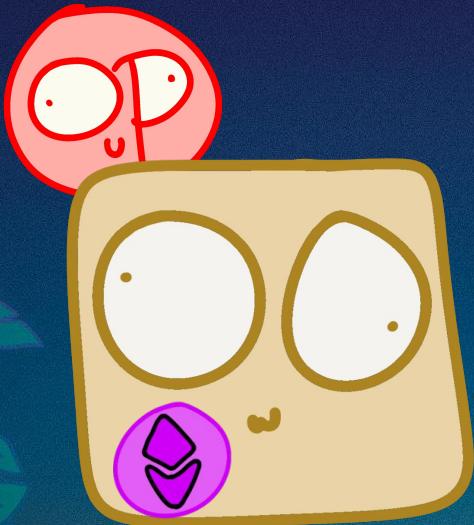
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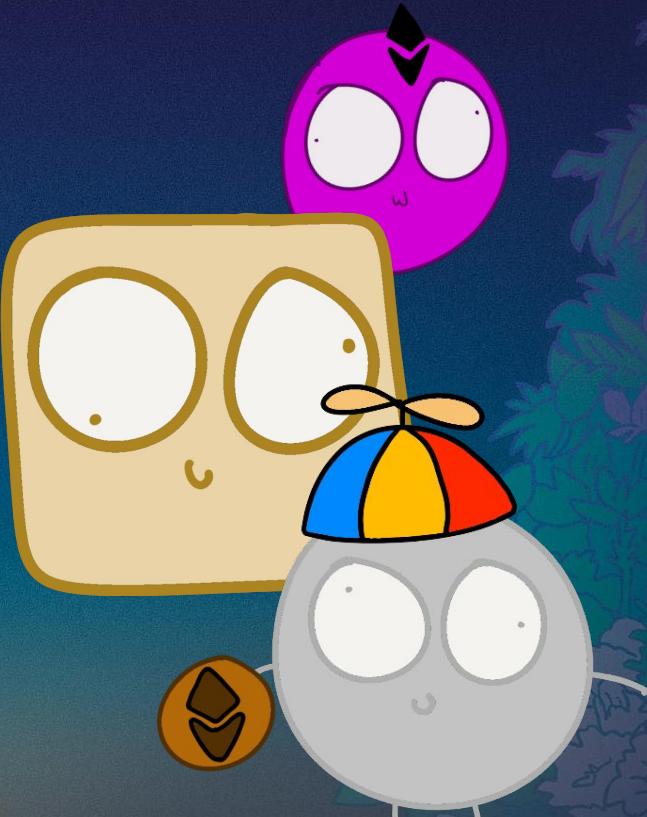
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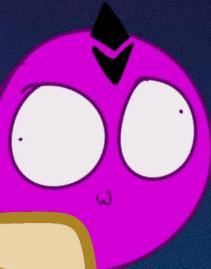
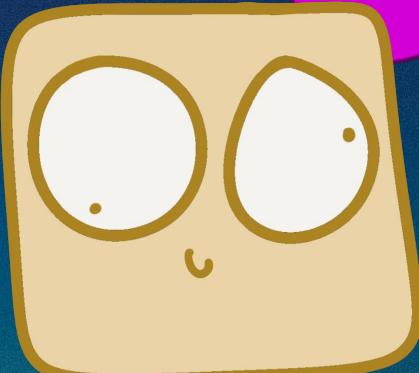
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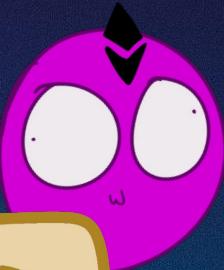
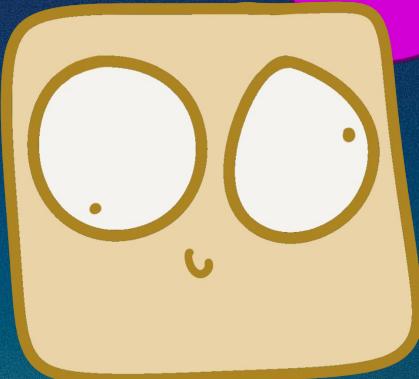
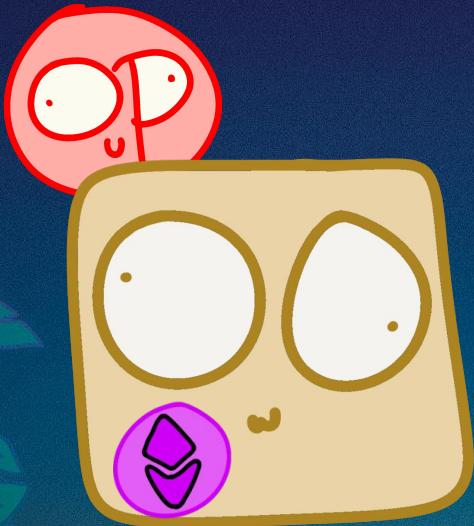
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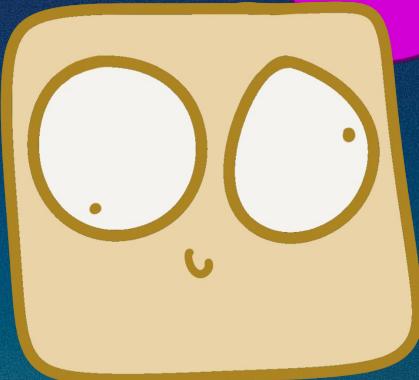
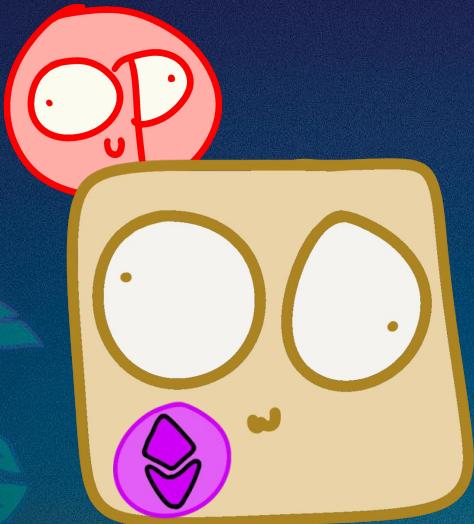
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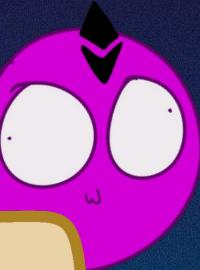
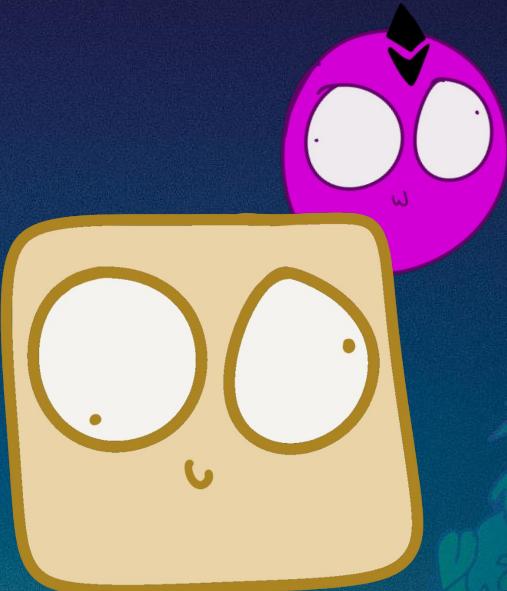
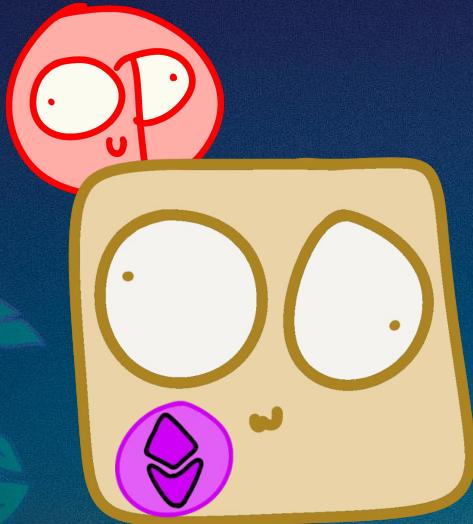
How do bridges work?



How do bridges work?



How do bridges work?



Proofs are things that bridges use.

**Proofs are things that bridges use.
Rollups don't use proofs.**

**Proofs are things that bridges use.
Rollups don't use proofs.
Bridges do.**

This has some weird implications.

**“ZK/Optimistic Rollup”
doesn’t really make a lot of
sense.**

Rollups don't use proofs.
Bridges do.

Where does “ZK/Optimistic Rollup” come from?

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- Rollup teams think bridges are useful.

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- Rollup teams think bridges are useful.
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Where does “ZK/Optimistic Rollup” come from?

- Rollup teams think bridges are useful.
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- “Official” bridge is naturally popular.
- “Official” bridge has lots of influence.
- “Official” bridge has some sort of proof system.
- Rollup gets its name from the “official” bridge.

Proofs are things that bridges use.

**Proofs are things that bridges use.
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**Proofs are things that bridges use.
Rollups don't use proofs.
Bridges do.**



So what?

**The zk/Optimistic Rollup “war” is
a CIA psyop! It’s fake news! It’s
legacy media! It’s twitter bots!**

**“ZK/Optimistic Rollup” is terribly
limiting.**

What do we do if...

What do we do if...

- ... there's a chain with two massive bridges at the same?

What do we do if...

- ... there's a chain with two massive bridges at the same?
- ... there's a chain with no bridge at all?

What do we do if...

- ... there's a chain with two massive bridges at the same?
- ... there's a chain with no bridge at all?
- ... a random person puts a bridge on that chain?

What do we do if...

- ... there's a chain with two massive bridges at the same?
- ... there's a chain with no bridge at all?
- ... a random person puts a bridge on that chain?
- ... there's a chain that posts blocks to two other chains?

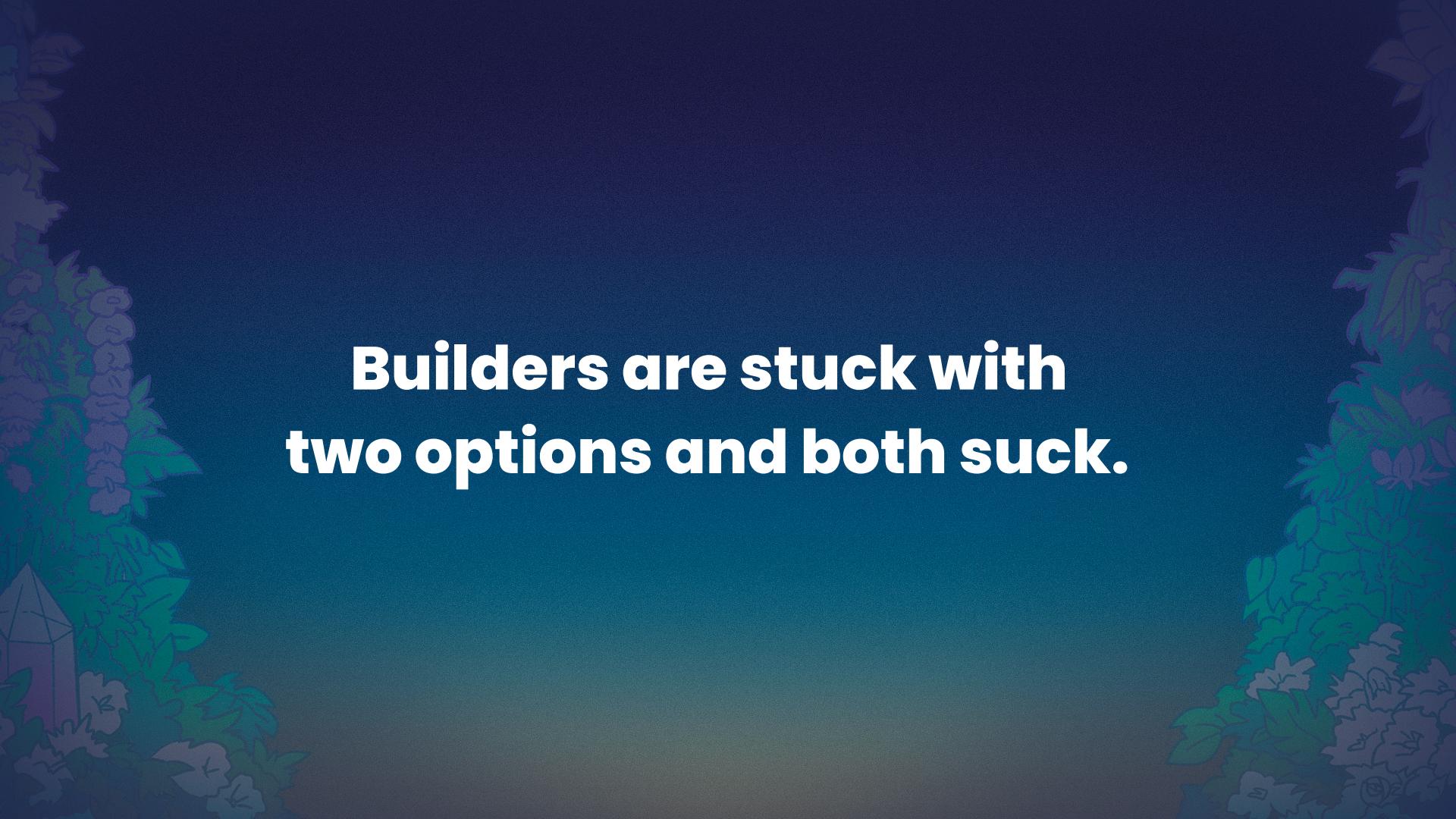
What do we do if...

- ... there's a chain with two massive bridges at the same?
- ... there's a chain with no bridge at all?
- ... a random person puts a bridge on that chain?
- ... there's a chain that posts blocks to two other chains?
- ... there's a bridge with more than one proof system?

**+ Like 20 other things you can
easily imagine if you're not
constrained in this way.**

**"The limits of my language are
the limits of my world."
– Wittgenstein**

**Our language doesn't leave any
room for novel constructions.**



**Builders are stuck with
two options and both suck.**



**Option #1: make up a
completely new term.**

Option #1: make up a
L1! L2! L3!

Option #1: **Optimistic Rollup!**
completely new term.
L1! L2! L3!

Option #1: Optimistic Rollup!
L1! L2! L3! Completely new term.
ZK Rollup!

Option #1: Optimistic Rollup!
Completely new term.
L1! L2! L3! ZK Rollup! a!

Validium!

Option #1: Optimistic Rollup!

Completely new term.

L1! L2! L3! Plasma!

ZK Rollup! a!

Validium!
Optimism!
L1! L2! L3! Optimistic Rollup!
Optimistic Rollup! Completely new term.
Plasma!

Validium! Volition!
Optic! Optimistic Rollup!
L1! L2! L3! ZK Rollup! Plasma!
Optimism! Completely neutral term.



Validium! Volitis
Optimismistic Rollup!
L1! L2! L3! ZK Rollup!
Discover Sovereign
Rollup! Plasma! term.

Option #2: just coopt an existing term.

We lose either way.

Our language is not flexible enough.

**The end result is that
nobody's working together.**

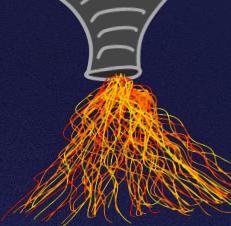
**“I think we’re all just
working on the same thing”**

**I was trying to figure out
how to end this talk, and
then this happened.**

**Those people share
definitions!**

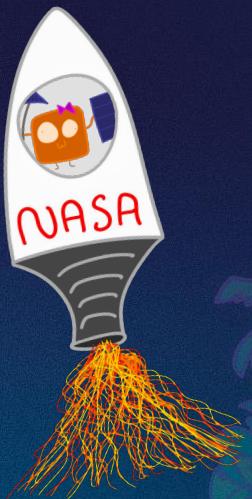


We can catch boosters too.

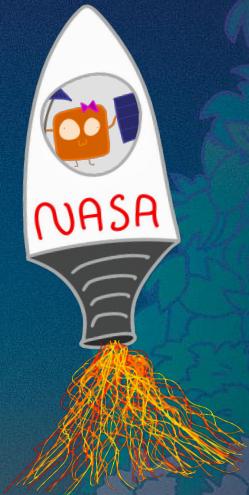


We can catch boosters too.

We can catch boosters too.



We can catch boosters too.



We can catch boosters too.



We can catch boosters too.



**We *need* to start working together
to create some shared definitions.**

So help write the Encyclopedia Etheraea.

**So help write the Encyclopedia Etheraea.
We've already got two definitions!**

Thank you!

HELP
FORMALIZE
STUFF !

Kelvin Fichter

Engineering @ OP Labs

Eternal Optimist @ The Optimism Collective

kelvinfichter@gmail.com

