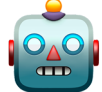


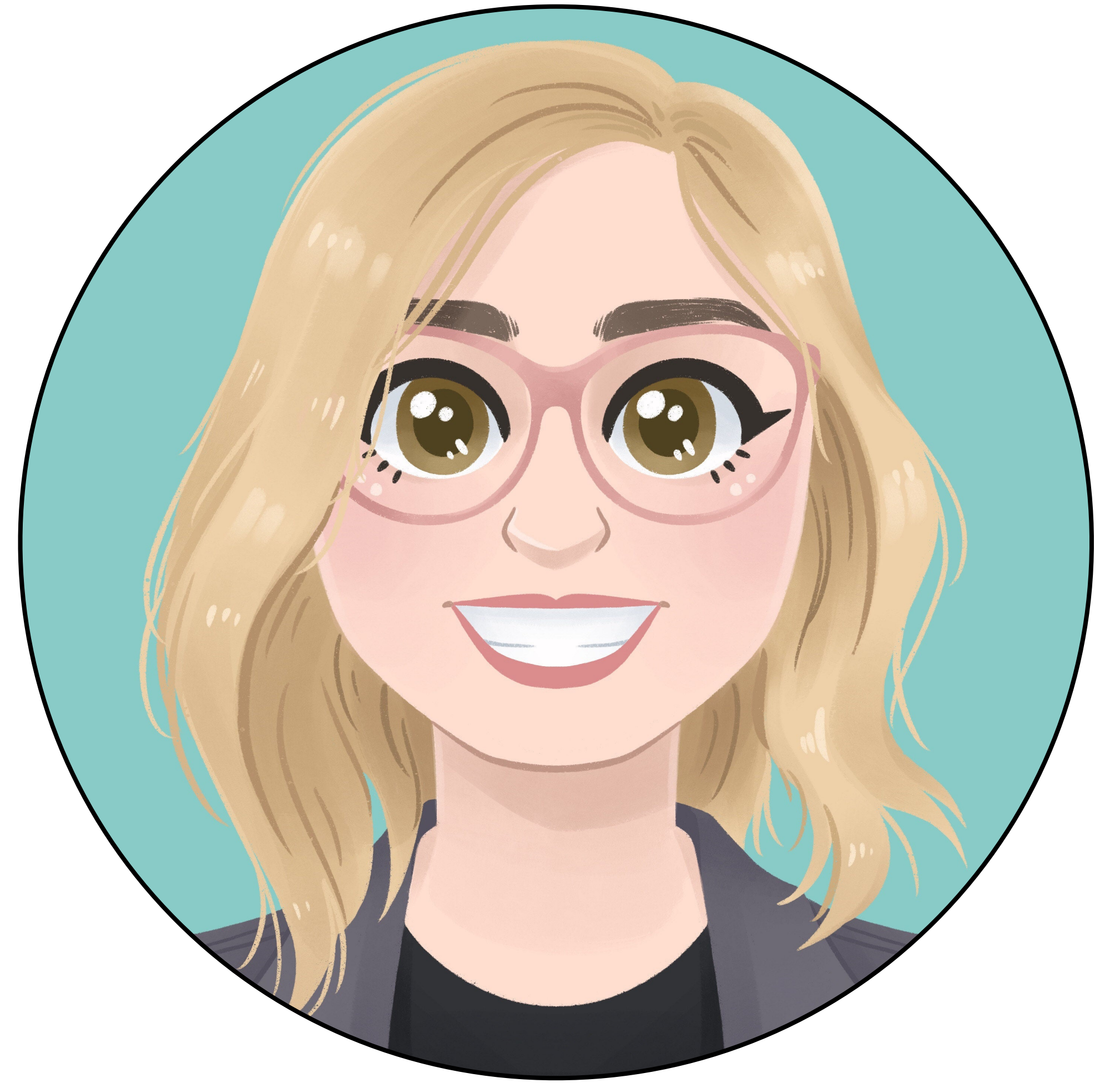
# ECIP-1050

*SMART CONTRACT STATUS CODES*

  COMPOSITIONALITY, INTEROPERABILITY, AUTOMATION, MESSAGING, AND MORE  

INTRO

BROOKLYN ZELENKA, @expede



 **fission**

INTRO

BROOKLYN ZELENKA, @expede

- Cofounder/CTO at Fission — <https://fission.codes>



INTRO

BROOKLYN ZELENKA, @expede

- Cofounder/CTO at Fission — <https://fission.codes>
- PLT & VM enthusiast



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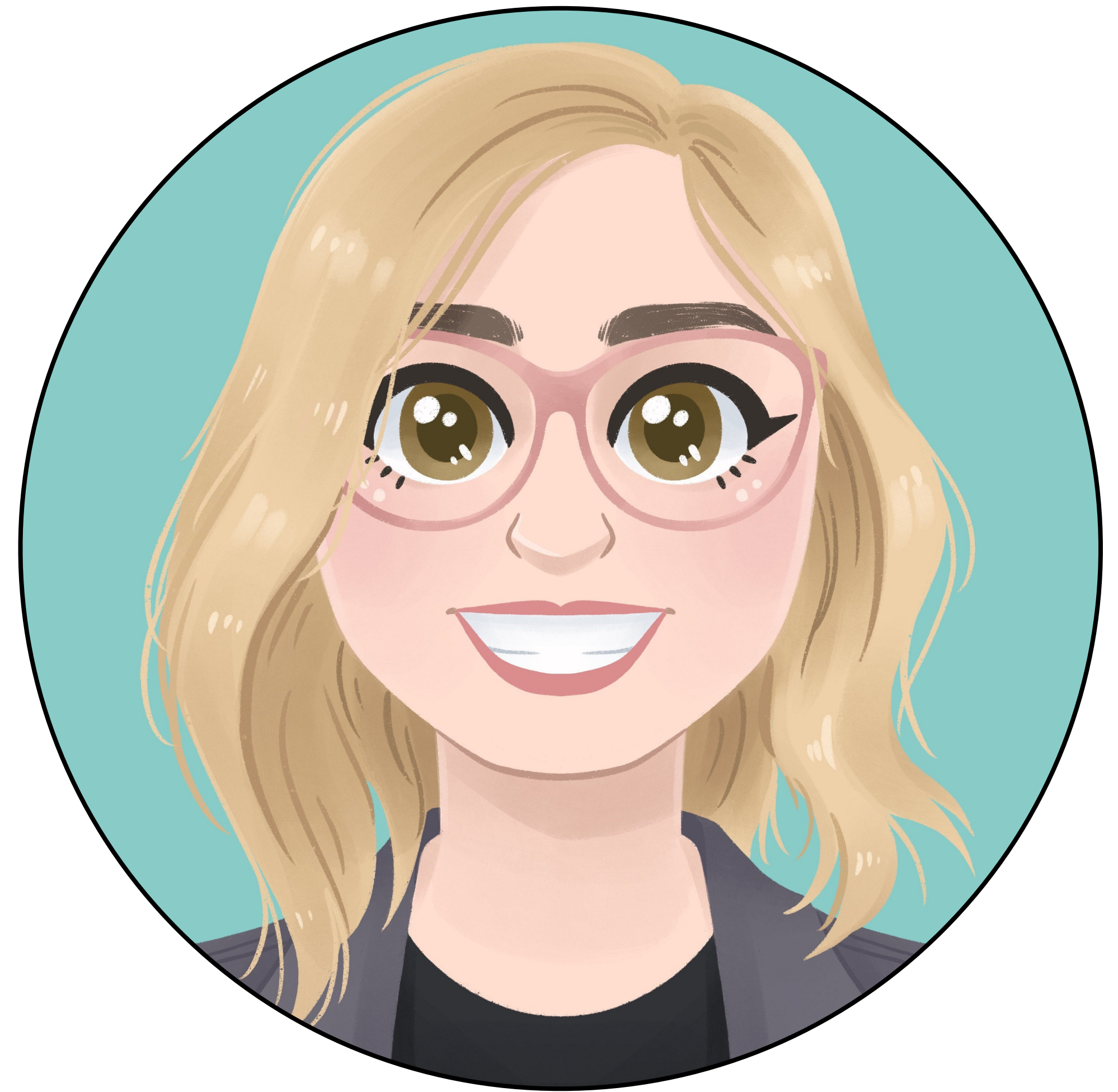


 **fission**

## INTRO

BROOKLYN ZELENKA, @expede

- Cofounder/CTO at Fission — <https://fission.codes>
- PLT & VM enthusiast
- Prev. ETH Core Dev, now visiting from IPFS-land 🚀
- EIPs
  - 615: *EVM Subroutines & Static Jumps*
  - 902: *Token Permissions / Validation*
  - 1066: *Standardized Status Codes*
  - 1444: *Permissionless On-Chain Translation*



 **fission**

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- Cofounder/CTO at Fission — <https://fission.codes>
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  - 1444: *Permissionless On-Chain Translation*
- **ECIP 1050**



INTRO

BIG, HAIRY, AUDACIOUS GOAL



INTRO

BIG, HAIRY, AUDACIOUS GOAL

- Write less code 🕒

INTRO

BIG, HAIRY, AUDACIOUS GOAL

- Write less code 🕒
- Have higher confidence 🙌

INTRO

BIG, HAIRY, AUDACIOUS GOAL

- Write less code 🕒
- Have higher confidence 🙌
- Make Ethereum more accessible 👩👧👦

INTRO

HTTP → ETC

INTRO

HTTP → ETC

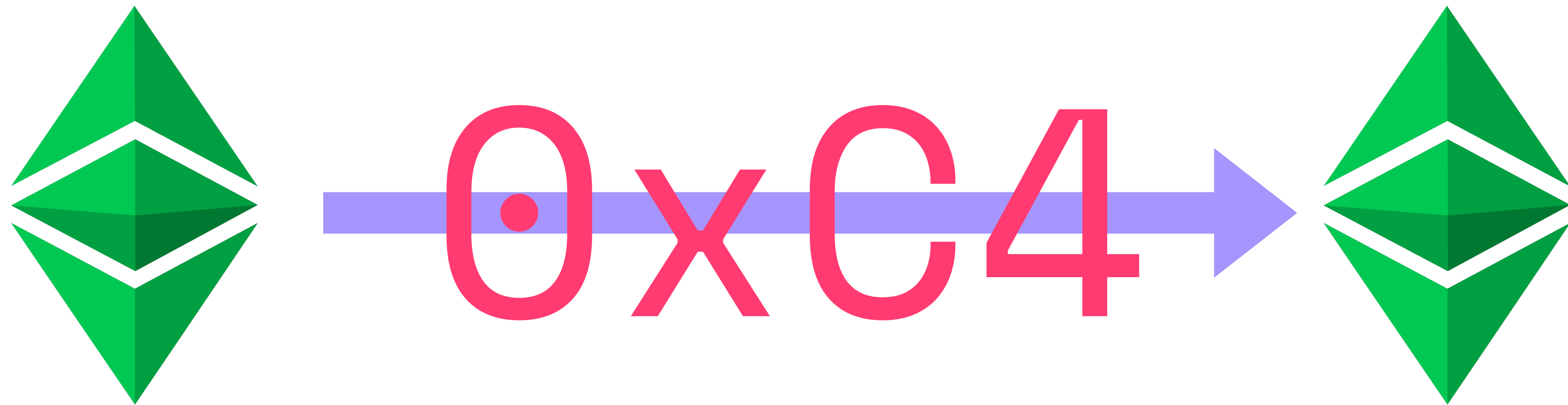


404



INTRO

HTTP → ETC

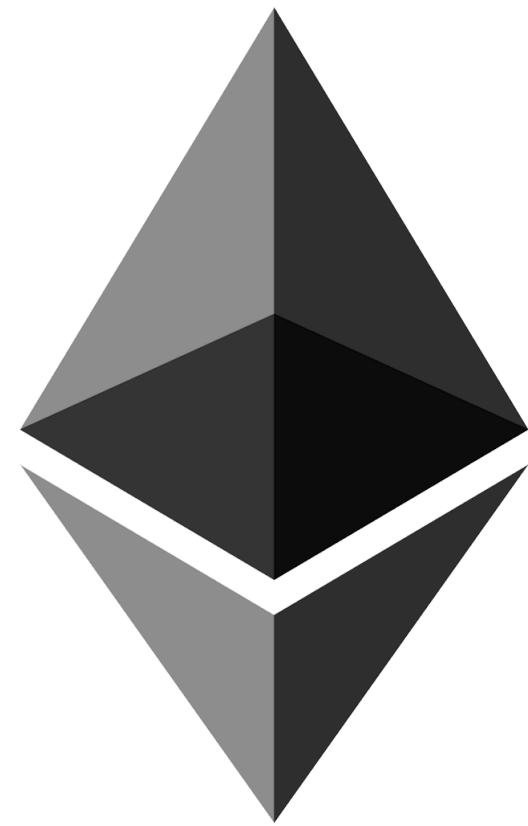


INTRO

HTTP → ETC



404



0xC4



INTRO

REASONS TO CARE 🌍



INTRO

## REASONS TO CARE 🌍

- Dependency for several ERCs — notably security tokens
- Approved to be a primitive in Vyper 🐍
- Flow automation
- Interoperability
- Deployed contract reuse (safety!)
- Open to extension
- Highly portable
- Developer & user feedback, incl. (nearly) gas-free localization

STRUCTURED CODES

# STRUCTURED CODES

SO SIMPLE A MACHINE CAN USE IT 🤗🤖

STRUCTURED CODES

TASTY NIBBLES 

STRUCTURED CODES

TASTY NIBBLES 🐭

OX41

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

0100 0001

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001 Reason



STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001 Reason

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001 Reason

---

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001 Reason

---

0X0B

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001 Reason

---

0X0B

0000 1011

STRUCTURED CODES

TASTY NIBBLES 🐭

0X41

Category 0100 0001 Reason



0X0B

1011

(oxo\* General is same as just the reason alone)

STRUCTURED CODES  
CODE TABLE









STRUCTURED CODES  
CODE TABLE

Accepted/Started  
Action Required  
Fail  
Ok  
...

**Reason**

**Category**

	Time	Range	Auth	Agreements	Off Chain	...										
	0*	1*	2*	3*	4*	5*	6*	7*	8*	9*	A*	B*	C*	D*	E*	F*
0																
1																
2																
3																
4																
5																
6																
7																
8																
9																
A																
B																
C																
D																
E																
F																

SEARCH / MATCH



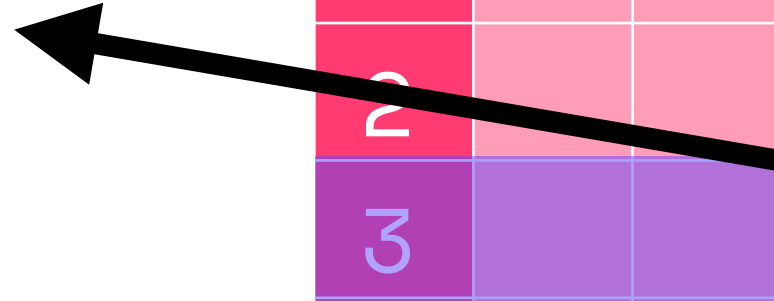


STRUCTURED CODES  
CODE TABLE

# Category

	Time	Range	Auth	Agreements	Off Chain	...										
	0*	1*	2*	3*	4*	5*	6*	7*	8*	9*	A*	B*	C*	D*	E*	F*
0																
1																
2																
3							AWAITING									
4																
5																
6																
7																
8																
9																
A																
B																
C																
D																
E																
F																

0x23 Awaiting Match



Fail  
Ok  
Accepted/Started  
Action Required  
...

## Reason

SEARCH / MATCH

AWAITING

STRUCTURED CODES

HELPER LIBRARY 

`npmjs.com/package/fission-codes`

STRUCTURED CODES

HELPER LIBRARY 

[npmjs.com/package/fission-codes](https://npmjs.com/package/fission-codes)

```
enum Category {  
  Generic,  
  Permission,  
  Match,  
  Offer,  
  Availability,  
  // ...  
}
```

```
enum Reason {  
  Failure,  
  Success,  
  Acceptance,  
  Before,  
  ActionRequired,  
  // ...  
}
```

STRUCTURED CODES

HELPER LIBRARY 

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  Match,  
  Offer,  
  Availability,  
  // ...  
}
```

```
enum Reason {  
  Failure,  
  Success,  
  Acceptance,  
  Before,  
  ActionRequired,  
  // ...  
}
```

```
function toCode(Category _category, Reason _reason) public pure returns (byte code) {  
  return toCode(uint(_category), uint(_reason));  
}  
  
function toCode(uint _category, uint _reason) public pure returns (byte code) {  
  return byte((_category << 4) + _reason);  
}  
  
function appCode(uint _appReason) public pure returns (byte code) {  
  return byte(160 + _appReason);  
}
```

Combine (inclusions)



STRUCTURED CODES

HELPER LIBRARY 

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```
enum Category {  
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}  
  
function appCode(uint _appReason) public pure returns (byte code) {  
  return byte(160 + _appReason);  
}
```

Combine (inclusions)

```
function categoryOf(byte _status) public pure returns (uint category) {  
  return uint(_status >> 4);  
}  
  
function reasonOf(byte _status) public pure returns (uint reason) {  
  return uint(_status & hex"0F");  
}
```

Pull Apart (projections)

STRUCTURED CODES

HELPER LIBRARY 

[npmjs.com/package/fission-codes](https://npmjs.com/package/fission-codes)

```
enum Category {  
  Generic,  
  Permission,  
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  Offer,  
  Availability,  
  // ...  
}
```

```
enum Reason {  
  Failure,  
  Success,  
  Acceptance,  
  Before,  
  ActionRequired,  
  // ...  
}
```

```
function toCode(Category _category, Reason _reason) public pure returns (byte code) {  
  return toCode(uint(_category), uint(_reason));  
}  
  
function toCode(uint _category, uint _reason) public pure returns (byte code) {  
  return byte((_category << 4) + _reason);  
}  
  
function appCode(uint _appReason) public pure returns (byte code) {  
  return byte(160 + _appReason);  
}
```

Combine (inclusions)

```
function categoryOf(byte _status) public pure returns (uint category) {  
  return uint(_status >> 4);  
}  
  
function reasonOf(byte _status) public pure returns (uint reason) {  
  return uint(_status & hex"0F");  
}
```

Pull Apart (projections)

```
function requireOk(byte _status, string message) public pure {  
  require(isOk(_status), message);  
}
```

Automatic **require**  
with (hardcoded) message\*

TOY FLOW

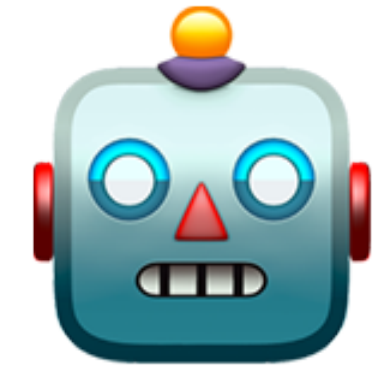
# TOY FLOW



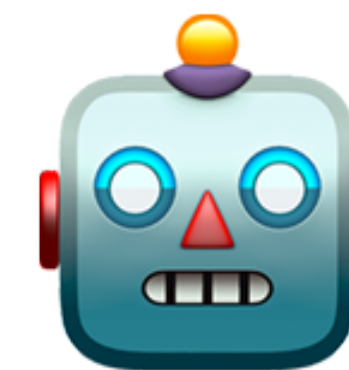
TOY FLOW

NOT READY YET

TOY FLOW  
NOT READY YET



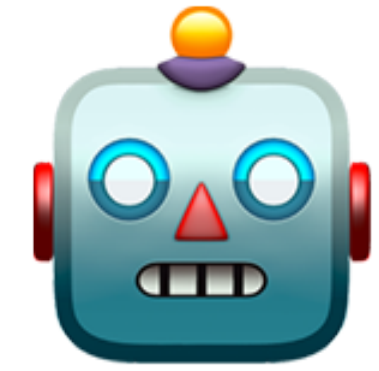
TOY FLOW  
NOT READY YET



TOY FLOW  
NOT READY YET

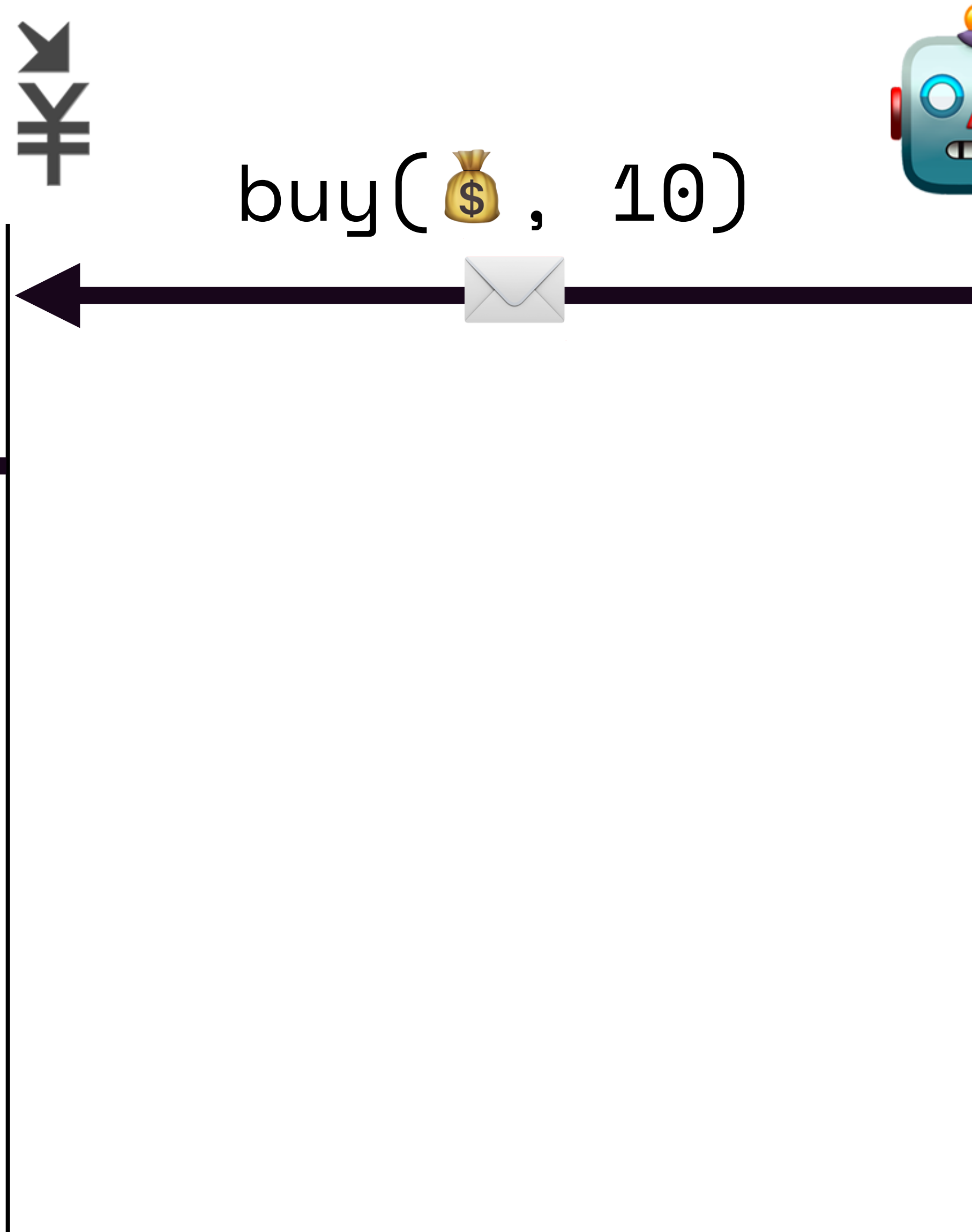
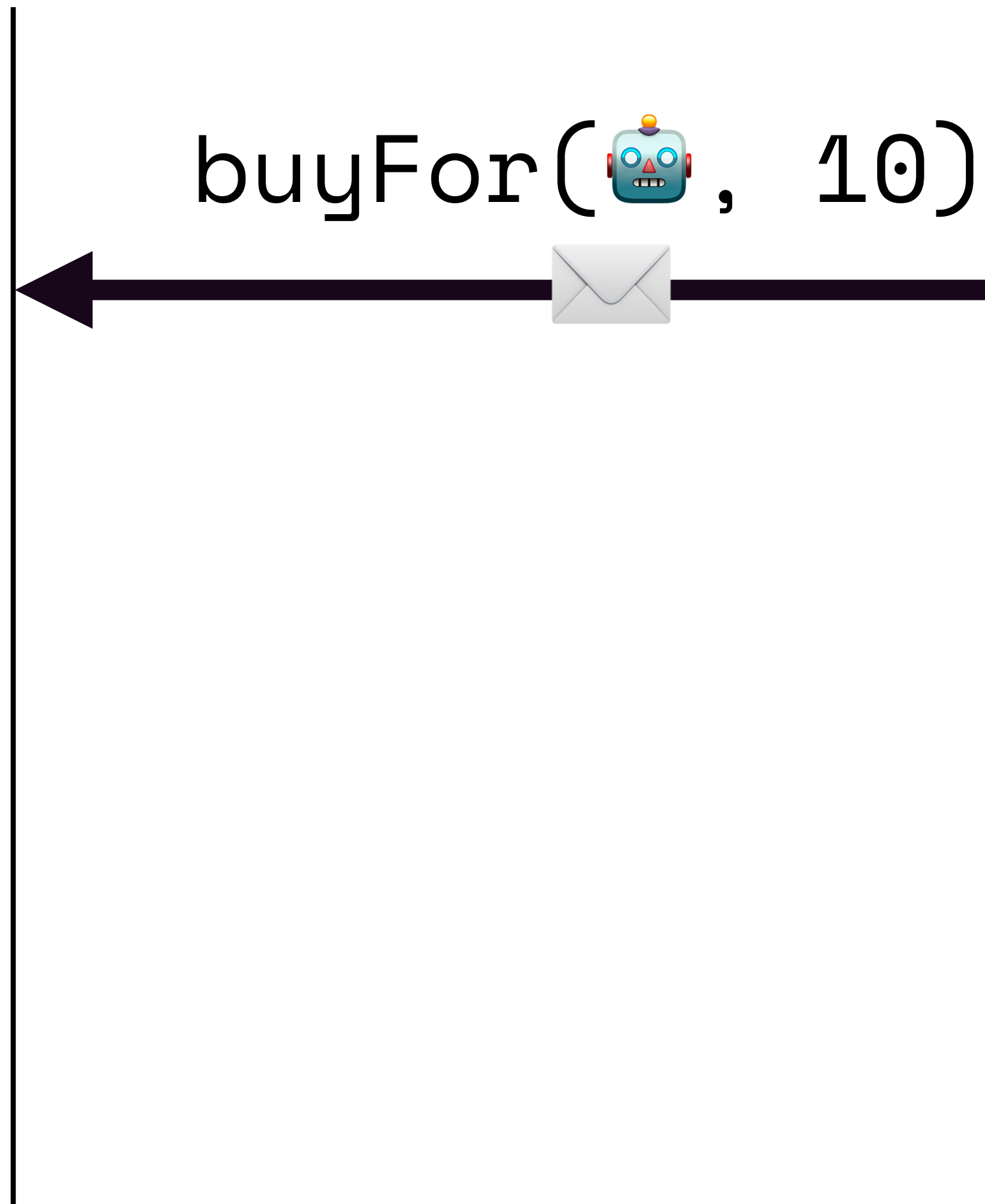
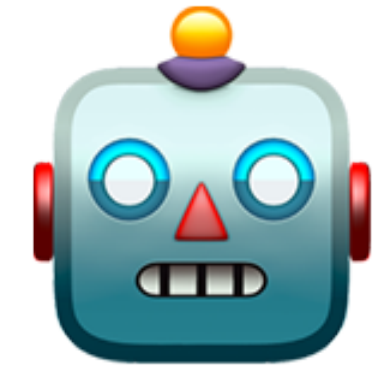


buy(💰, 10)

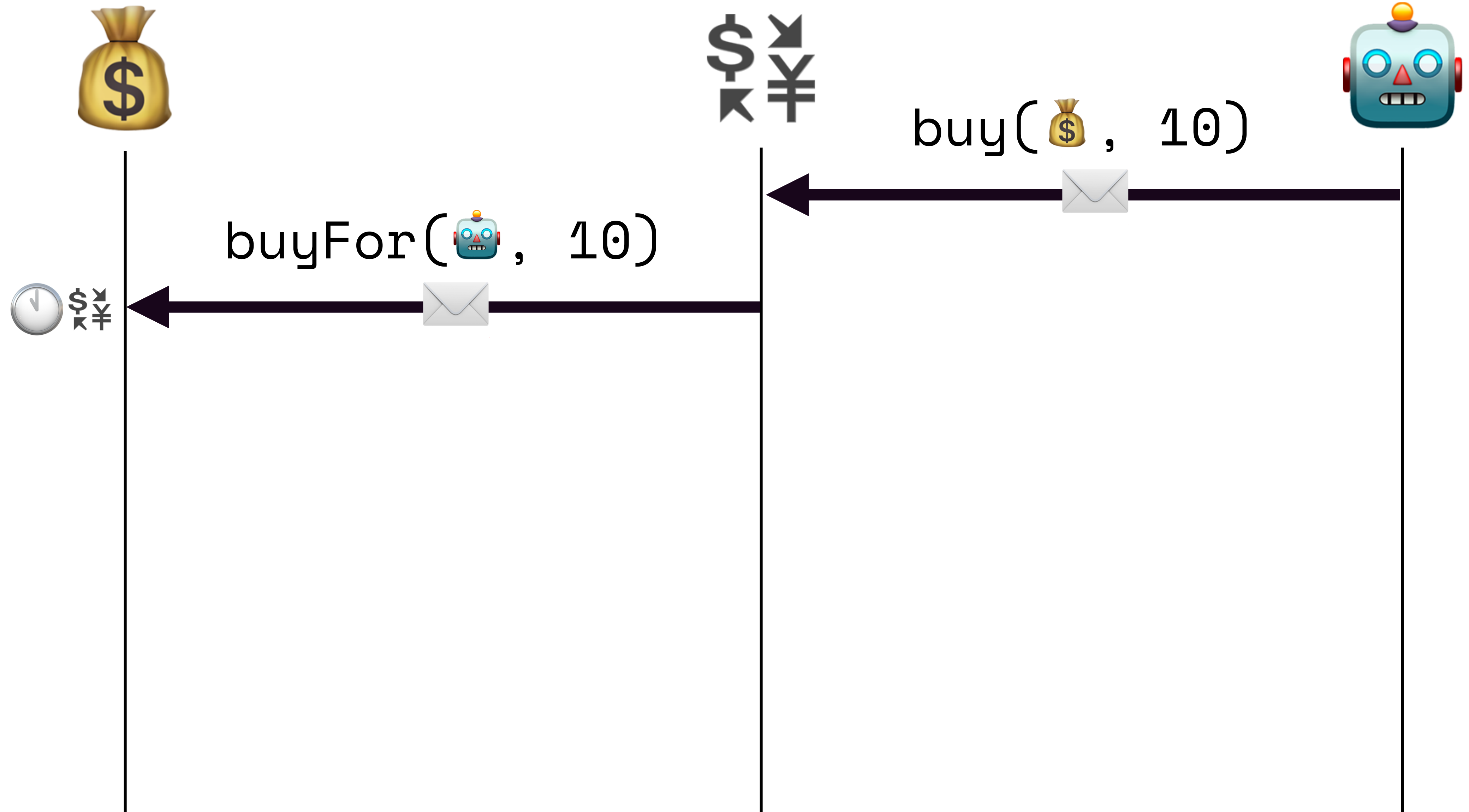




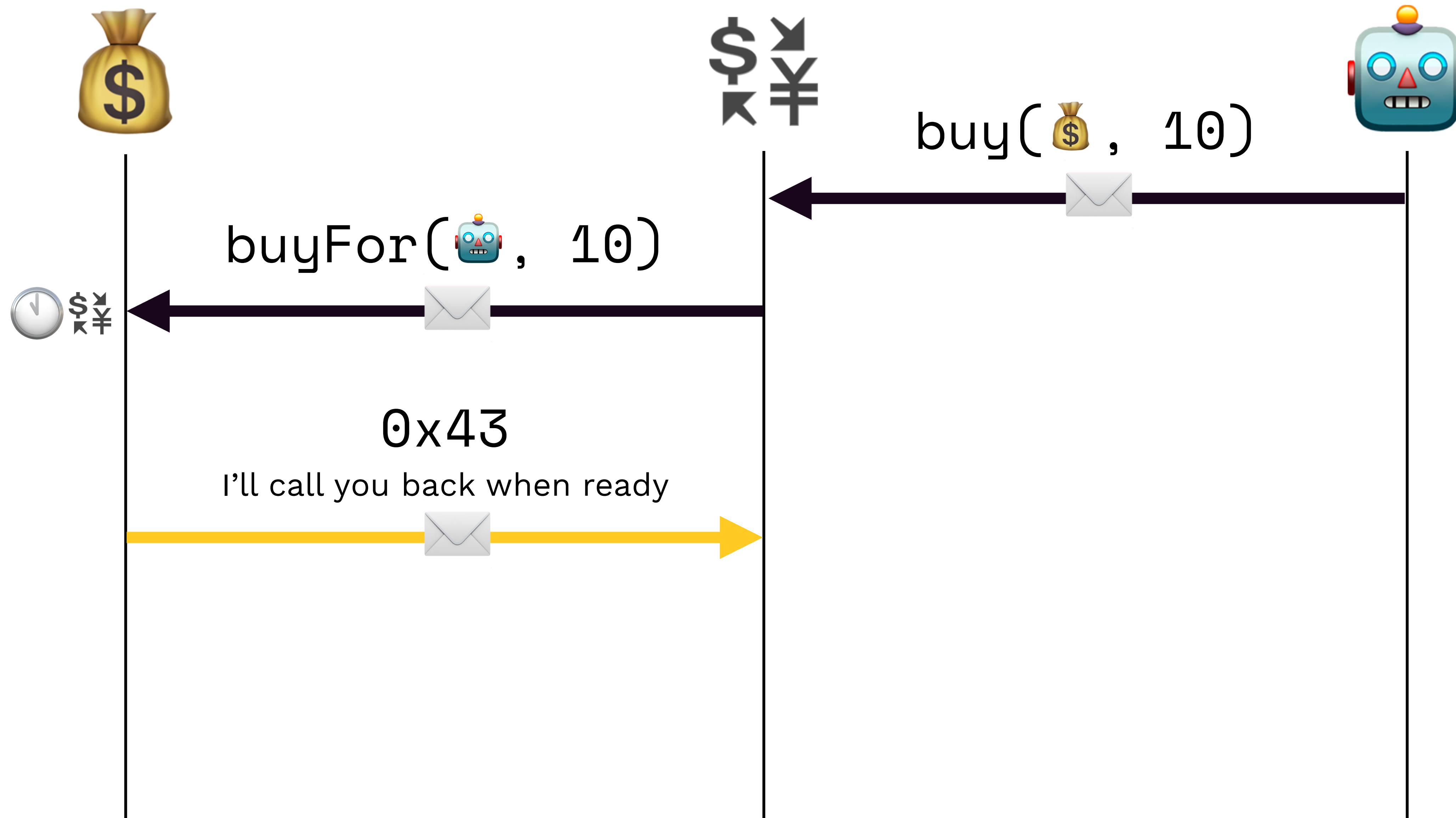
TOY FLOW  
NOT READY YET



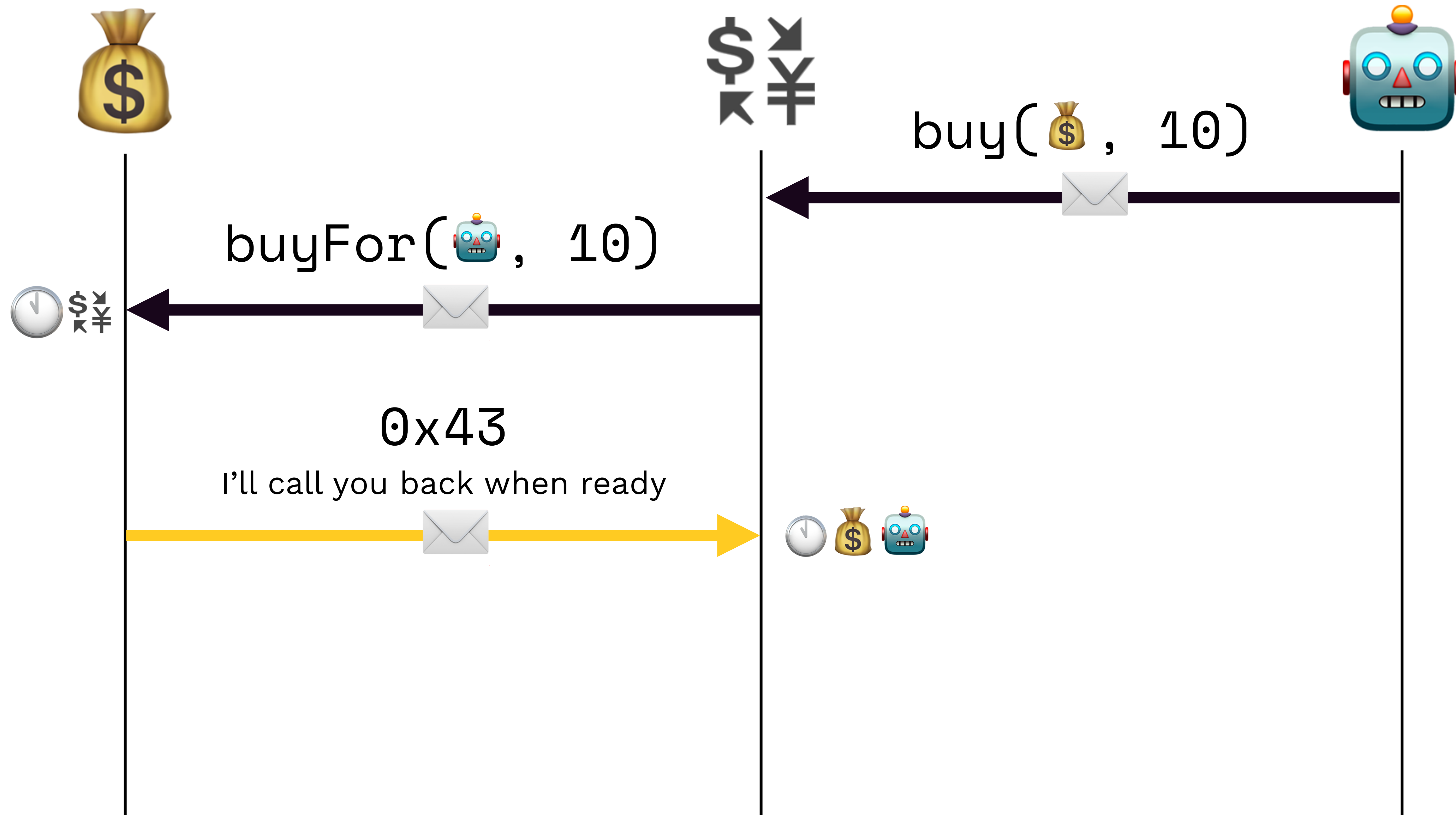
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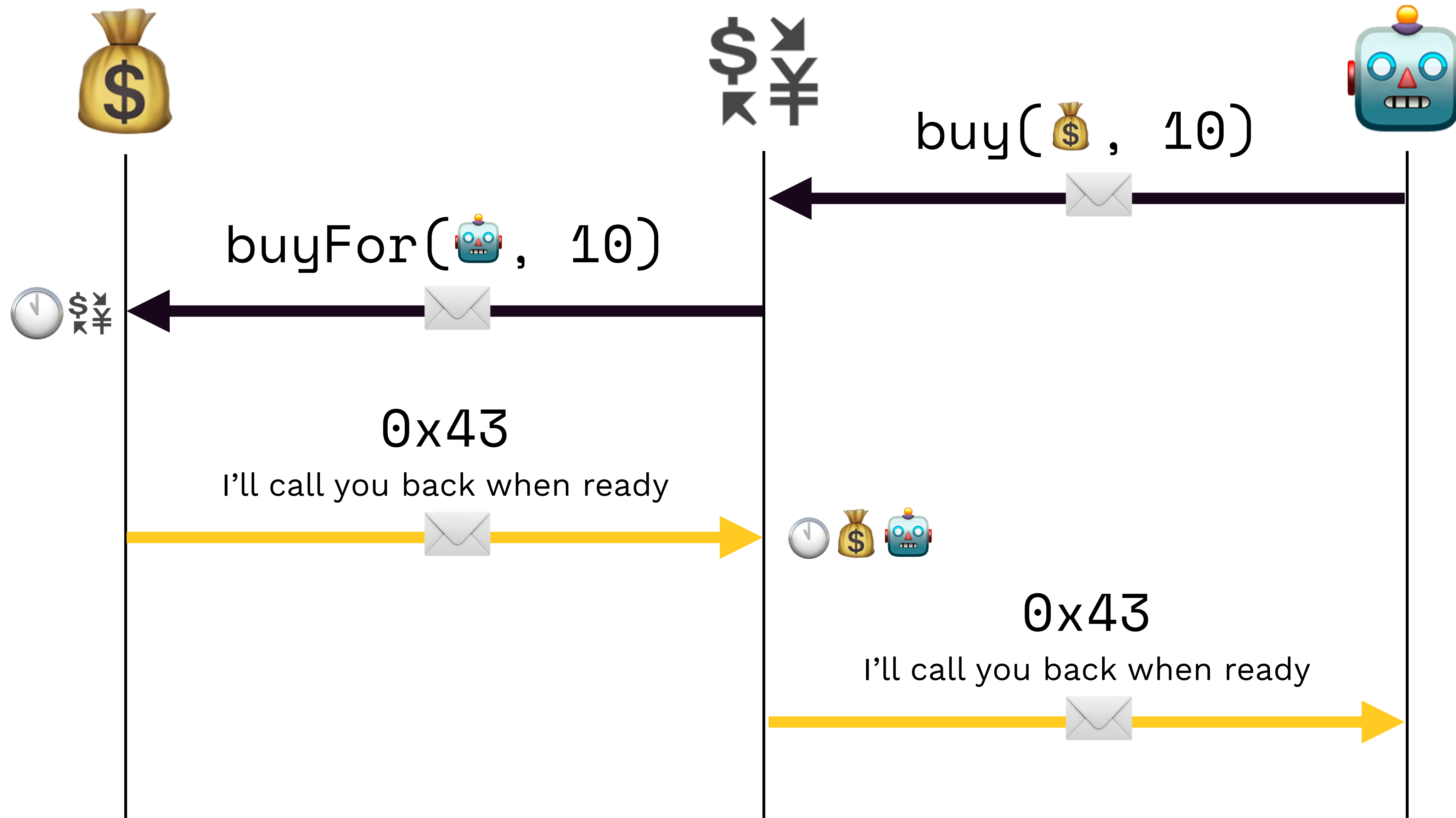
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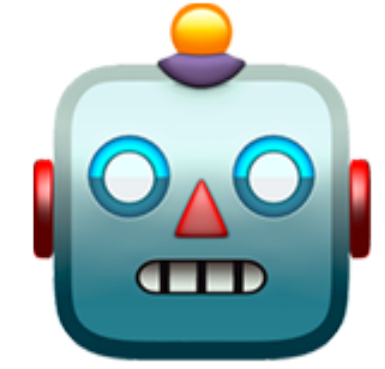
TOY FLOW  
NOT READY YET



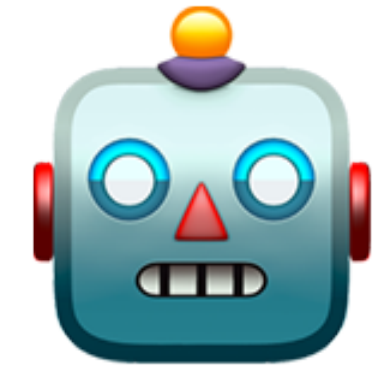
TOY FLOW  
NOT READY YET



# TOY FLOW IMPATIENCE



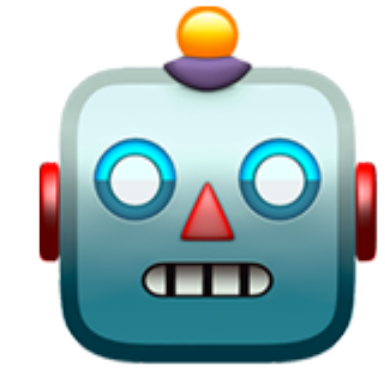
# TOY FLOW IMPATIENCE



isDoneYet



# TOY FLOW IMPATIENCE



isDoneYet



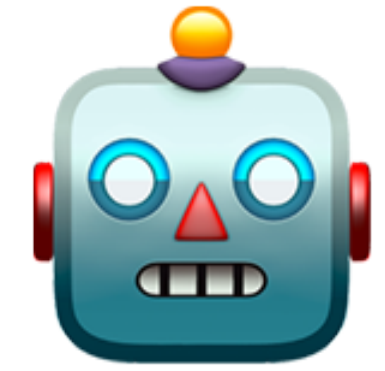
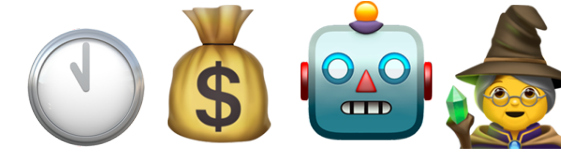
0x43

I'll call you back when ready

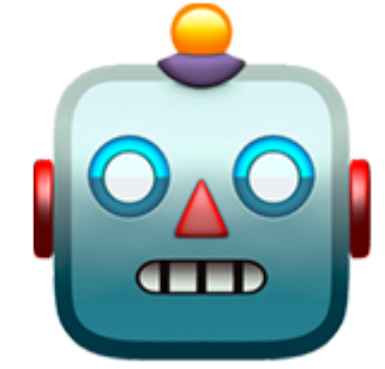




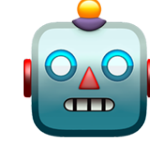
TOY FLOW  
KICK-OFF



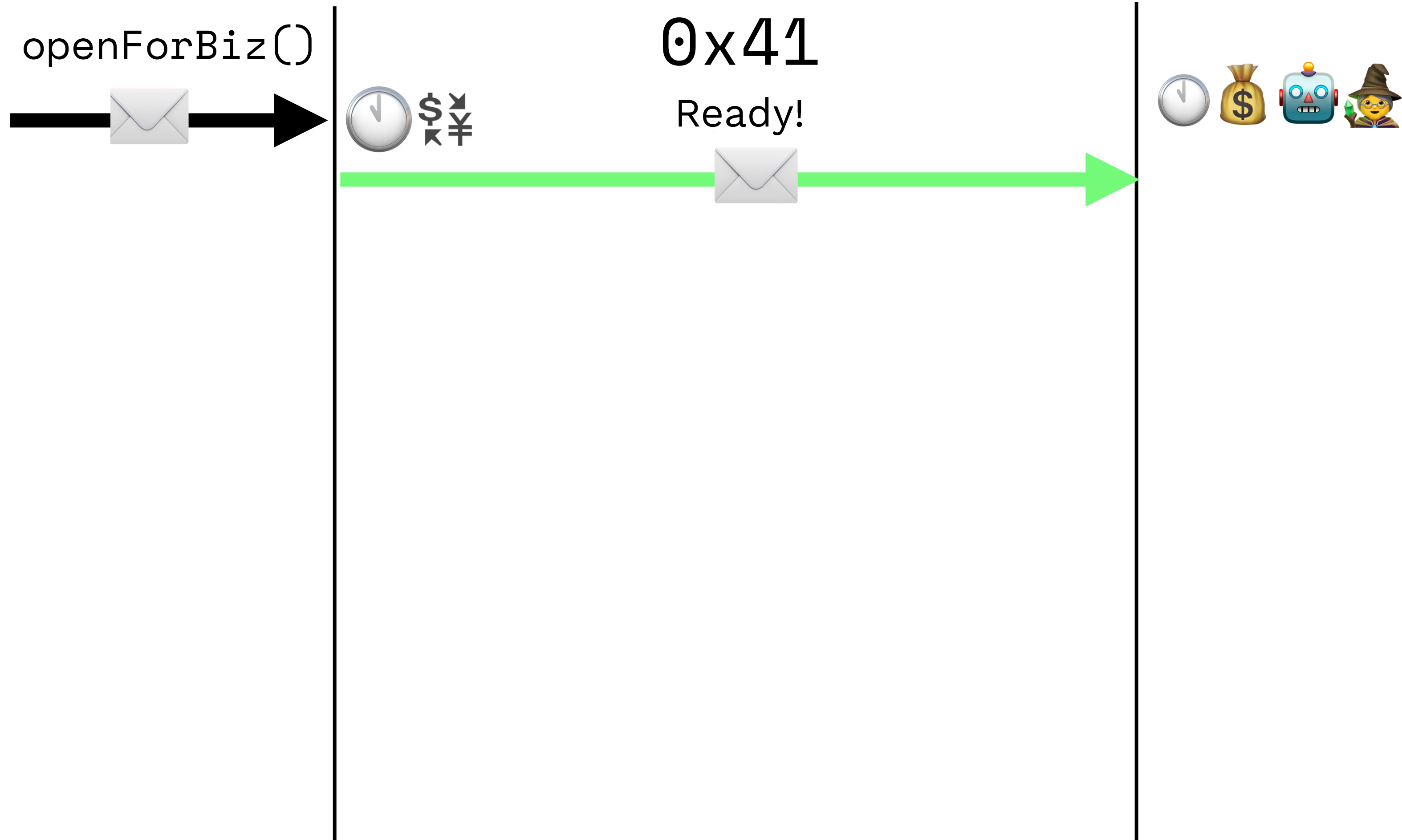
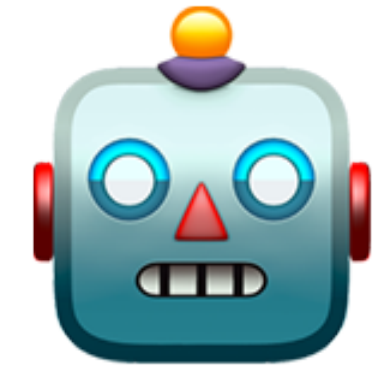
TOY FLOW  
KICK-OFF



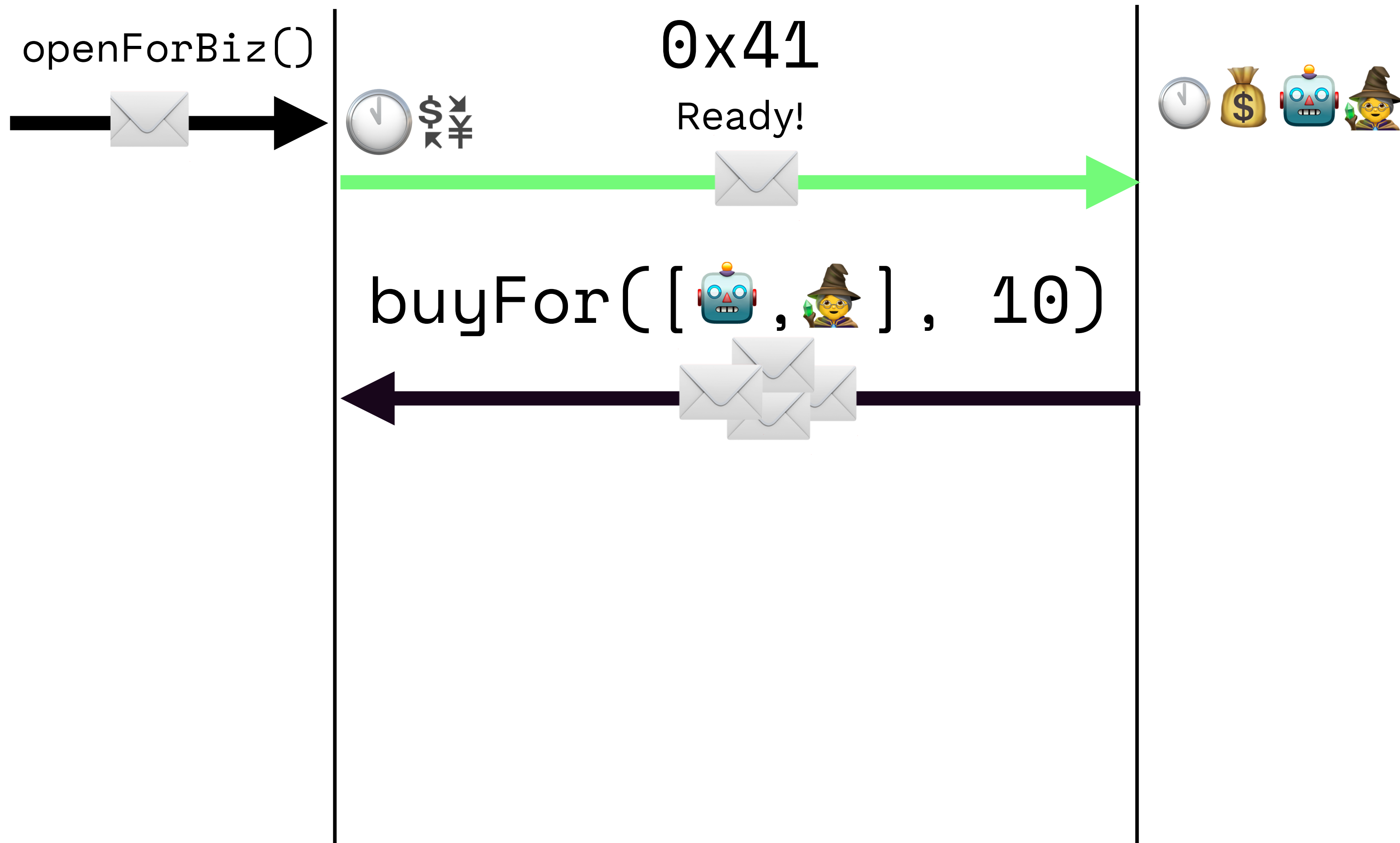
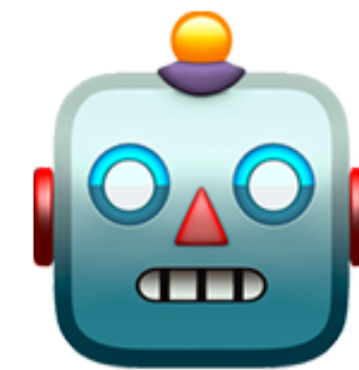
openForBiz()



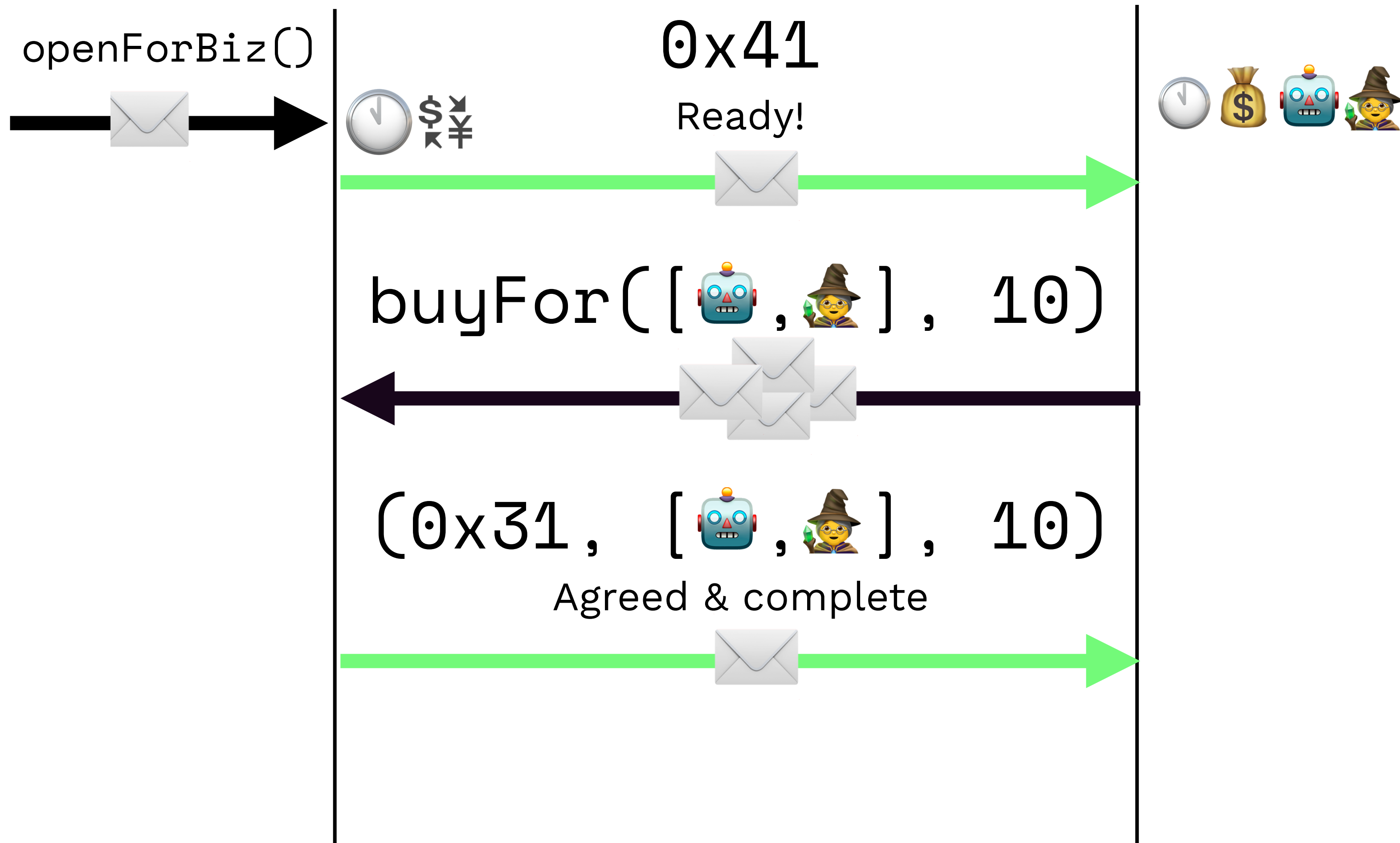
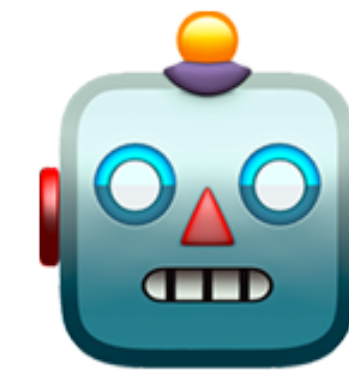
TOY FLOW  
KICK-OFF



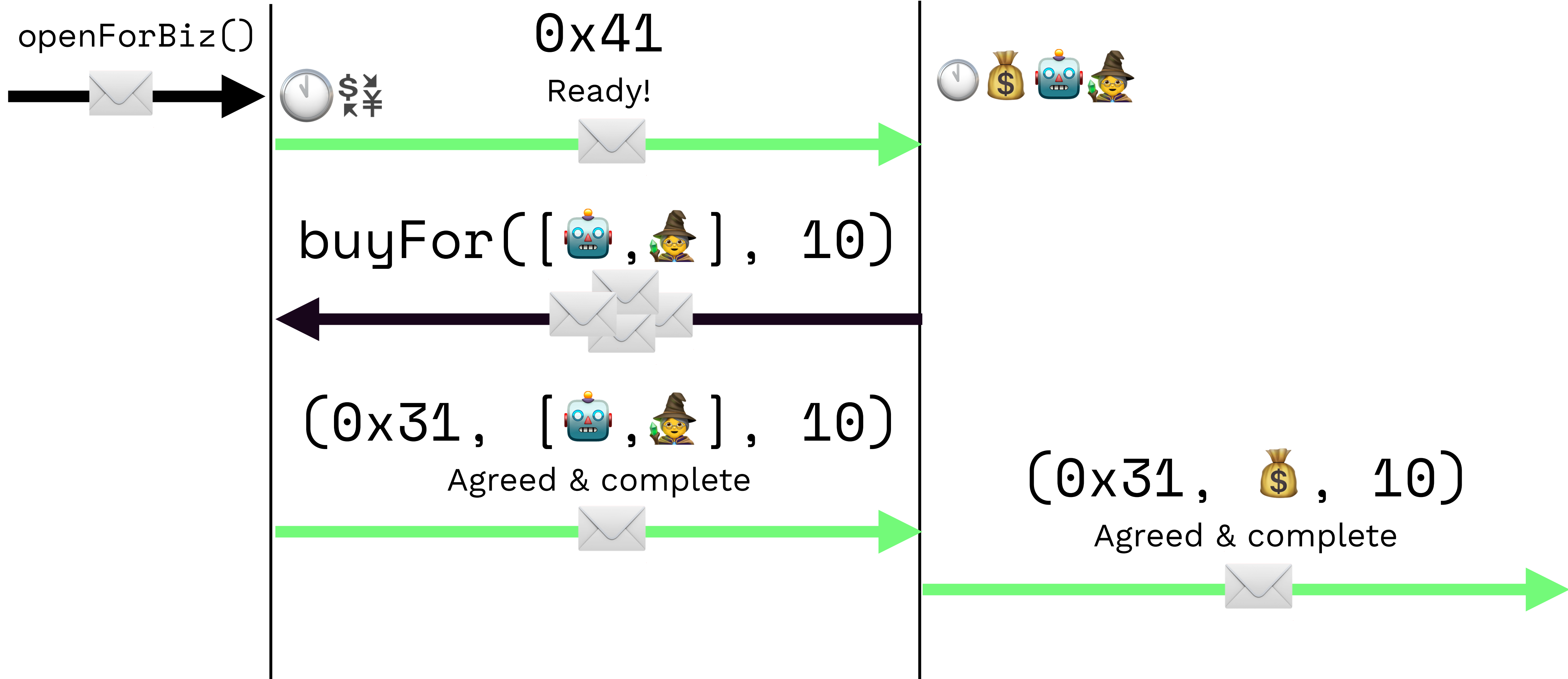
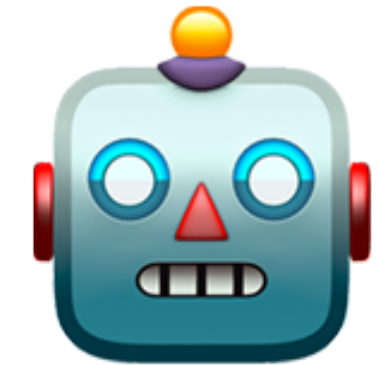
TOY FLOW  
KICK-OFF



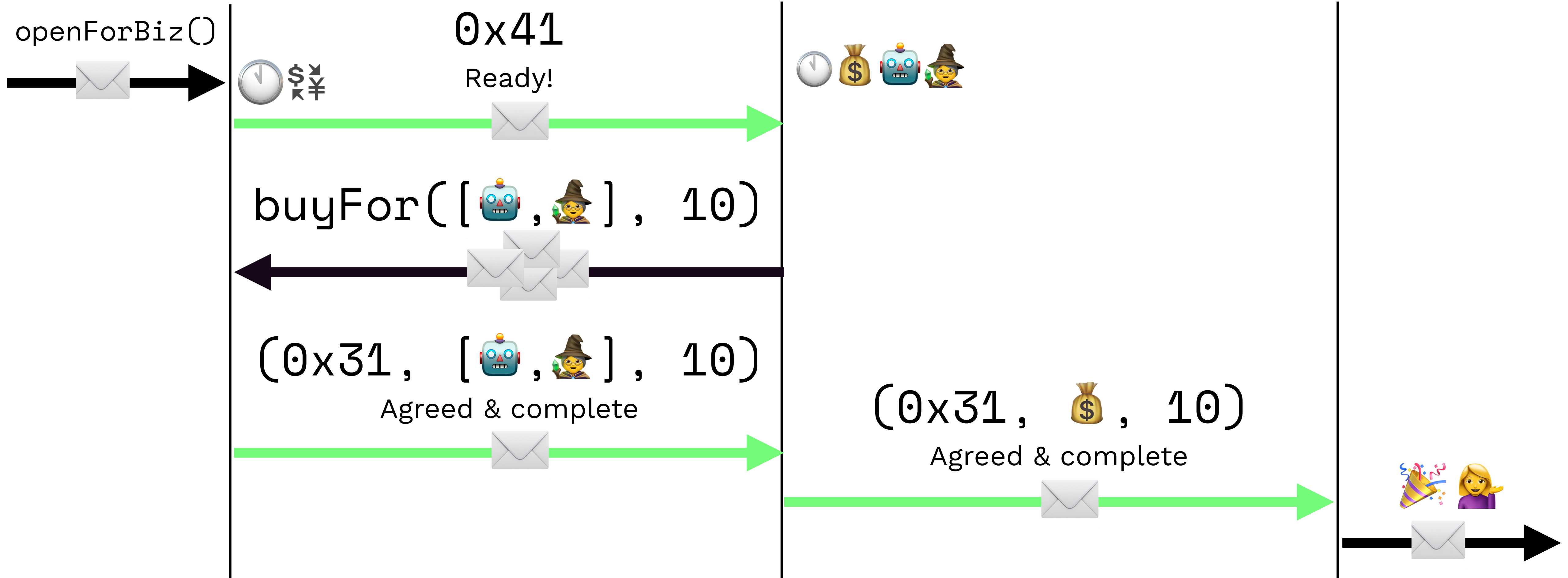
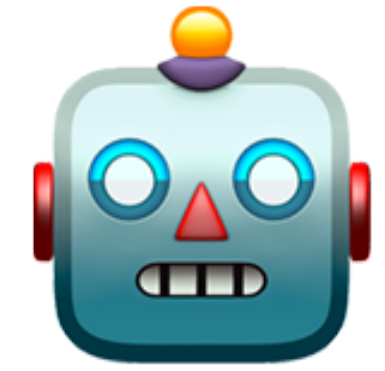
# TOY FLOW KICK-OFF



TOY FLOW  
KICK-OFF



TOY FLOW  
KICK-OFF



MOTIVATING MORE CONTEXT



# MOTIVATING MORE CONTEXT

 GREATER THAN BOOLEANS 

## MOTIVATING MORE CONTEXT

To make use of a Boolean, you have to know its provenance  
so that you can **know what it means.**



*CONOR MCBRIDE [VIA HARPER]*

# MOTIVATING MORE CONTEXT

## ERC-902

Ethereum Improvement Proposals

All Core Networking Interface ERC Informational Meta

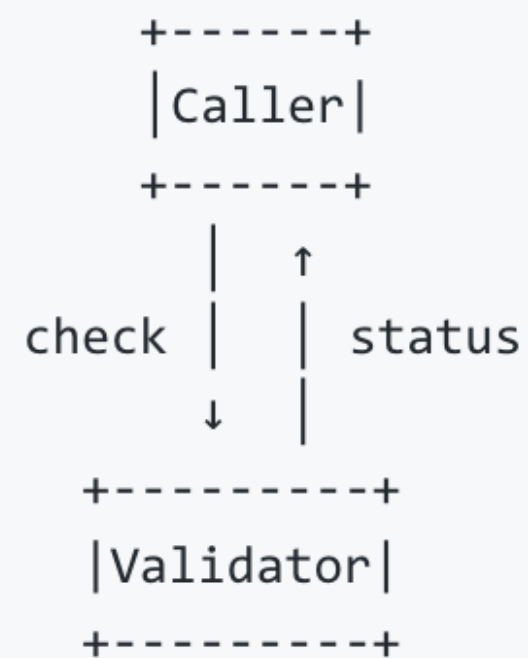
### EIP 902: Token Validation <>

Author	<a href="#">Brooklyn Zelenka</a> , <a href="#">Tom Carchrae</a> , <a href="#">Gleb Naumenko</a>
Status	Draft
Type	Standards Track
Category	ERC
Created	2018-02-14

#### Simple Summary

A protocol for services providing token ownership and transfer validation.

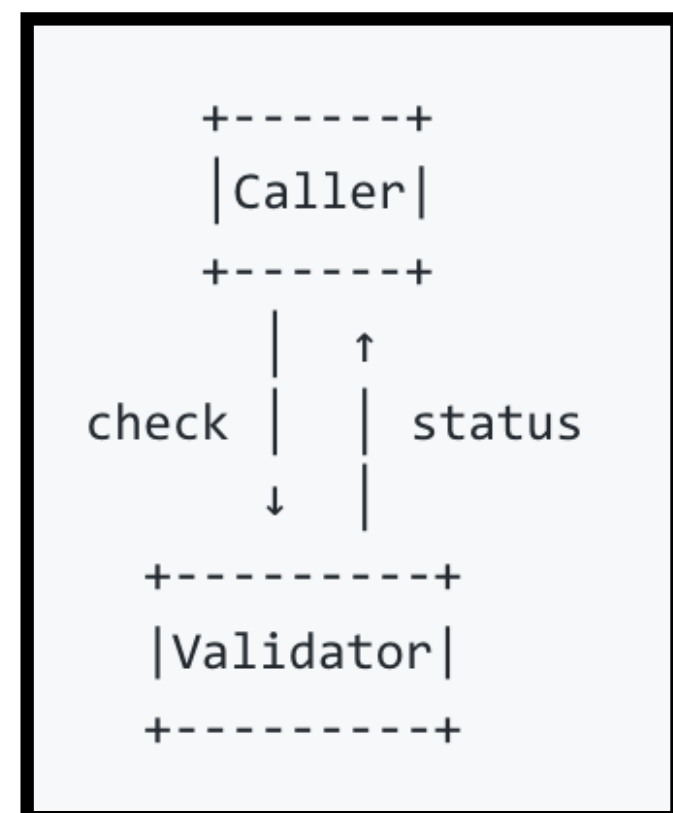
#### Abstract



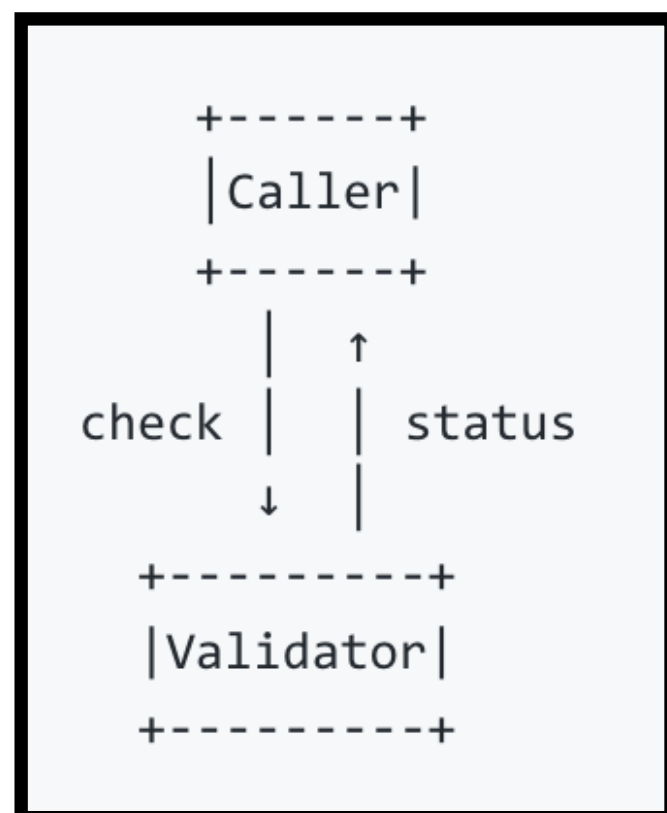
```
interface TokenValidator {
    function check(
        address _token,
        address _subject
    ) public returns(byte result)

    function check(
        address _token,
        address _from,
        address _to,
        uint256 _amount
    ) public returns (byte result)
}
```

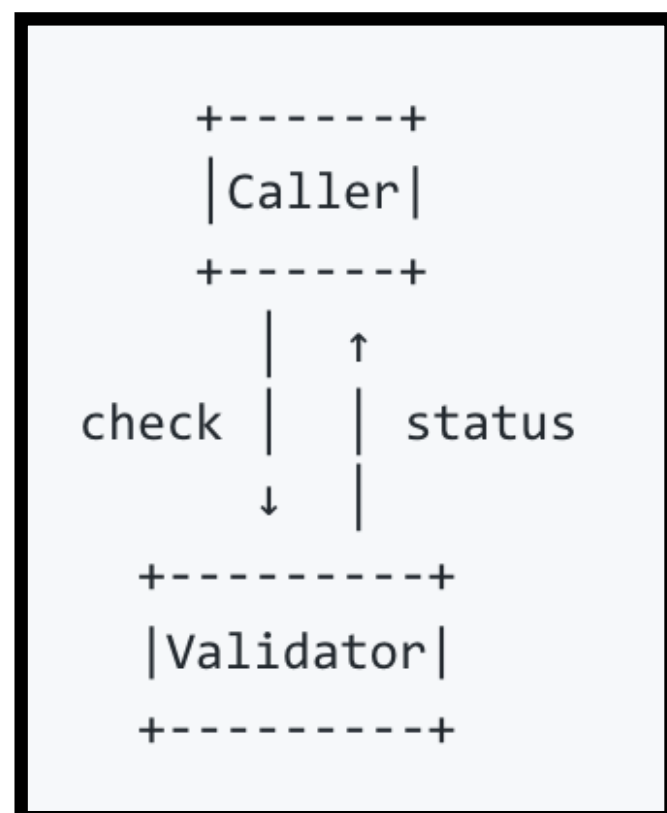
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



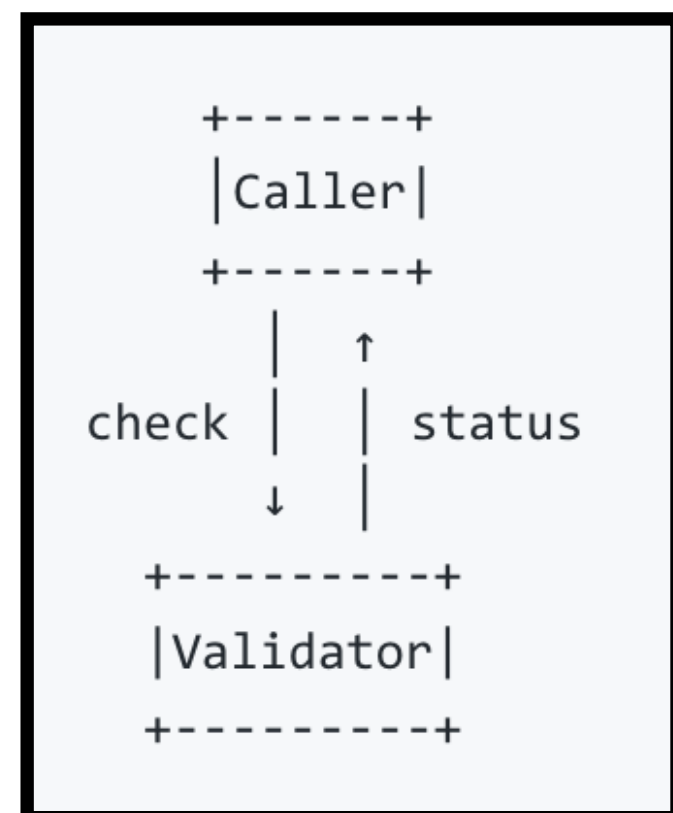
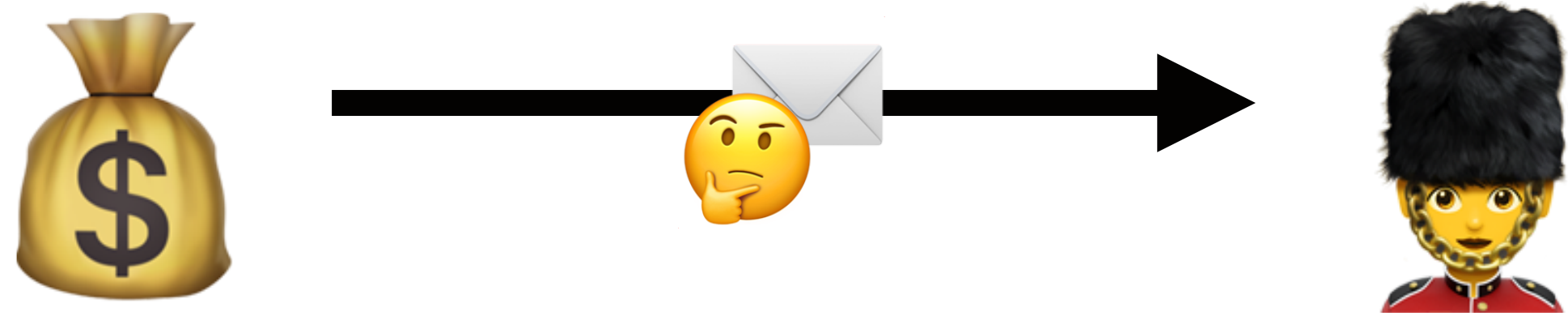
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



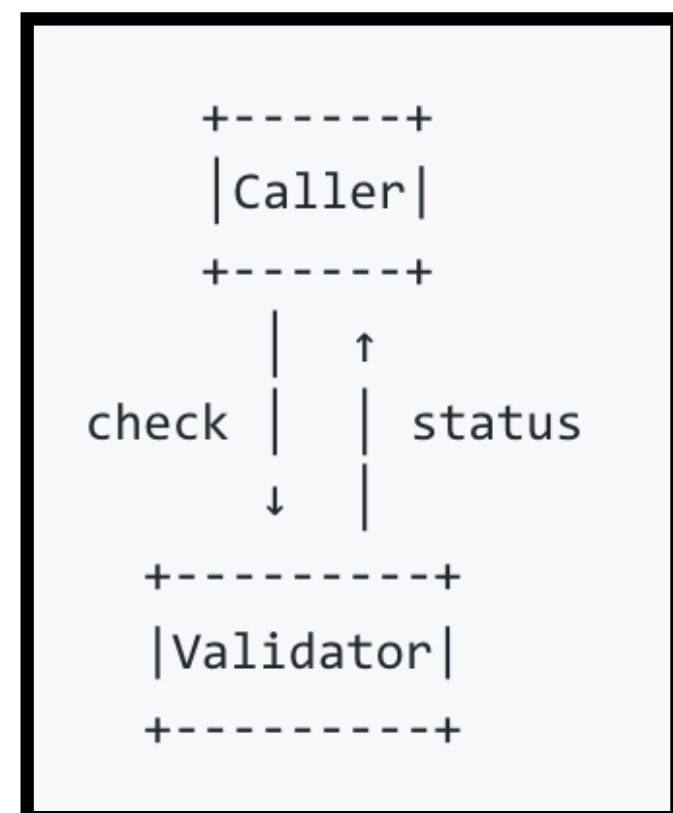
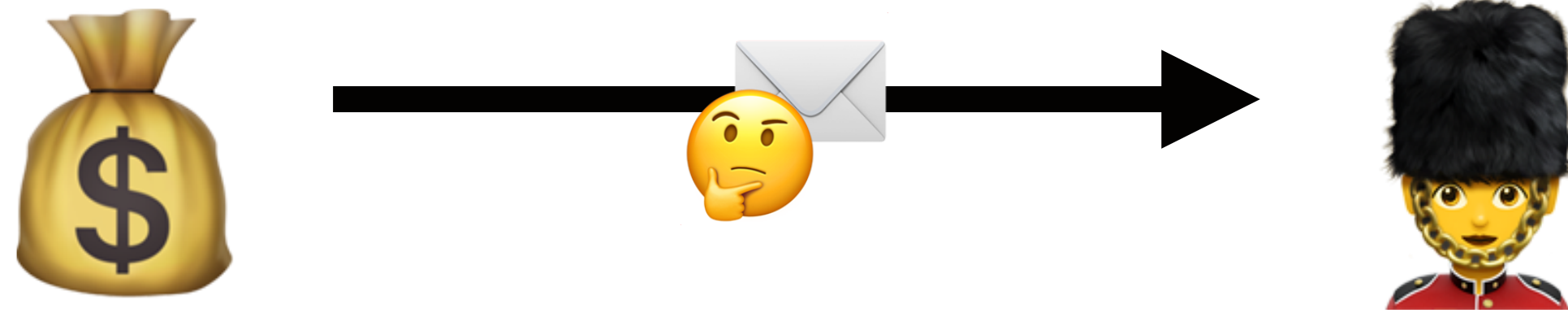
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS

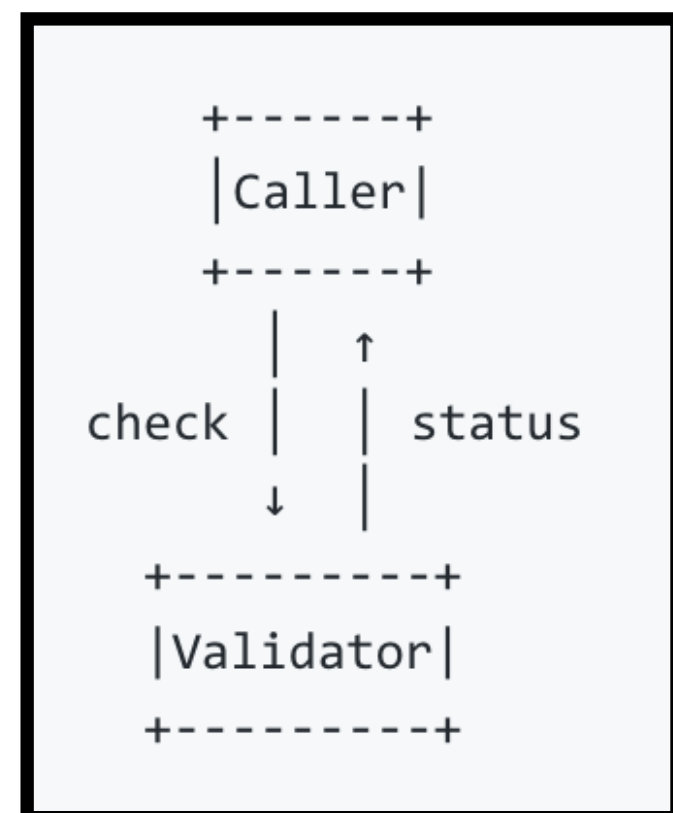
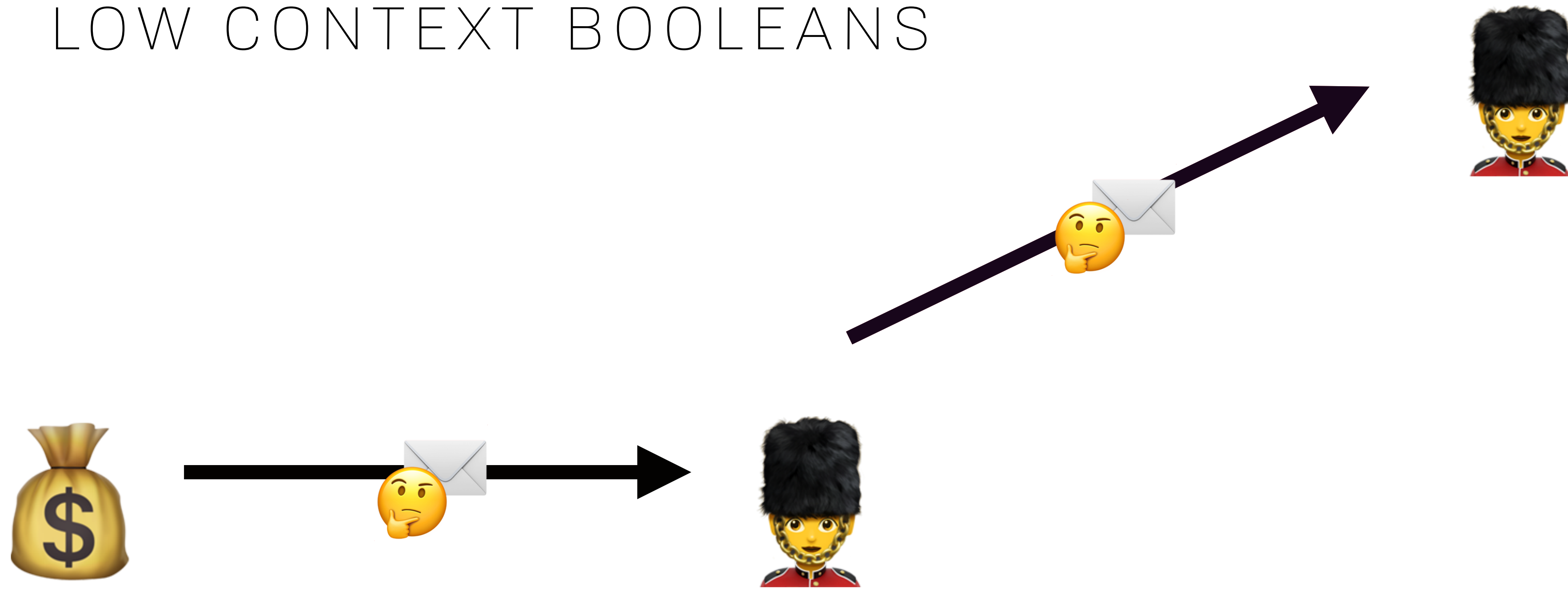


# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS

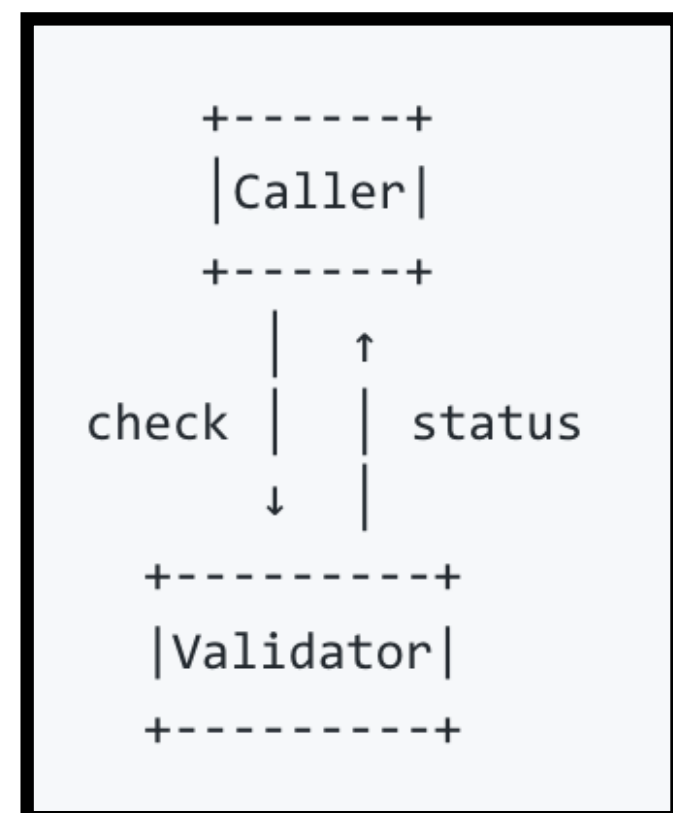
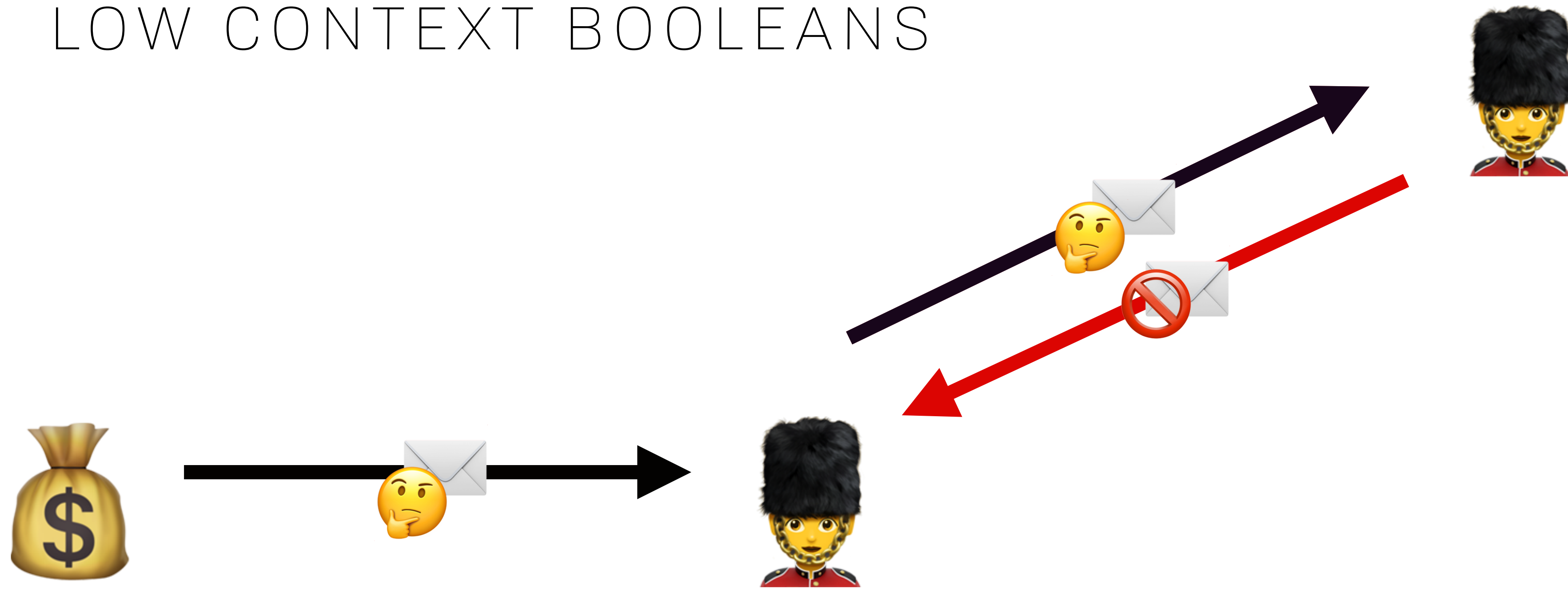




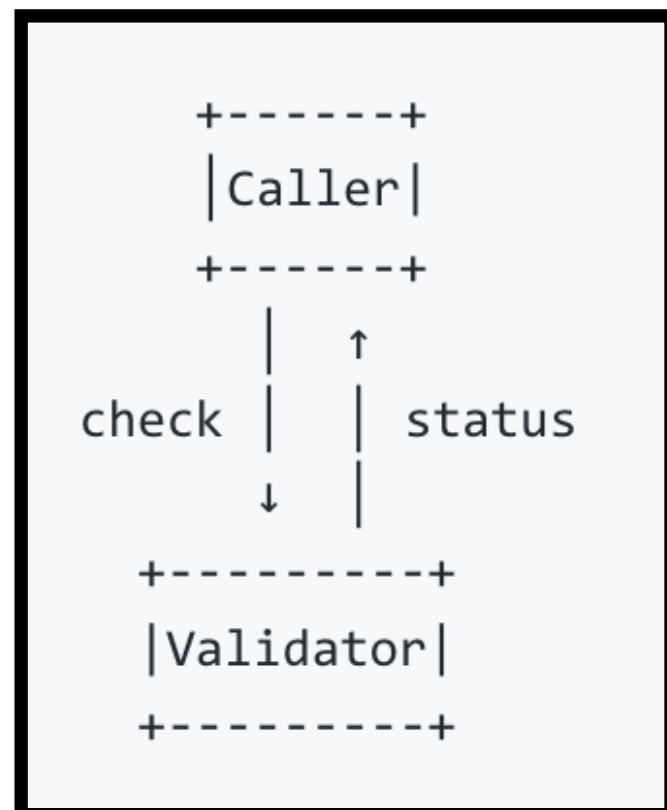
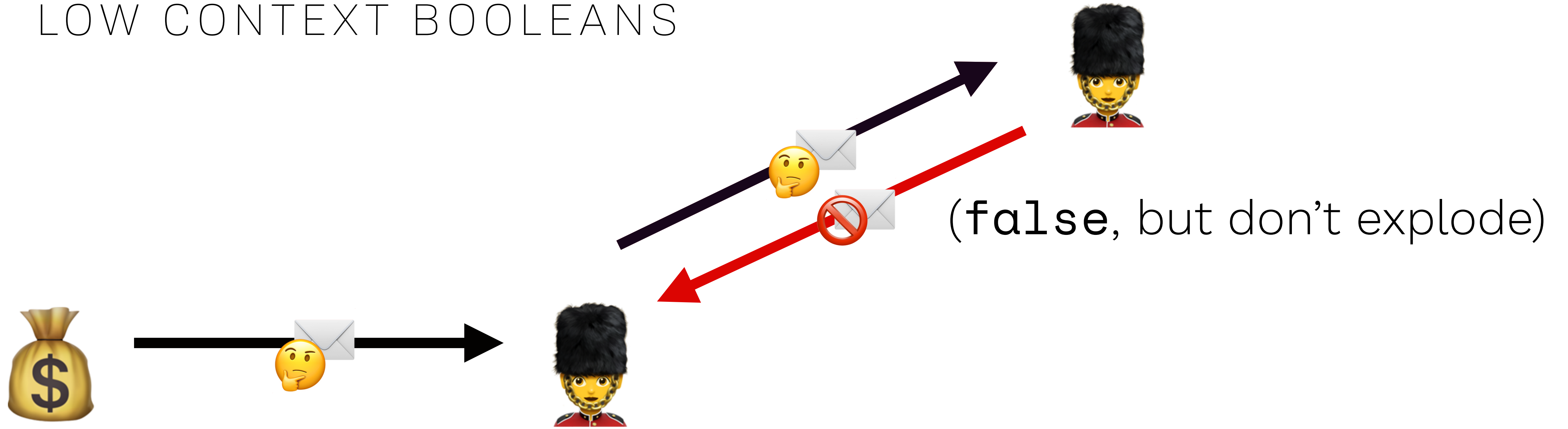
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



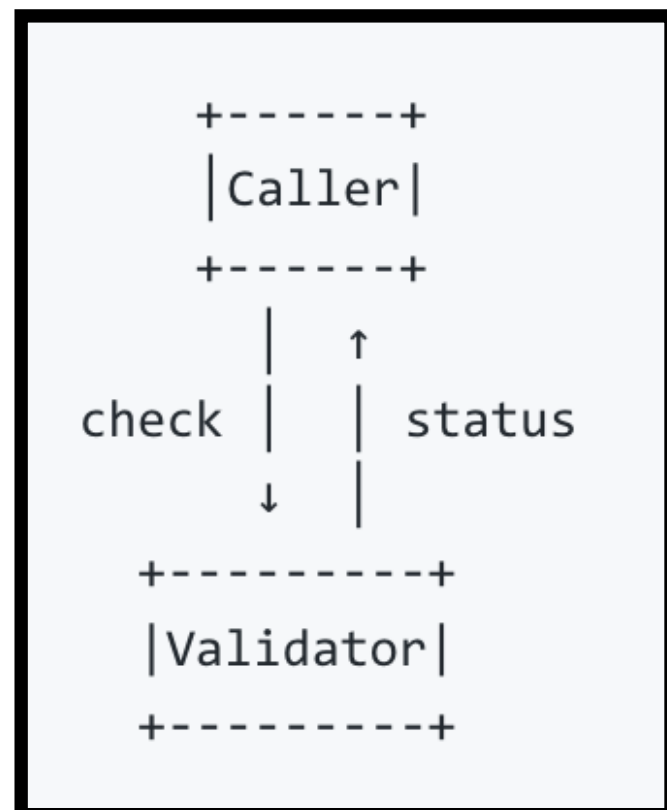
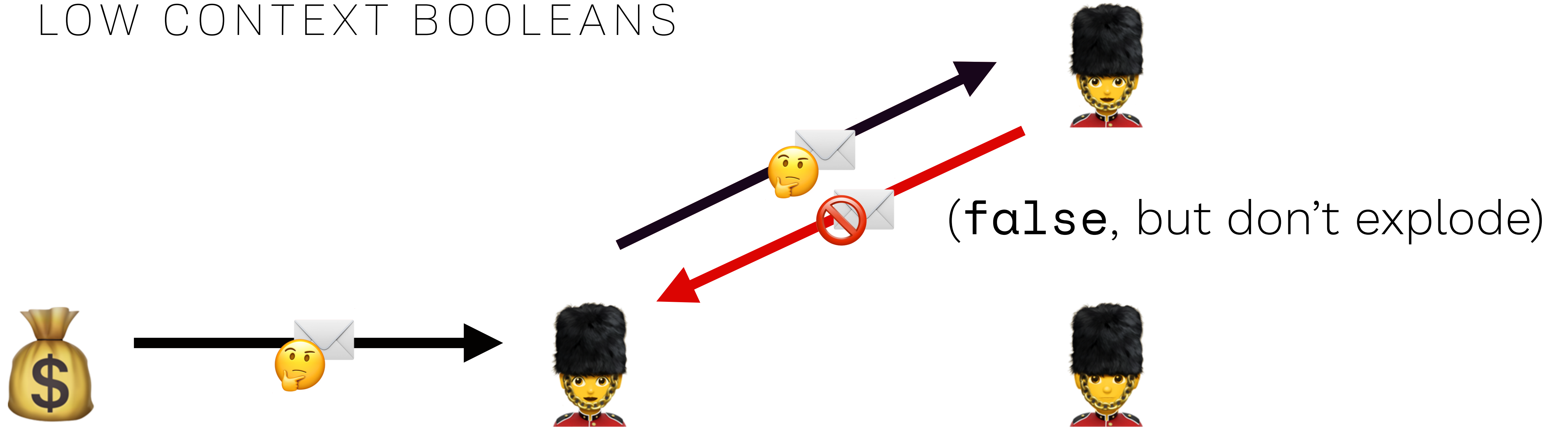
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



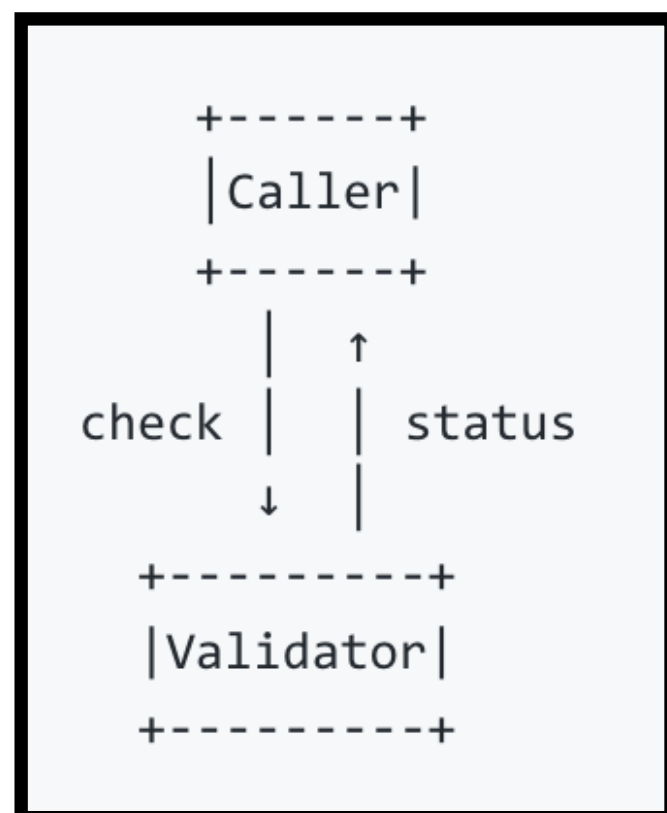
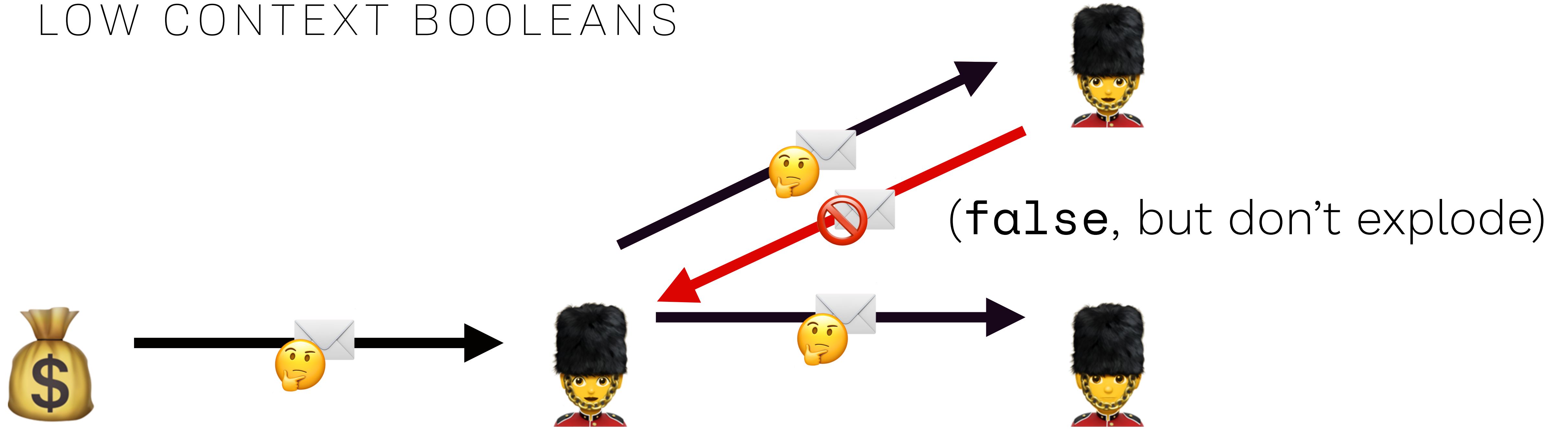
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



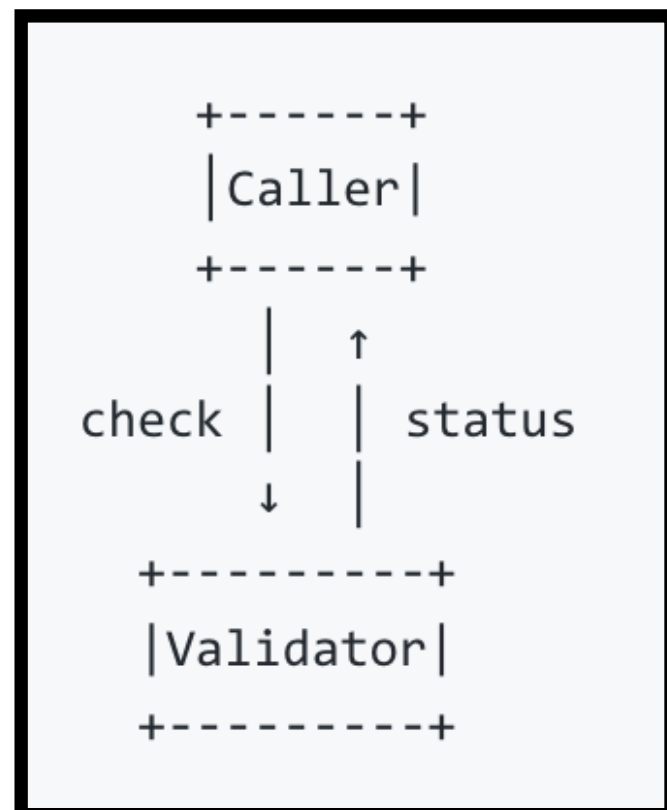
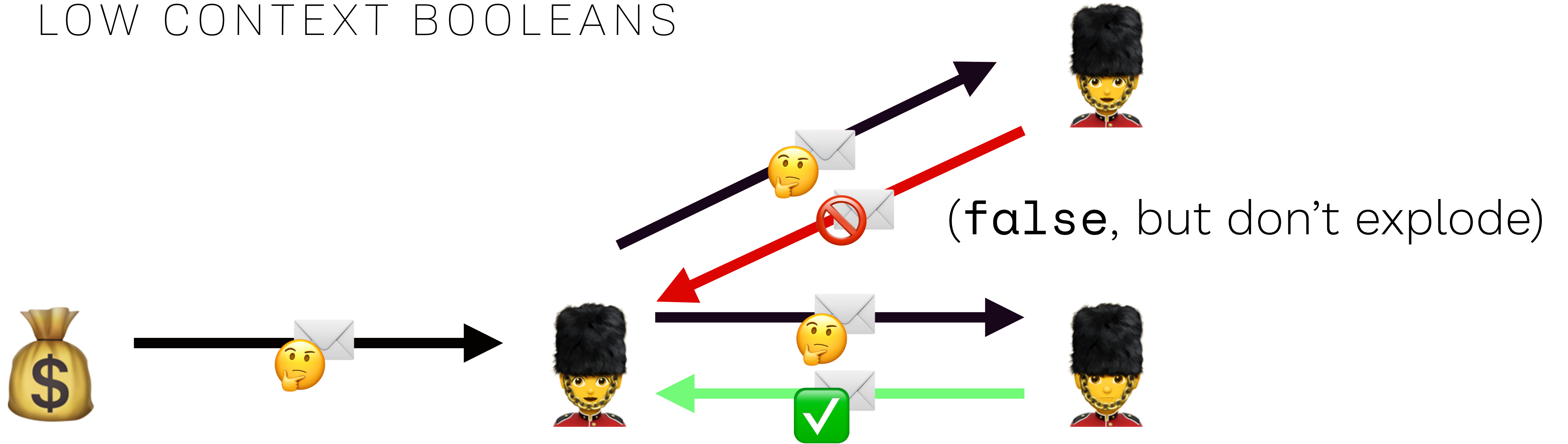
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



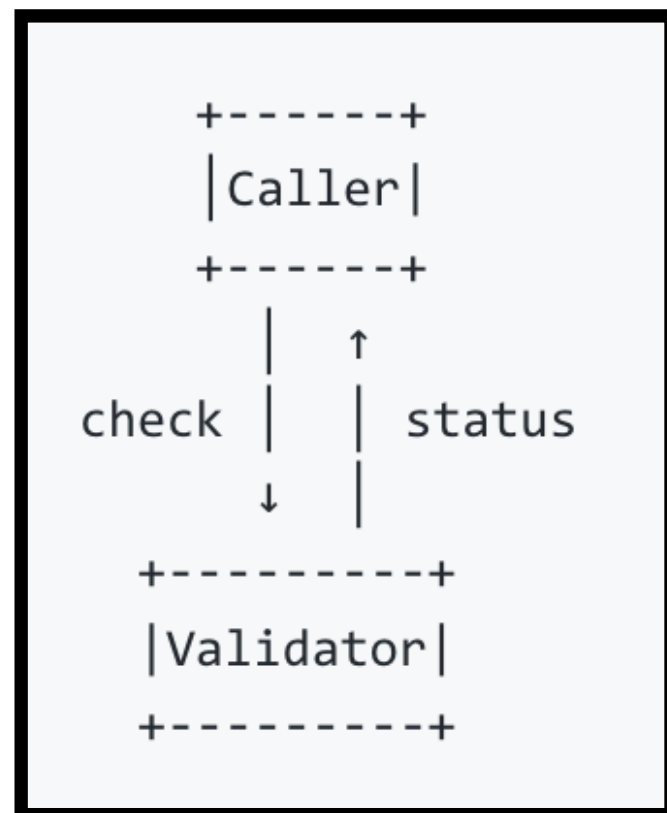
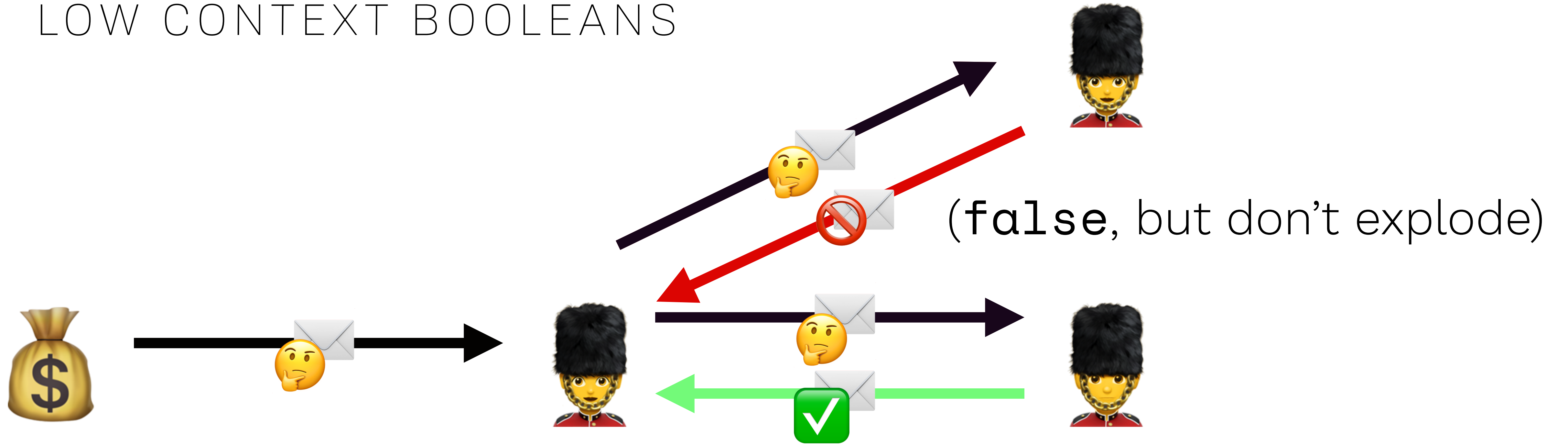
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



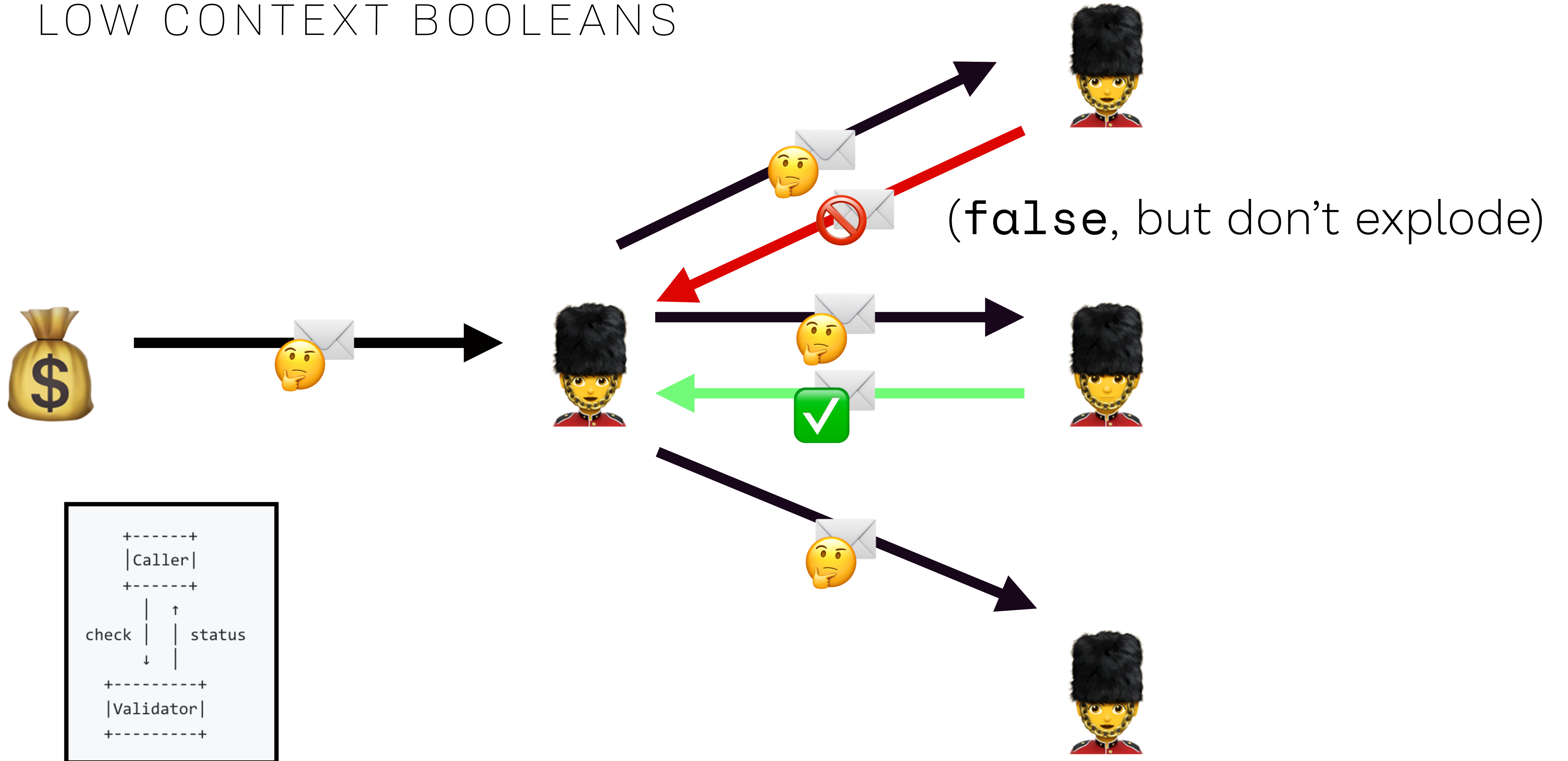
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS

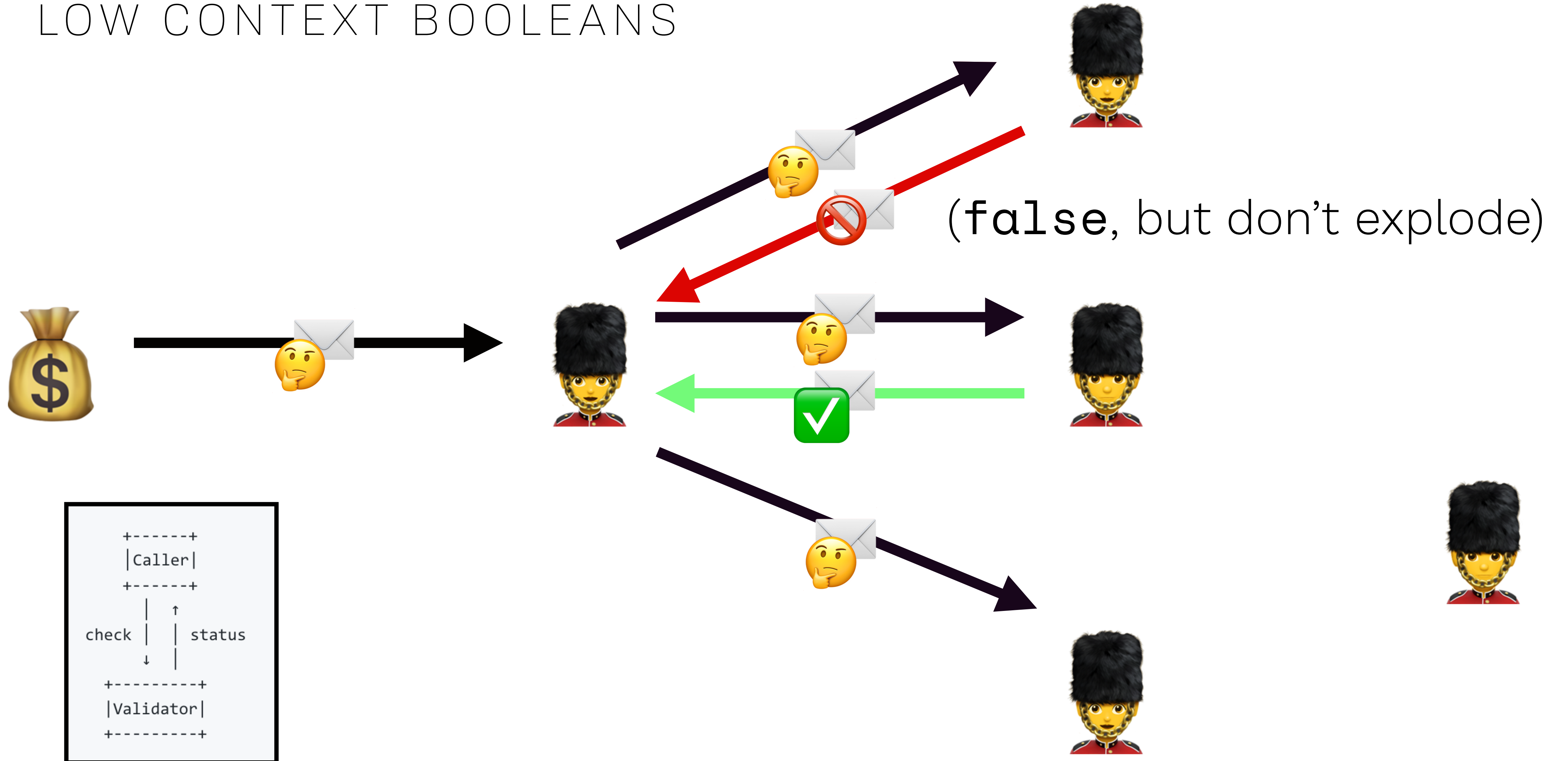


# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS

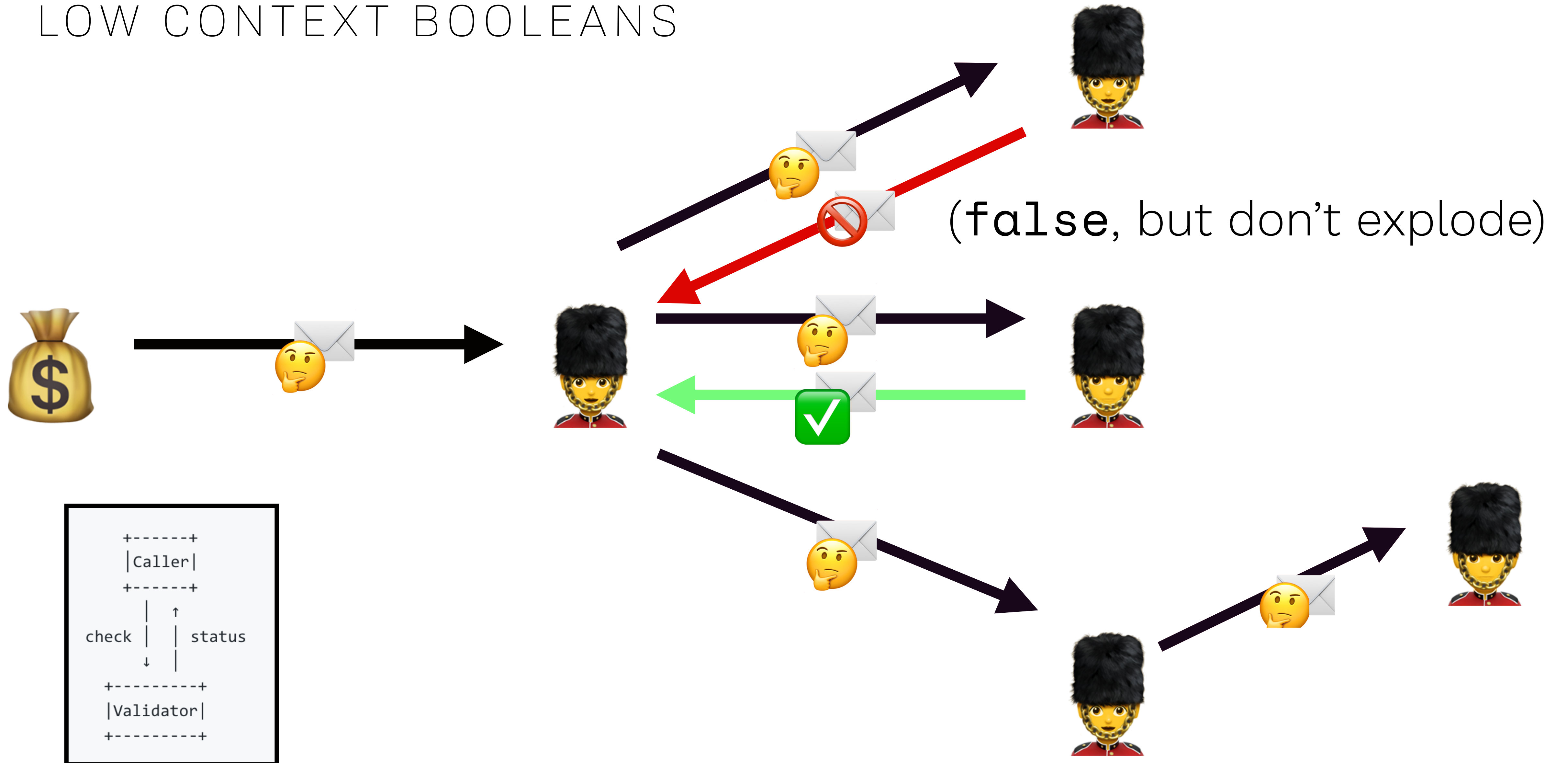




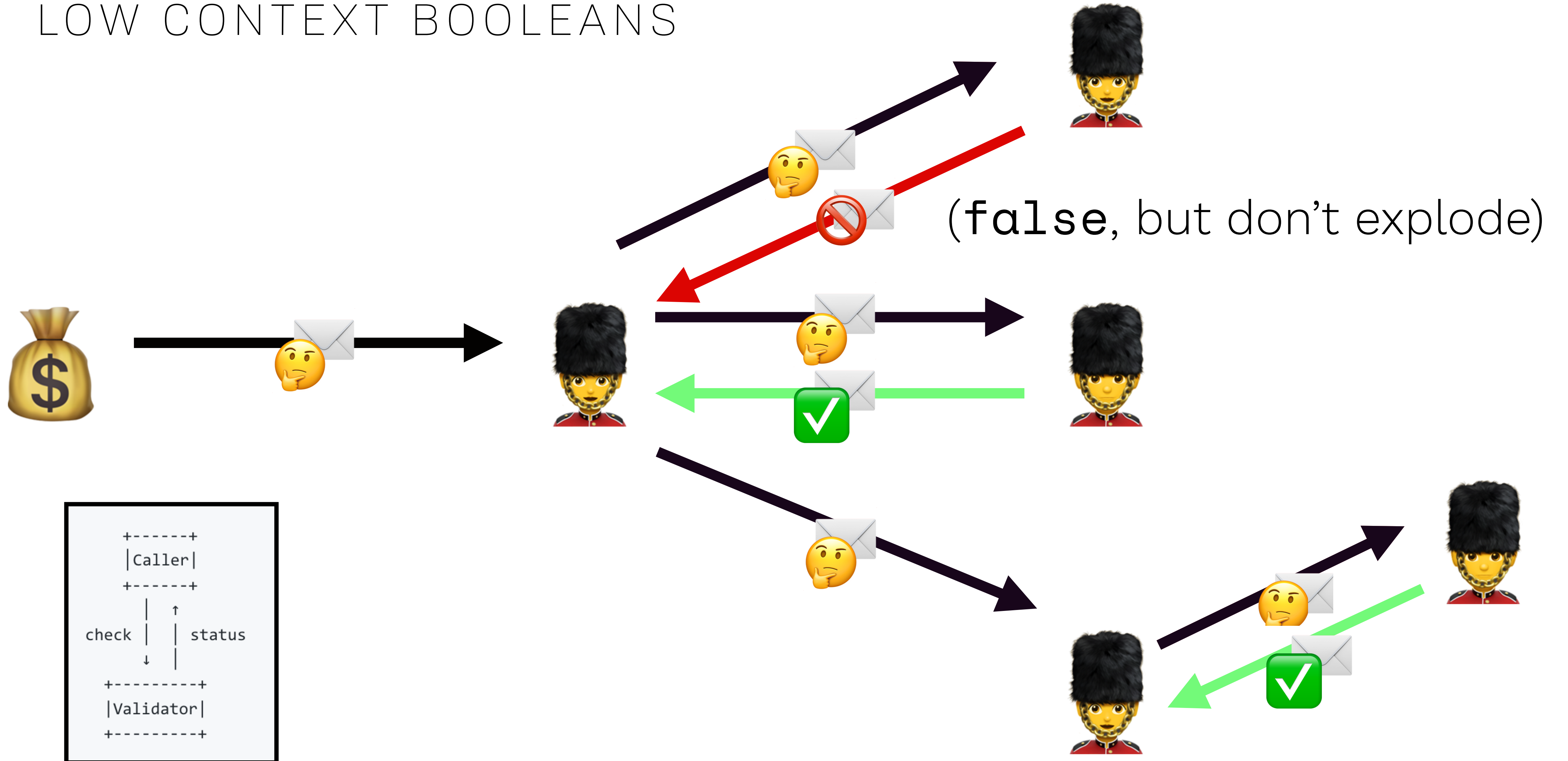
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



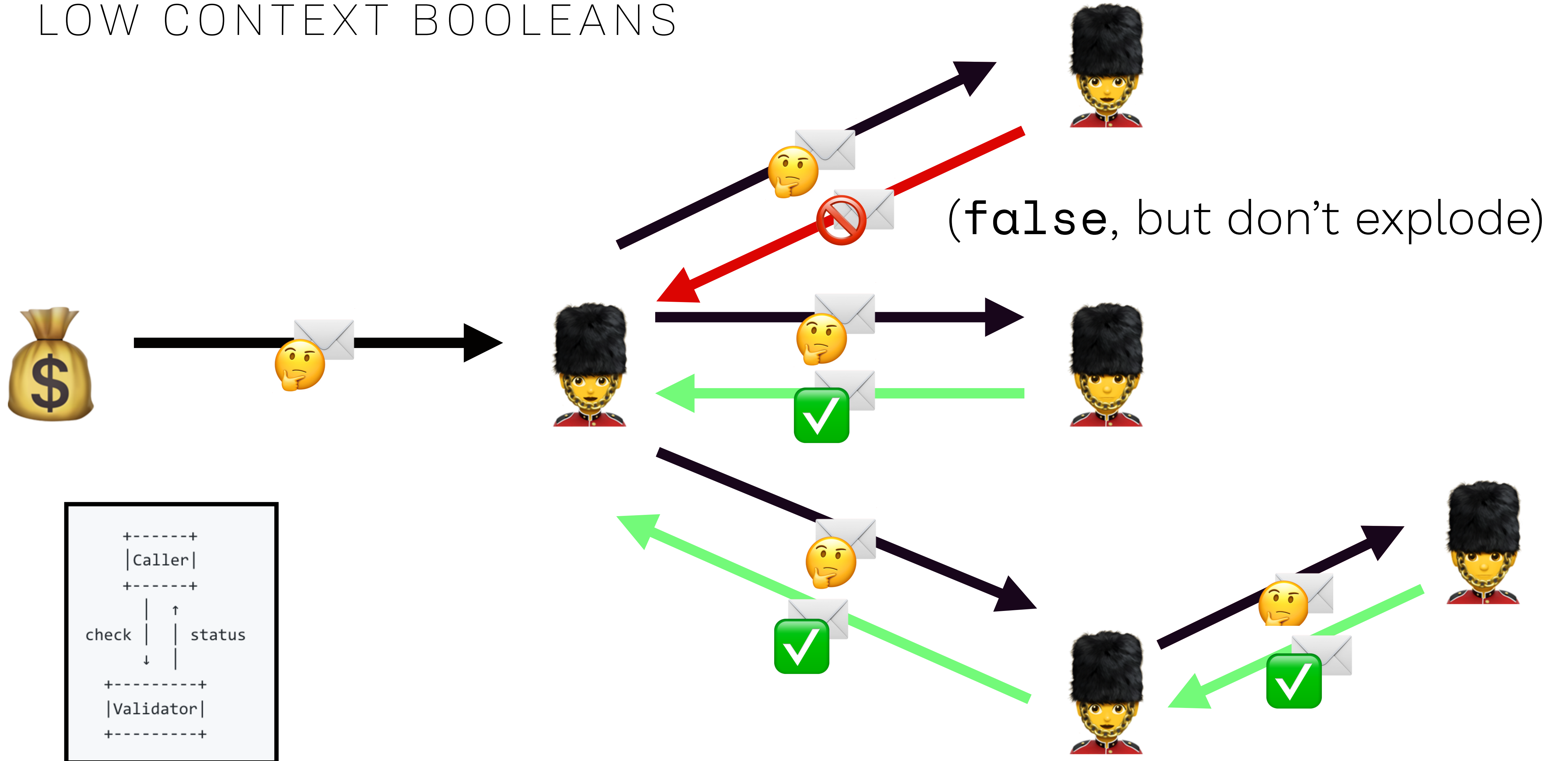
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



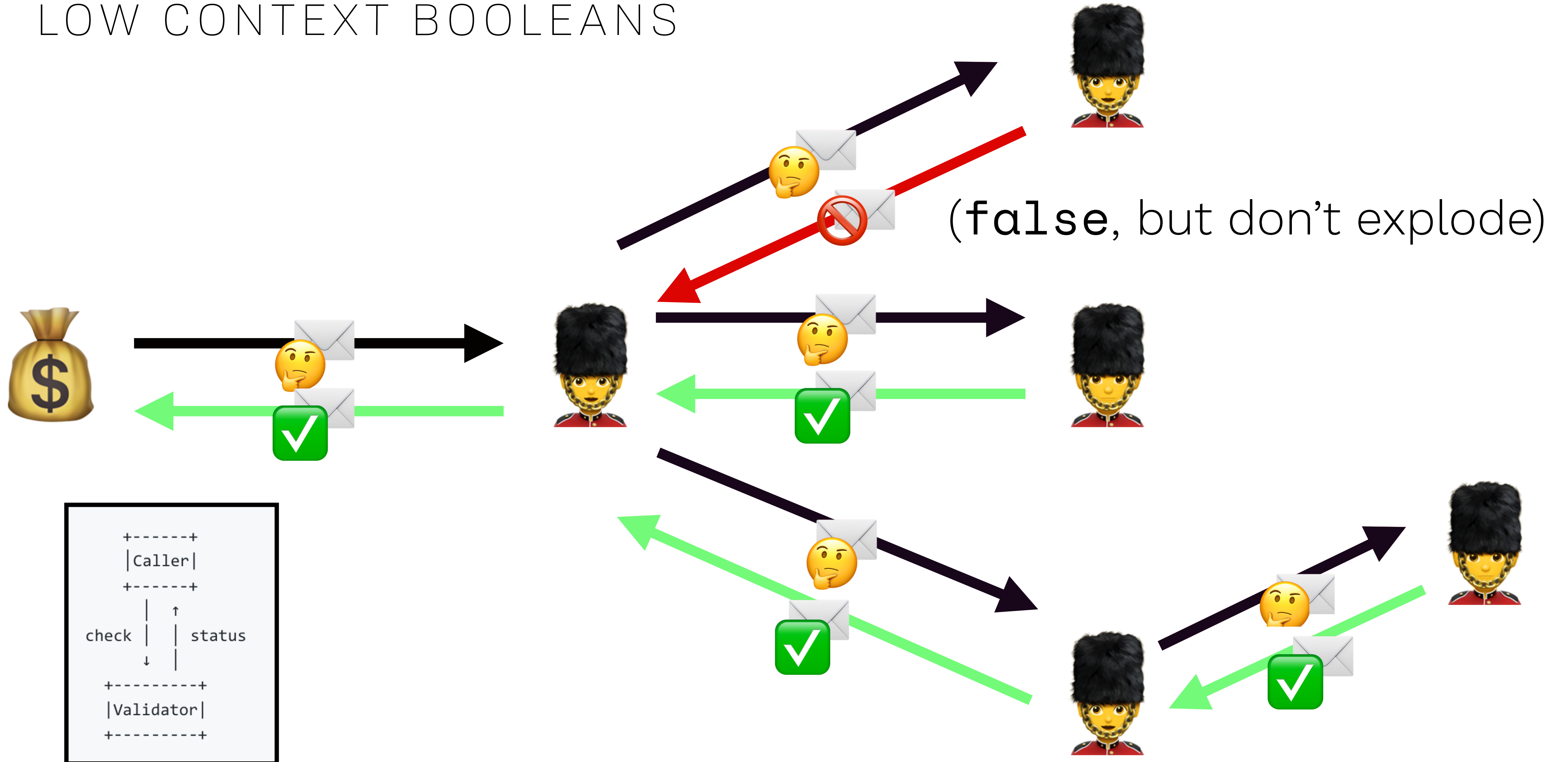
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



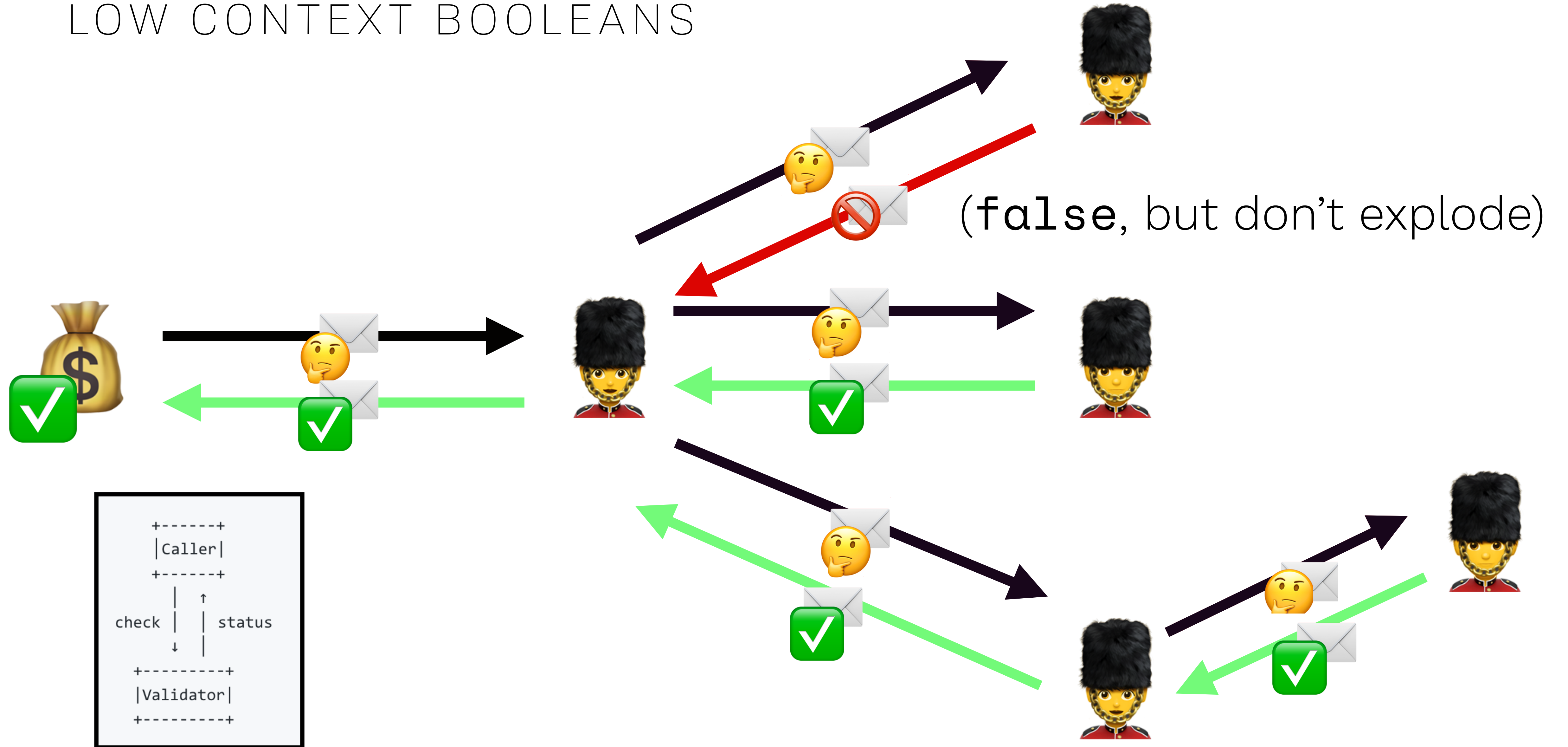
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



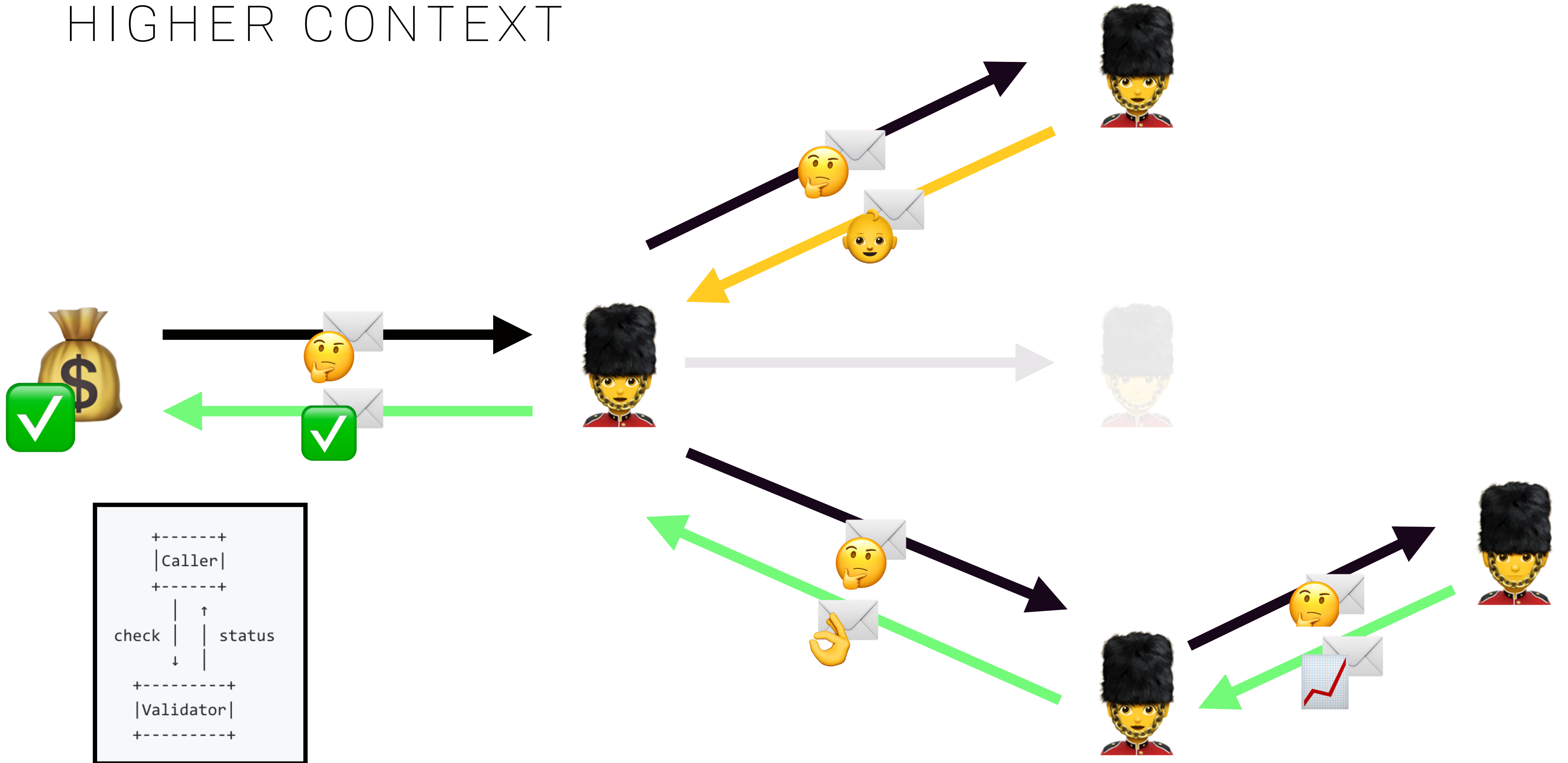
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



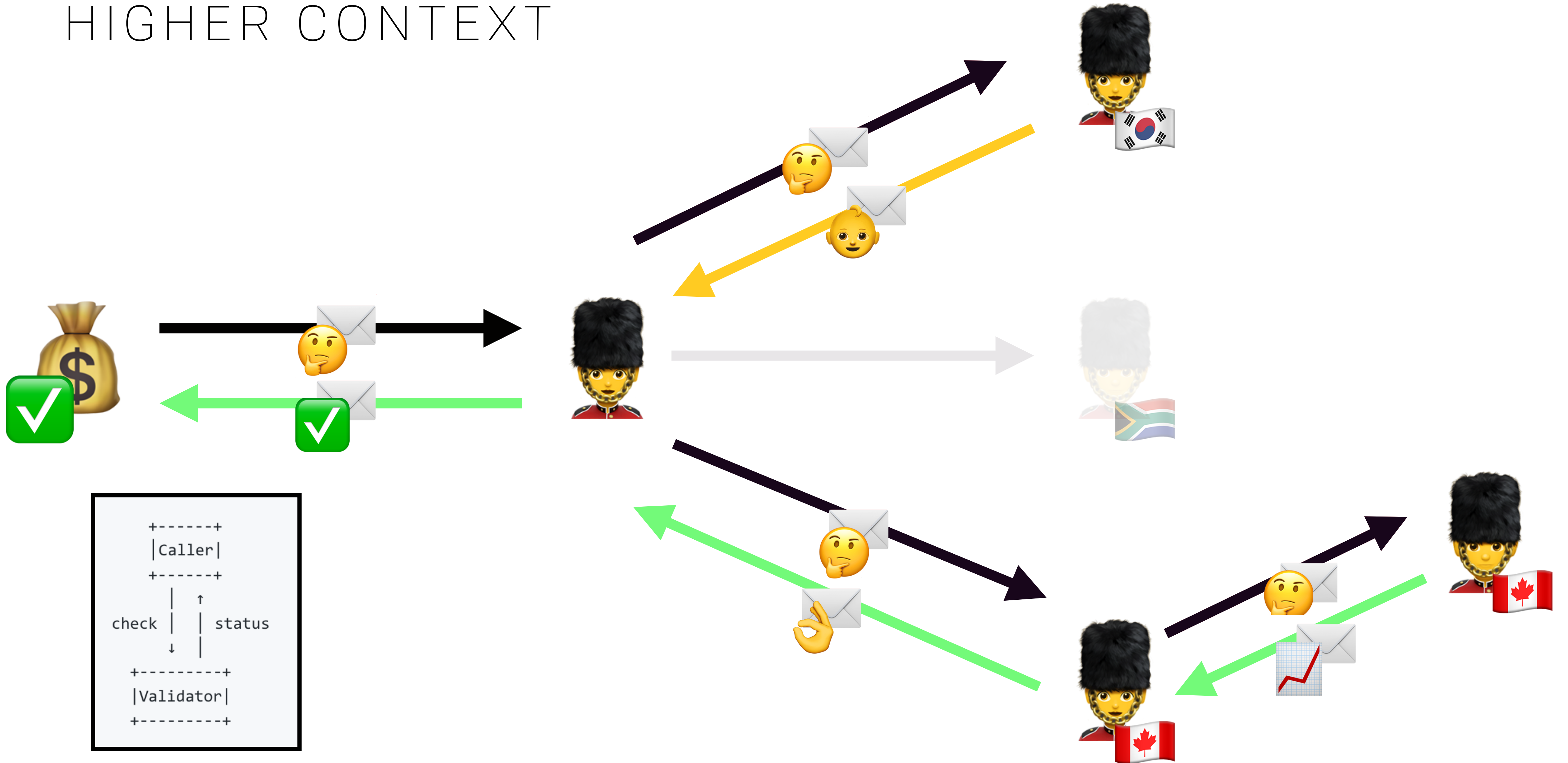
# MOTIVATING MORE CONTEXT LOW CONTEXT BOOLEANS



# MOTIVATING MORE CONTEXT HIGHER CONTEXT



# MOTIVATING MORE CONTEXT HIGHER CONTEXT





USER FEEDBACK

# USER FEEDBACK



USER FEEDBACK

EVOLUTION OF **revert()**

USER FEEDBACK

# EVOLUTION OF `revert()`

[Contract 0xfe6f2a4991f002c1582fe51d30efbfa42986a4e6 Created] 

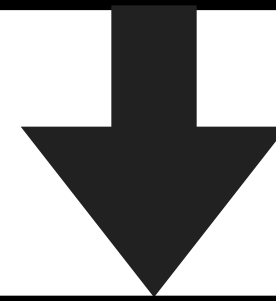
Warning! Error encountered during contract execution [Out of gas] 

USER FEEDBACK

# EVOLUTION OF `revert()`

[Contract 0xfe6f2a4991f002c1582fe51d30efbfa42986a4e6 Created] ⚠

Warning! Error encountered during contract execution [Out of gas] 😞



```
[vm] from:0xca3...a733c to:Ctontine.join() 0xbbf...732db value:0 wei data:0xb68...8a363  
logs:0 hash:0x90a...2c6a1 Debug ⌵
```

transact to Ctontine.join errored: VM error: revert.  
revert The transaction has been reverted to the initial state.  
Reason provided by the contract: "player doesn't exist". Debug the transaction to get more information.

# USER FEEDBACK

## EVOLUTION OF `revert()`

[Contract 0xfe6f2a4991f002c1582fe51d30efbfa42986a4e6 Created] ⚠

Warning! Error encountered during contract execution [Out of gas] 😞

⊗ [vm] from:0xca3...a733c to:Ctontine.join() 0xbbf...732db value:0 wei data:0xb68...8a363  
logs:0 hash:0x90a...2c6a1 Debug ▾

transact to Ctontine.join errored: VM error: revert.  
revert The transaction has been reverted to the initial state.  
Reason provided by the contract: "player doesn't exist". Debug the transaction to get more information.

April 24 2018 15:27



0x80944fef...38D6

0 ETH

Failed

0 USD

Spieler "Bob" existiert nicht

April 24 2018 15:26



0x80944fef...38D6

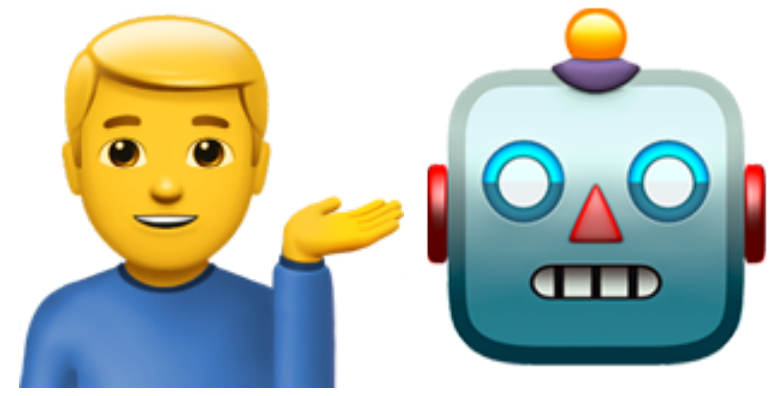
0 ETH

Failed

0 USD

Nicht autorisiert, überprüfen Sie mit [idcheck.net](https://idcheck.net)

# USER FEEDBACK ON-CHAIN LOCALIZATION



Requestor



LocalizationPreference



Localization



Localization



Localization



Localization



Localization



Localization



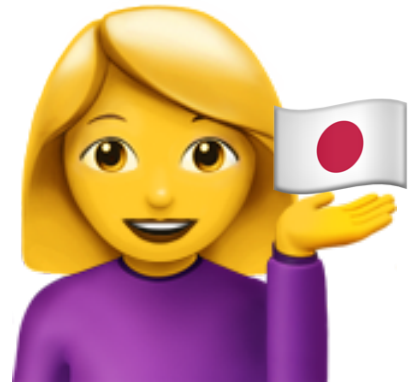
Localization

USER FEEDBACK

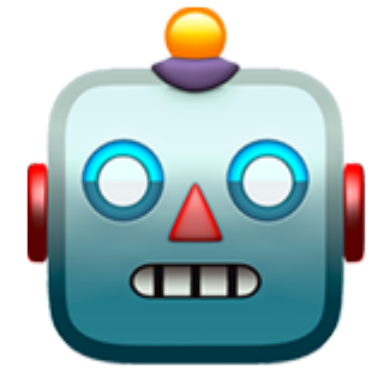
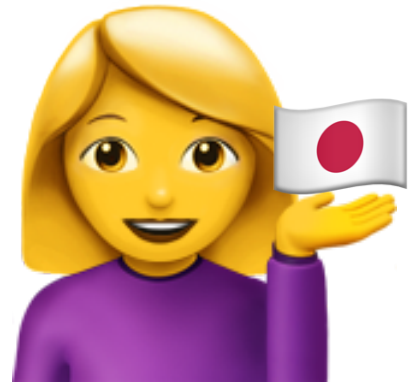
SUCCESS FLOW



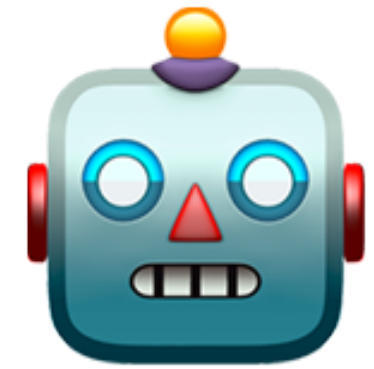
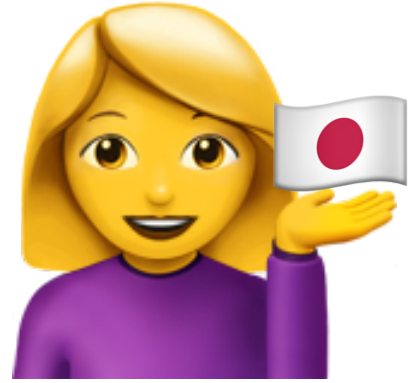
# USER FEEDBACK SUCCESS FLOW



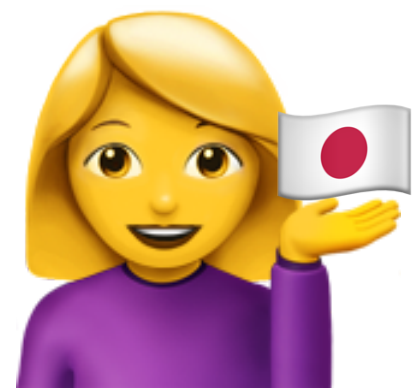
# USER FEEDBACK SUCCESS FLOW



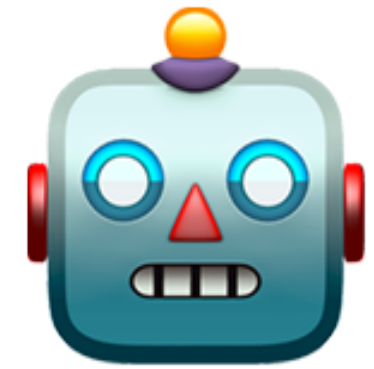
# USER FEEDBACK SUCCESS FLOW



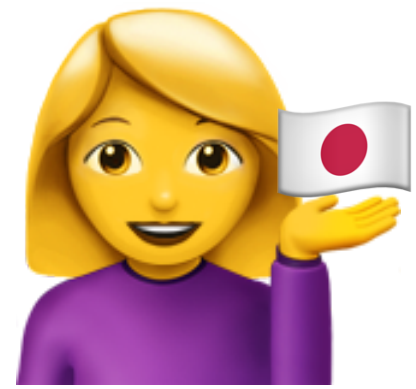
# USER FEEDBACK SUCCESS FLOW



tx



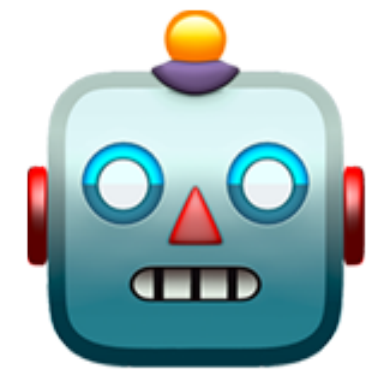
USER FEEDBACK  
SUCCESS FLOW



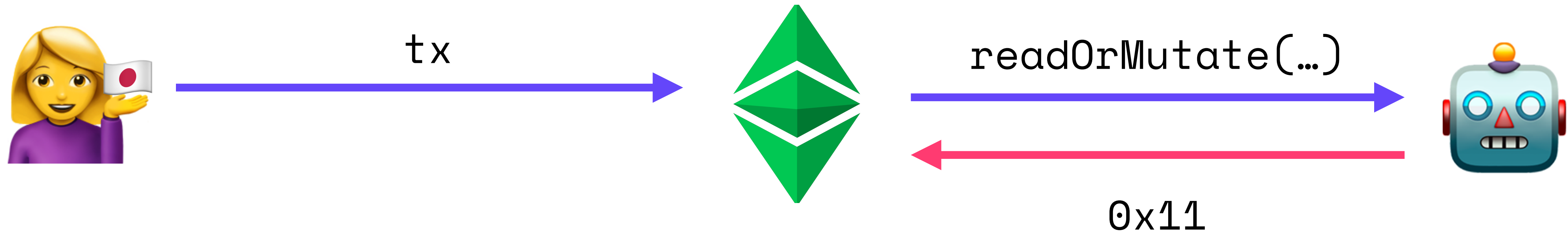
tx



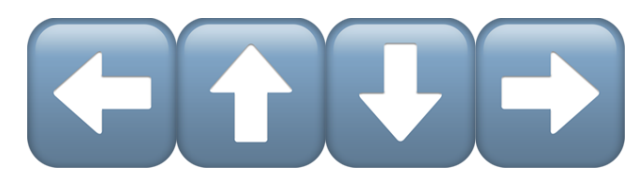
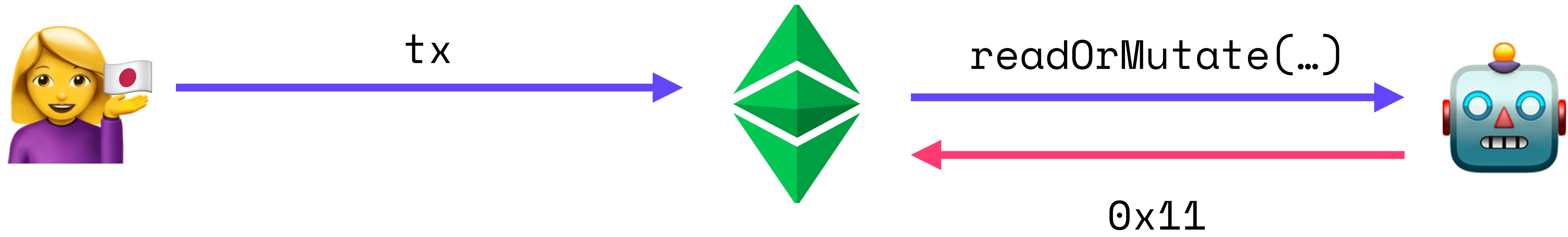
readOrMutate(...)



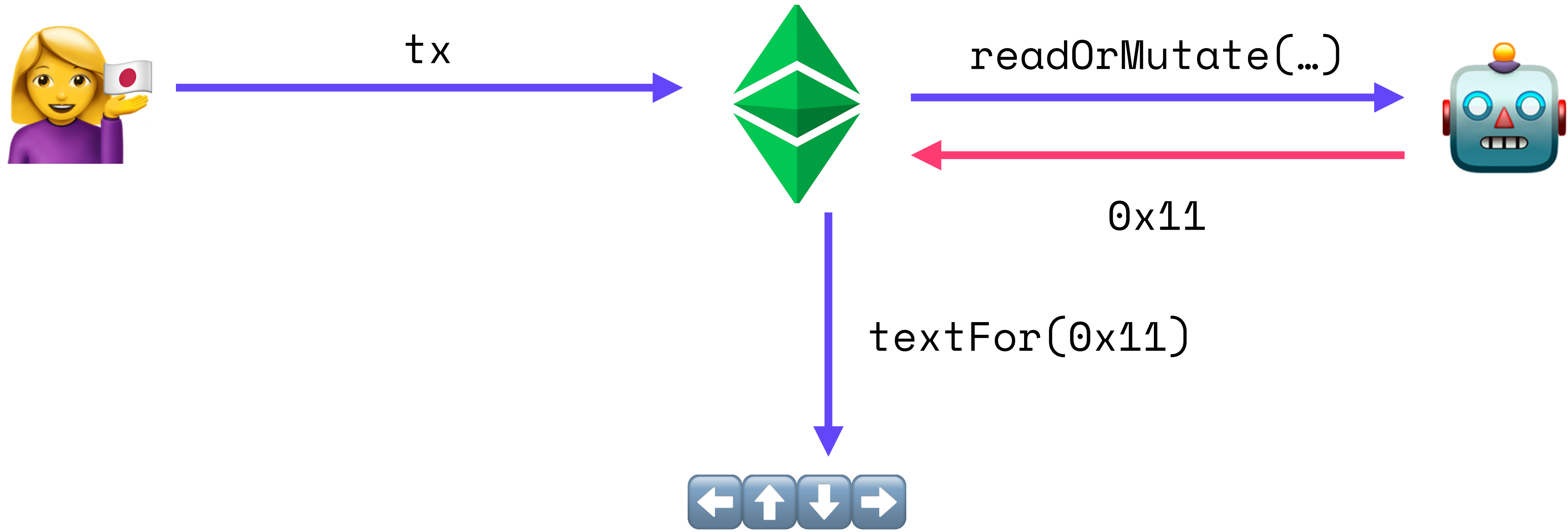
USER FEEDBACK  
SUCCESS FLOW



# USER FEEDBACK SUCCESS FLOW

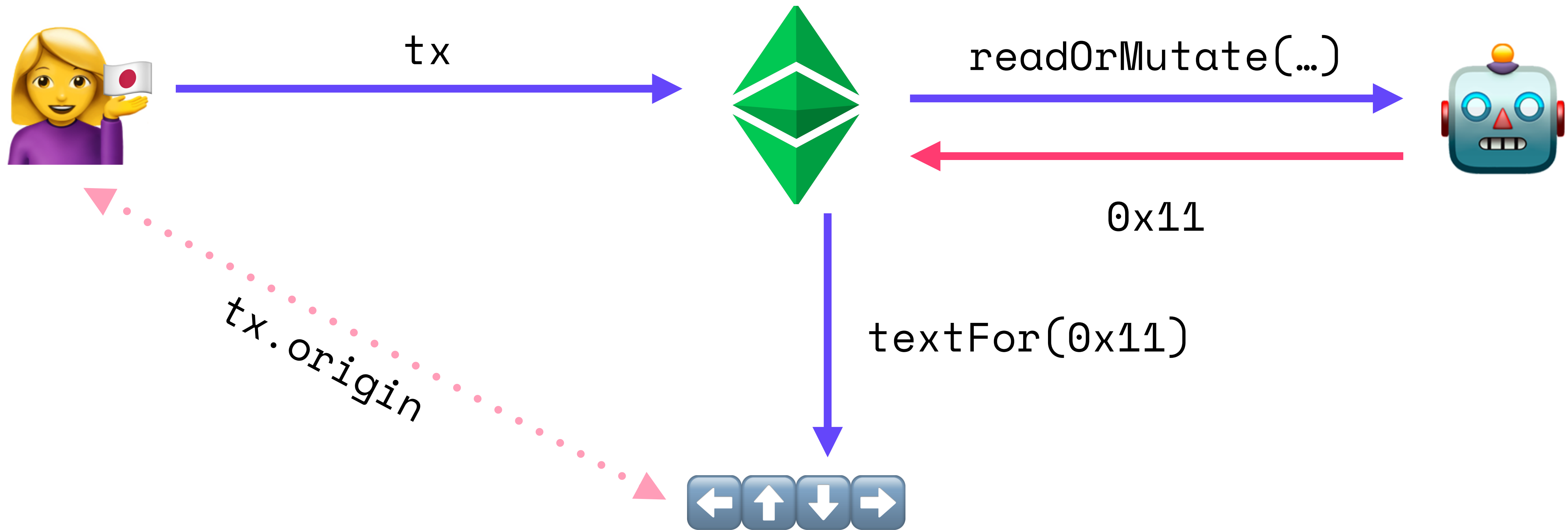


# USER FEEDBACK SUCCESS FLOW

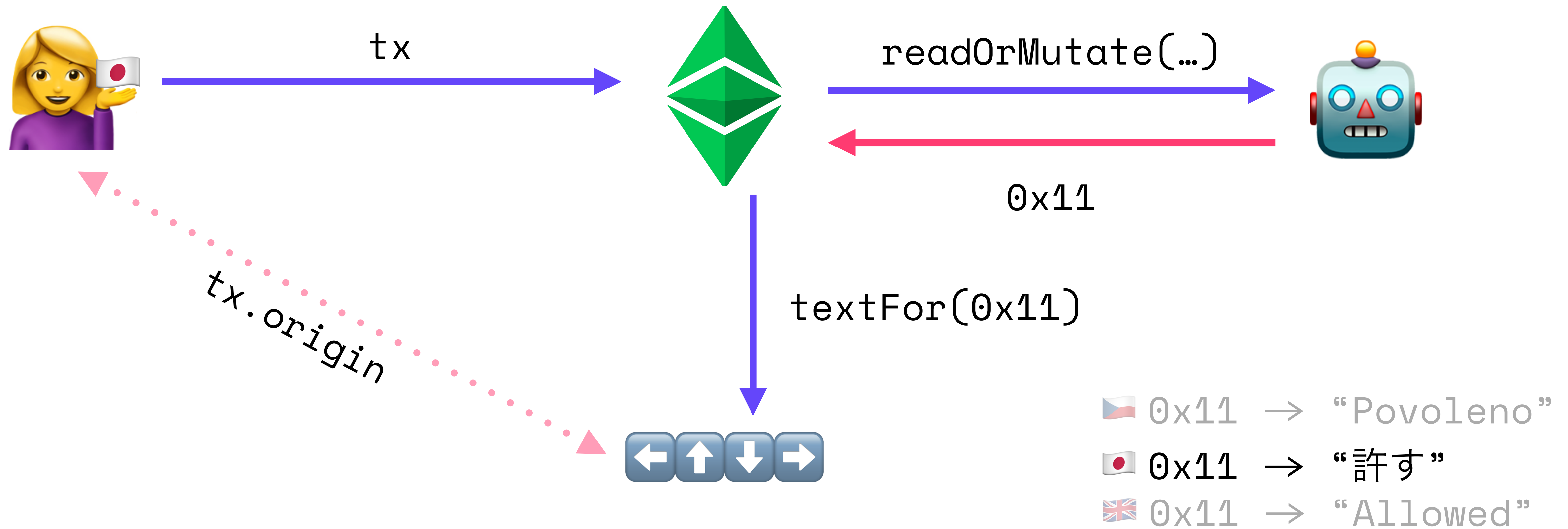




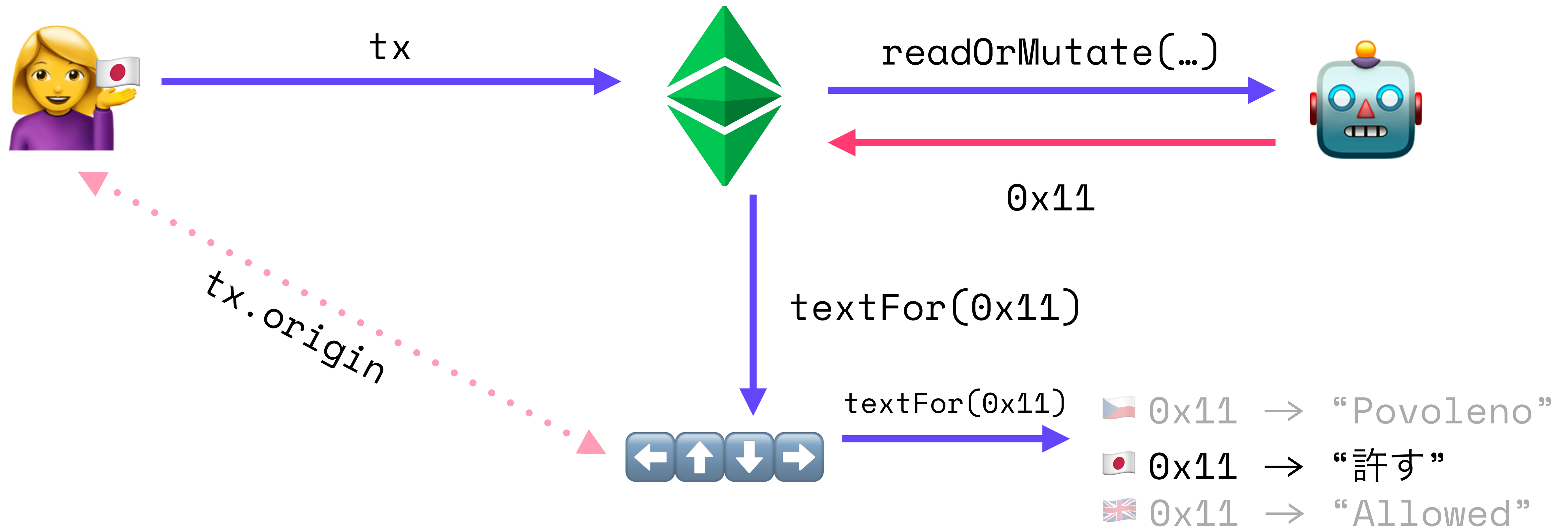
# USER FEEDBACK SUCCESS FLOW



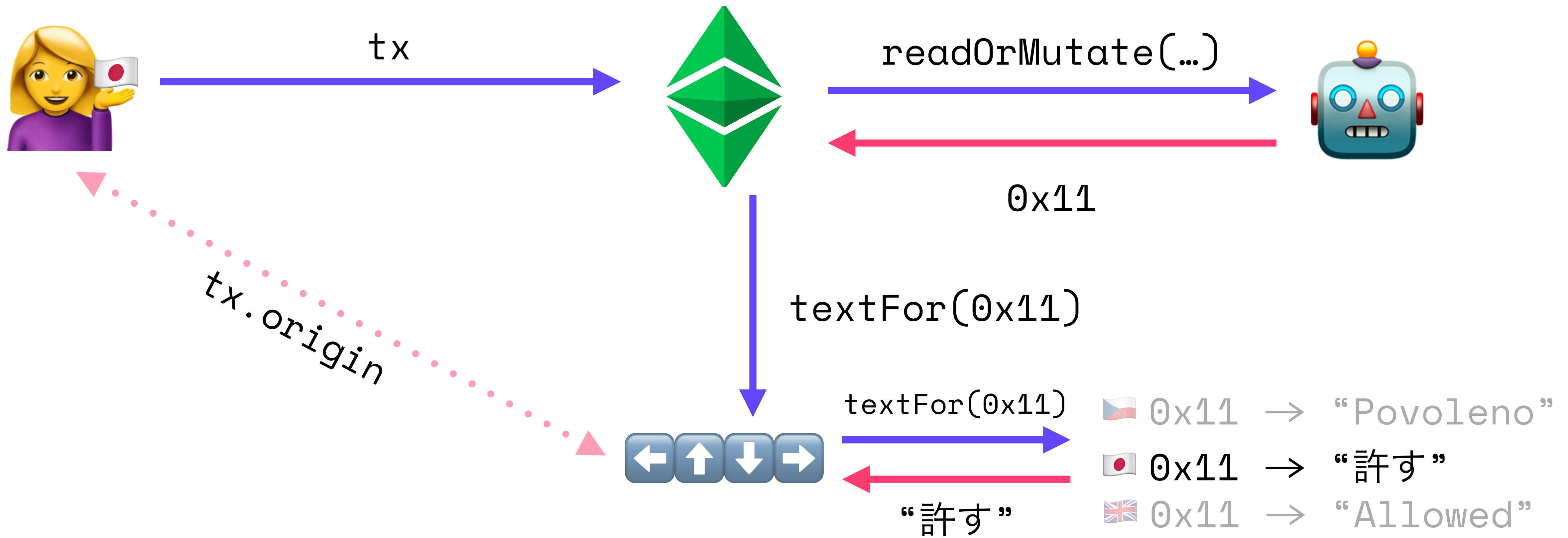
# USER FEEDBACK SUCCESS FLOW



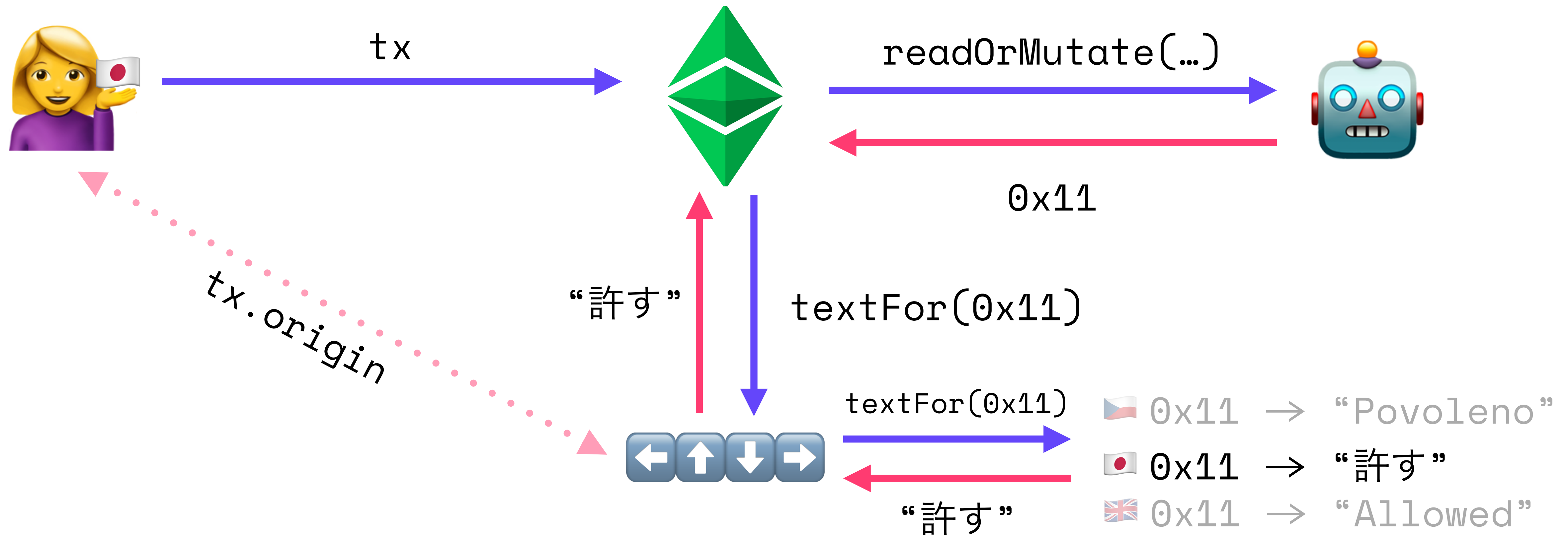
# USER FEEDBACK SUCCESS FLOW



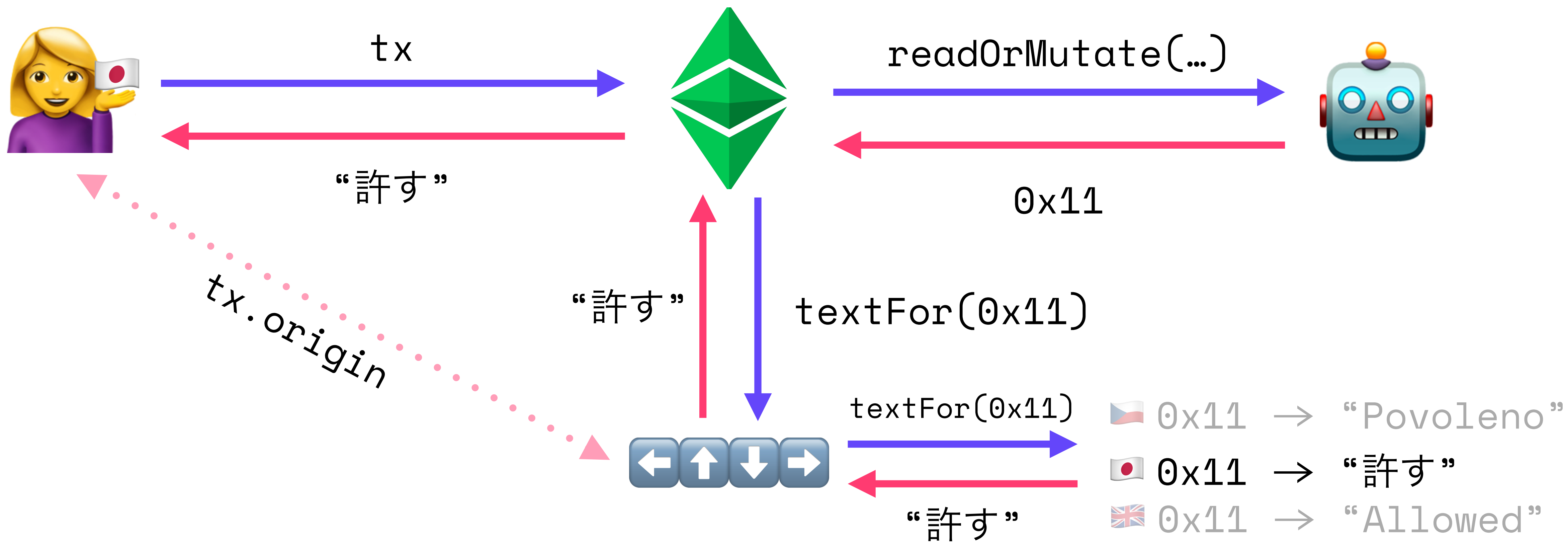
# USER FEEDBACK SUCCESS FLOW



# USER FEEDBACK SUCCESS FLOW

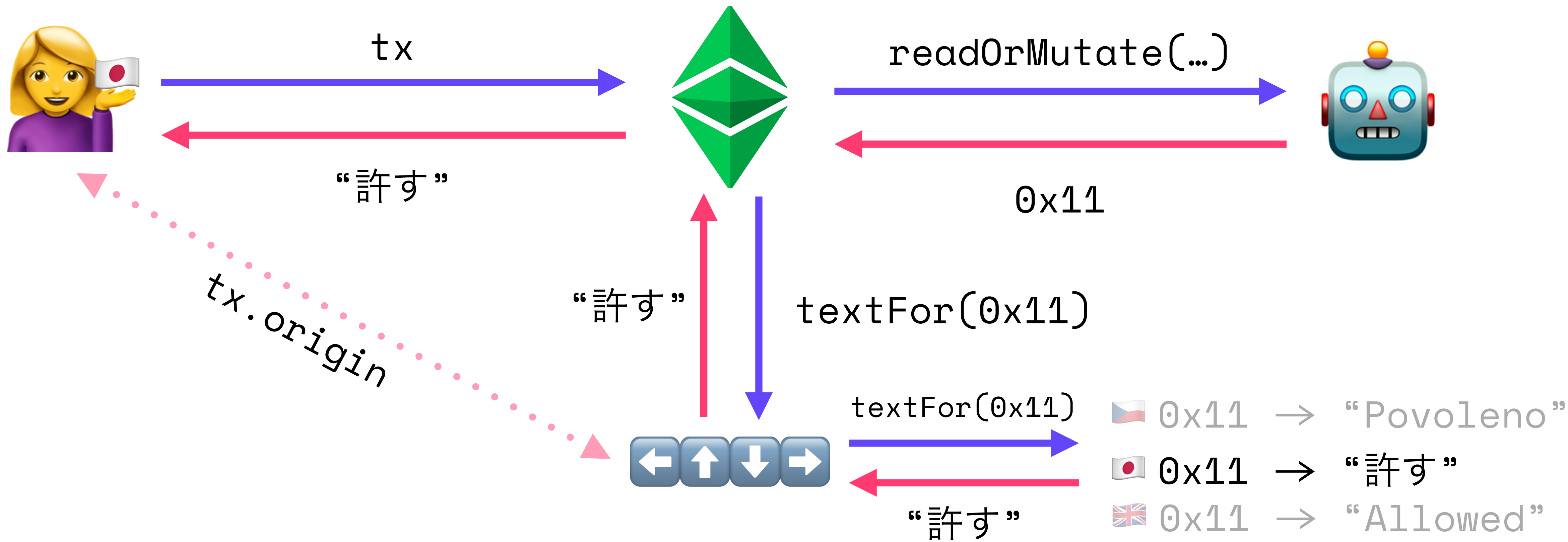


# USER FEEDBACK SUCCESS FLOW



# USER FEEDBACK SUCCESS FLOW

#3 - 4/25/2018 at 00:05  
AuthorizingContract -0 ETH  
CONFIRMED 許す -\$0.00 USD



USER FEEDBACK  
REVERT FLOW



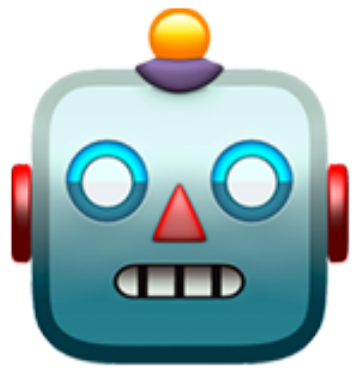
# USER FEEDBACK REVERT FLOW



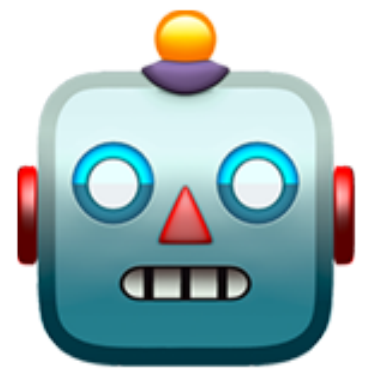
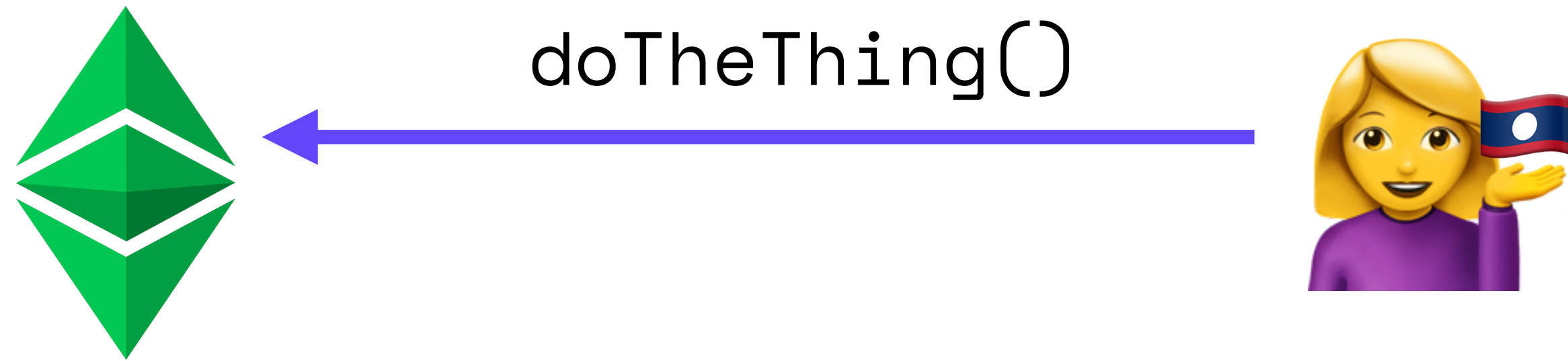
# USER FEEDBACK REVERT FLOW



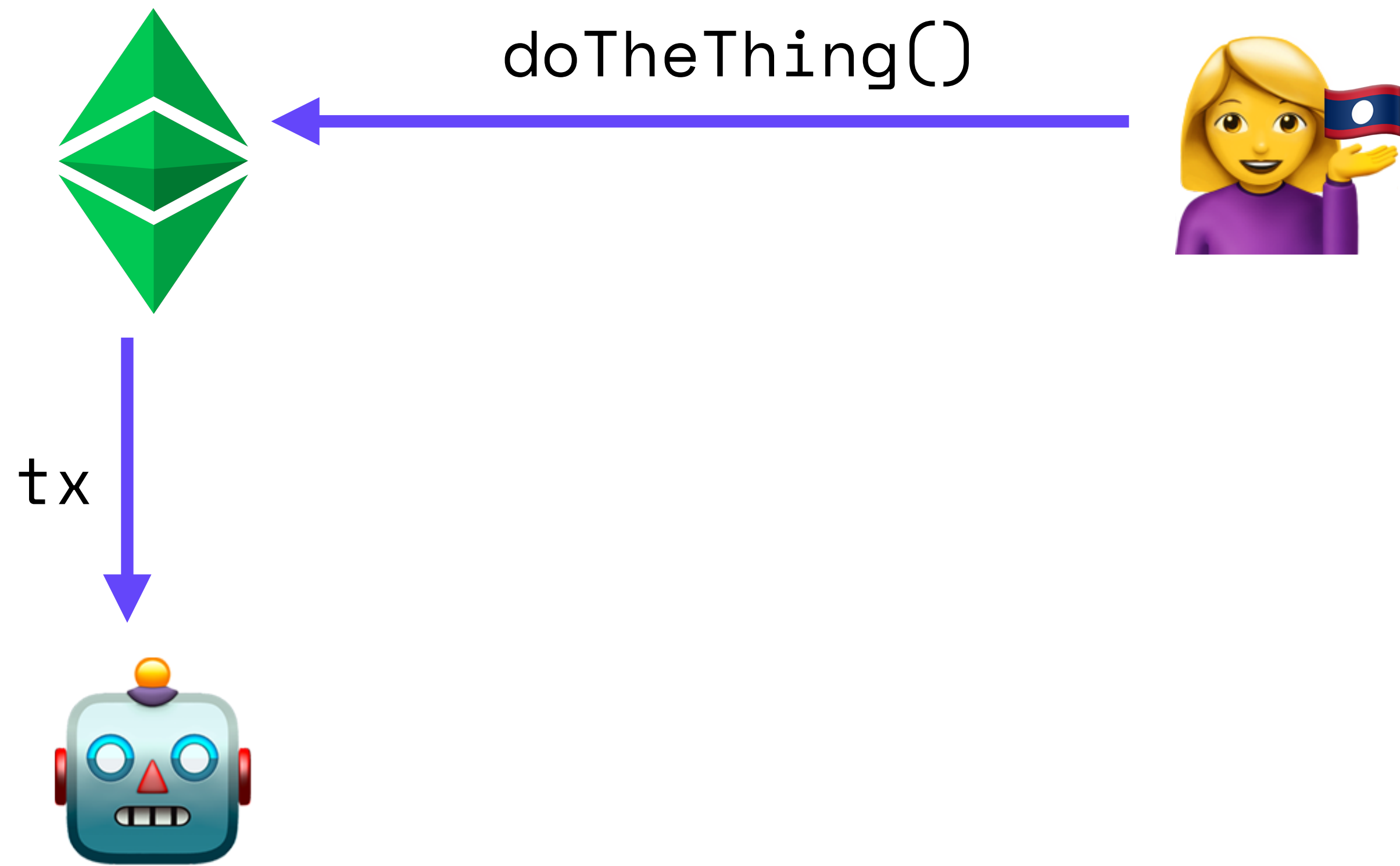
# USER FEEDBACK REVERT FLOW



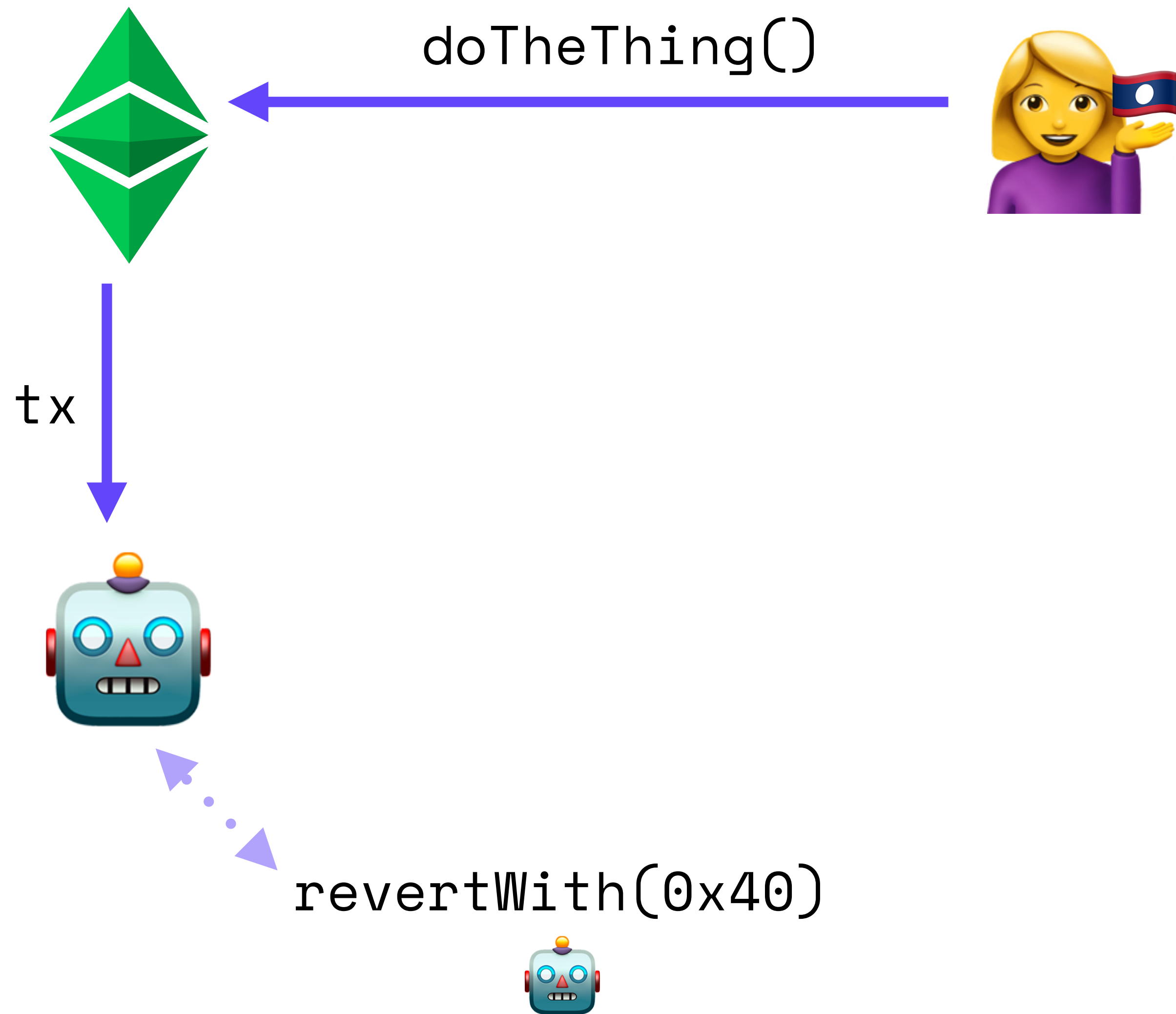
# USER FEEDBACK REVERT FLOW



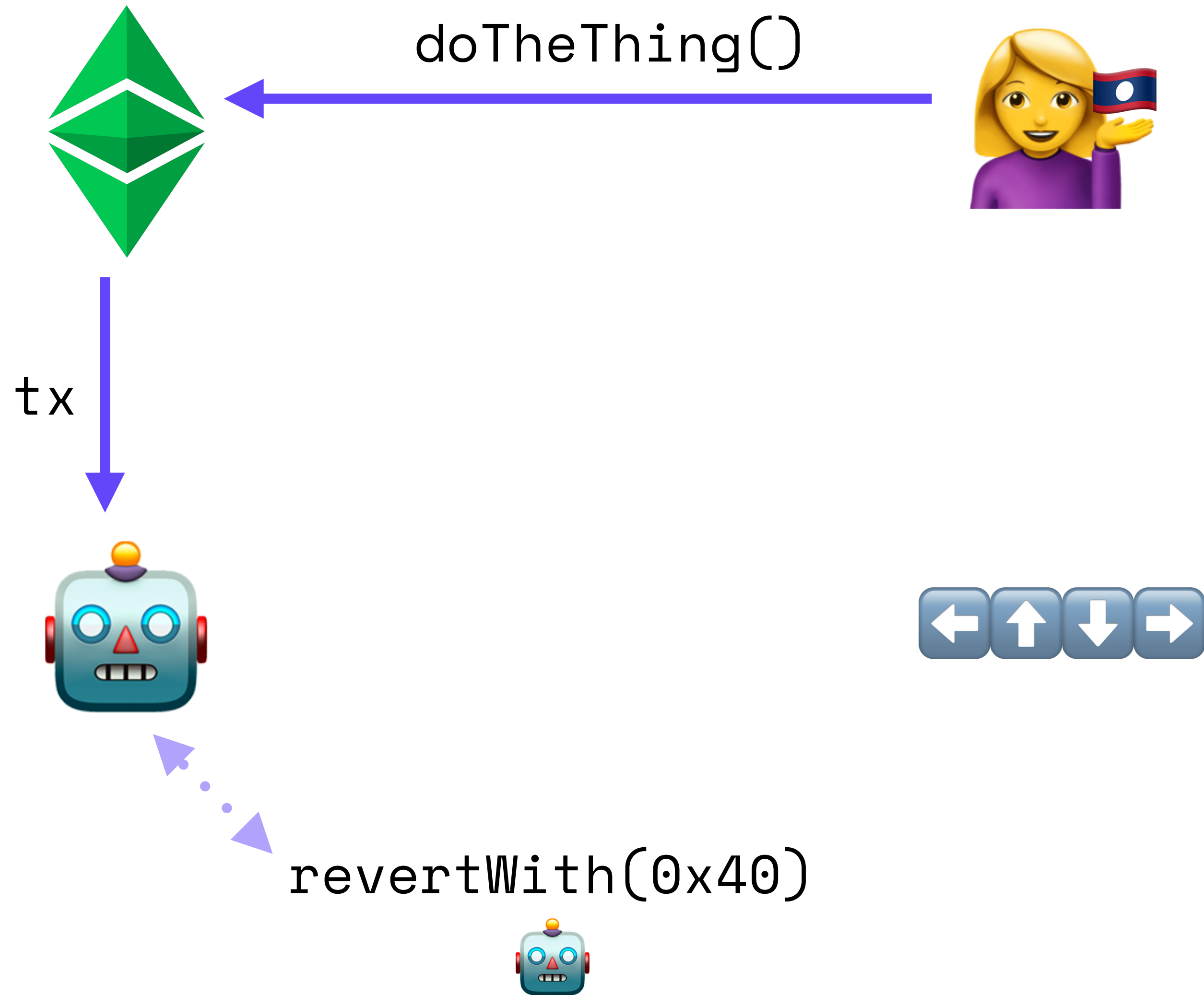
# USER FEEDBACK REVERT FLOW



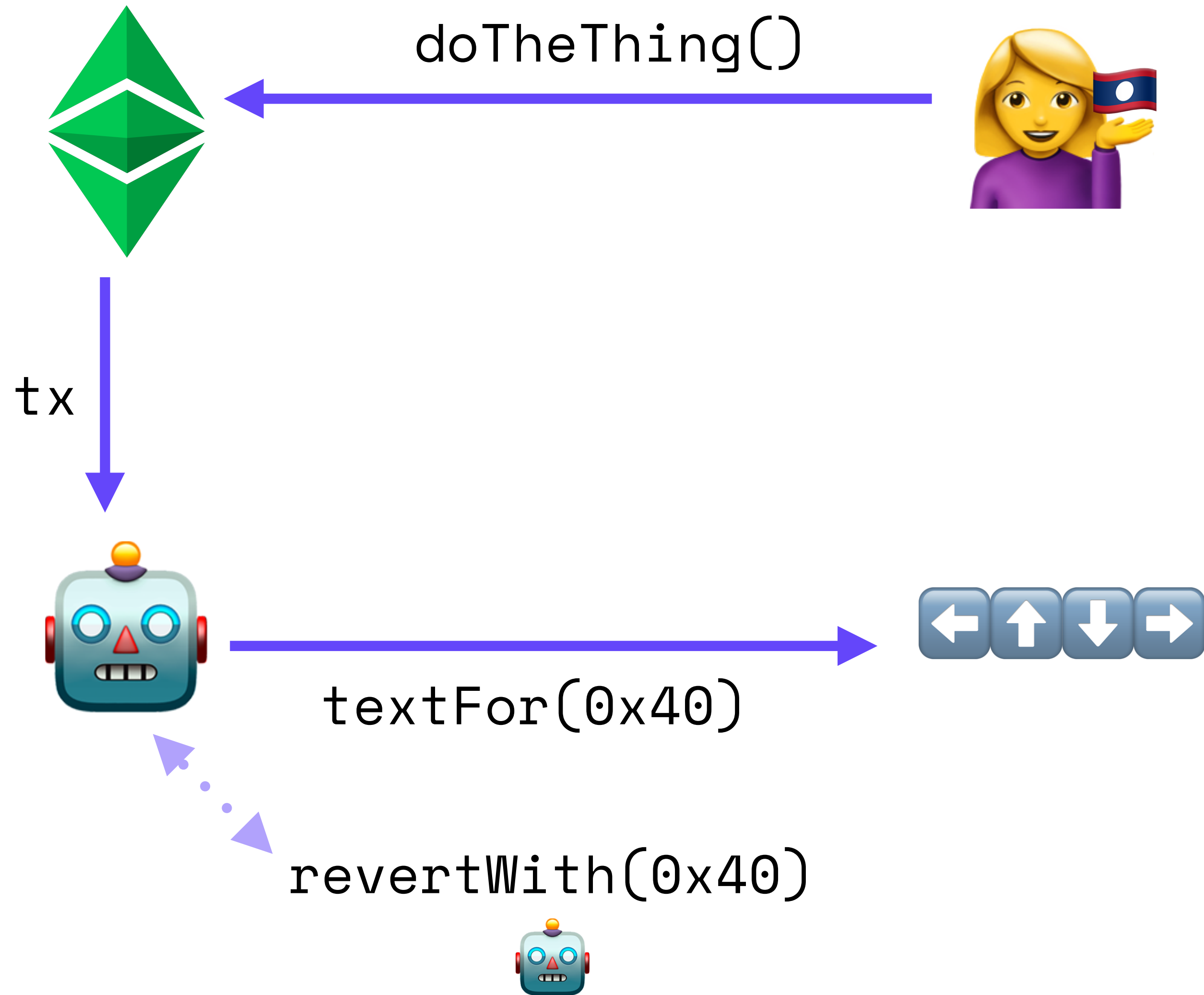
USER FEEDBACK  
REVERT FLOW



# USER FEEDBACK REVERT FLOW

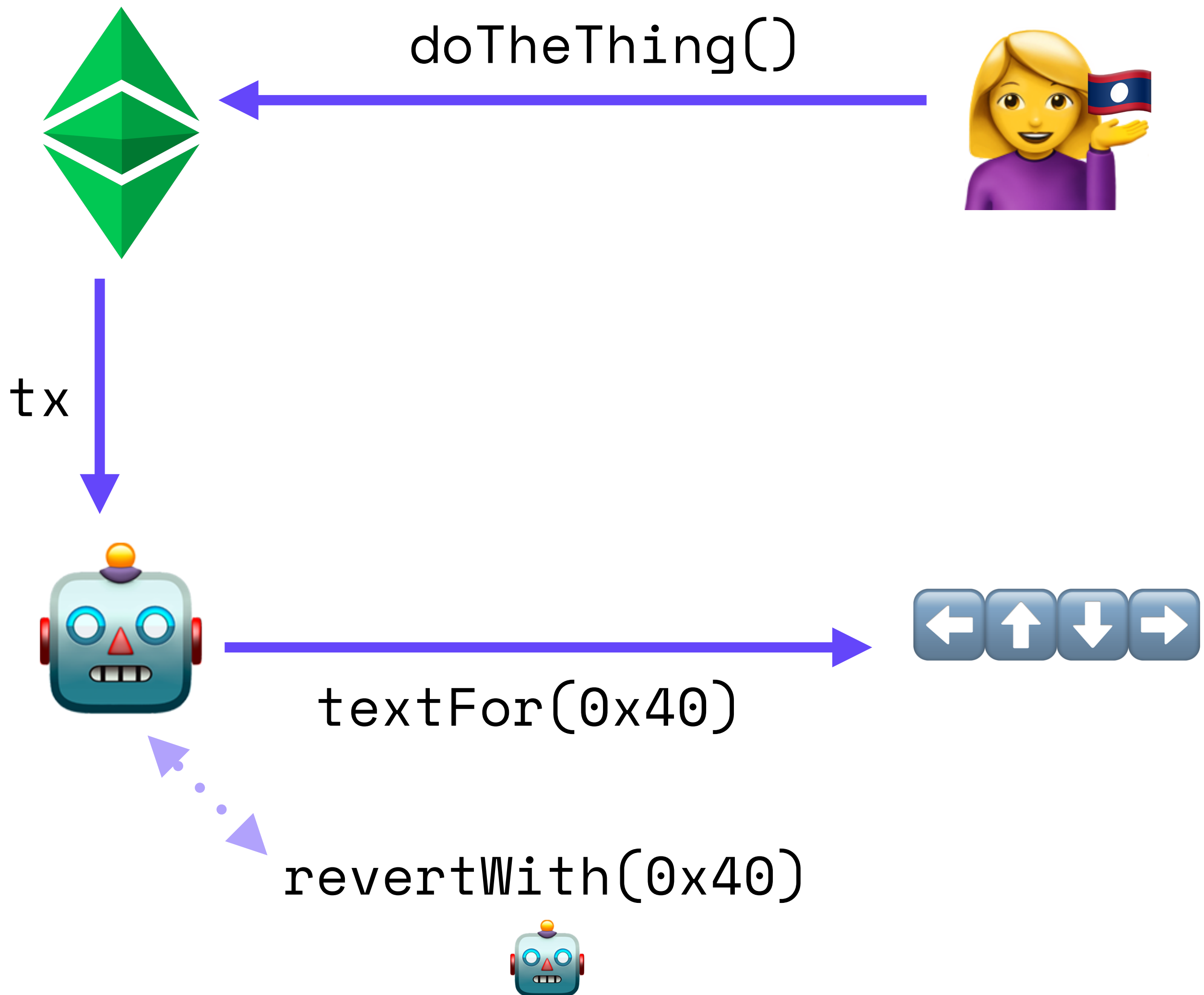


USER FEEDBACK  
REVERT FLOW



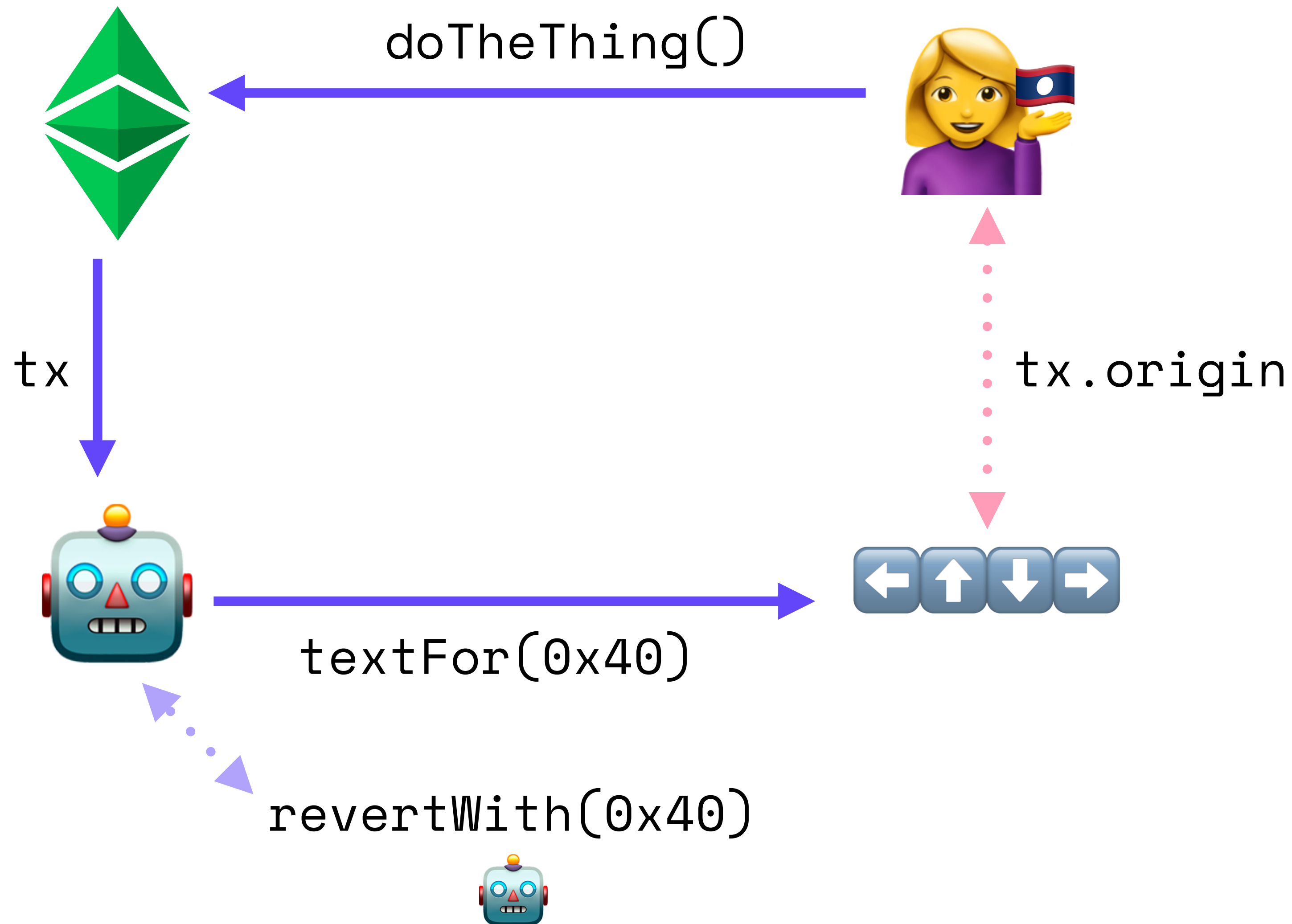


# USER FEEDBACK REVERT FLOW



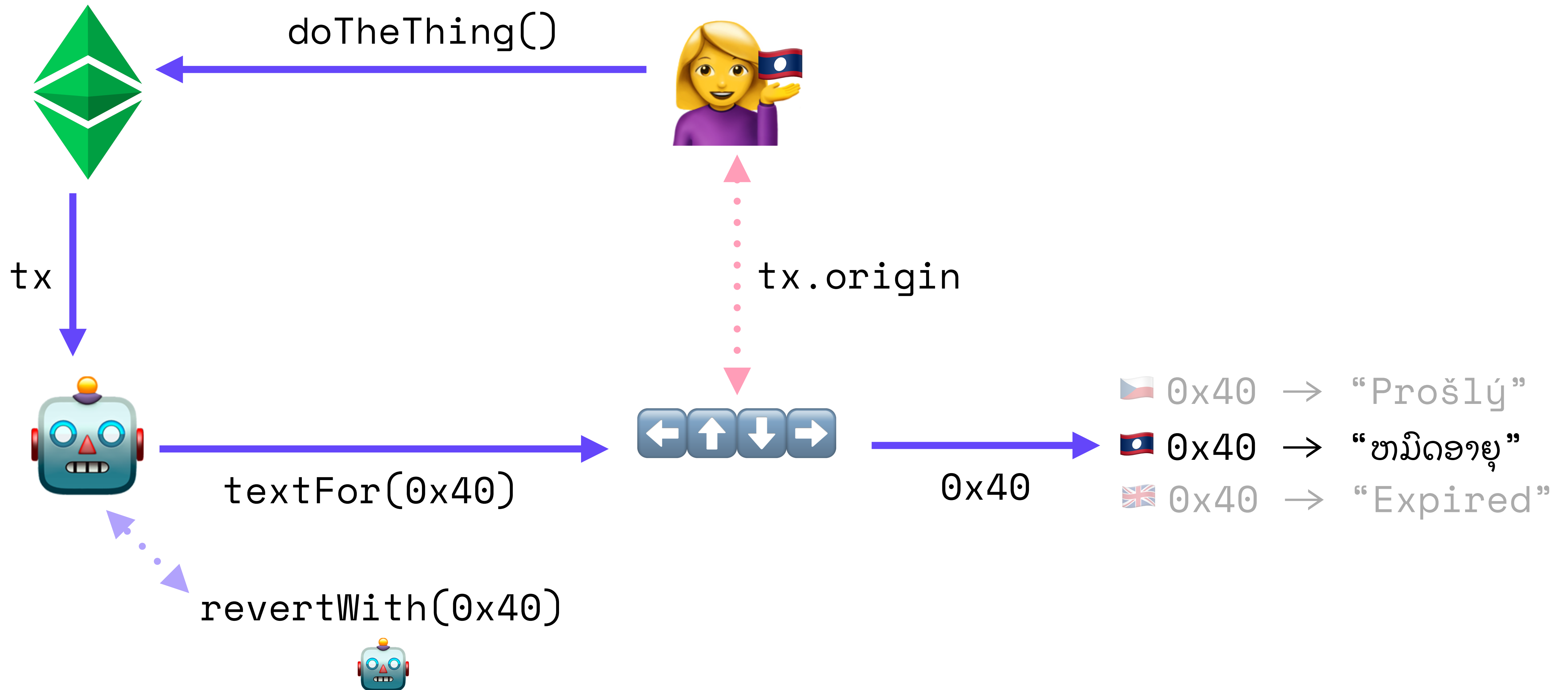
- 🇸🇰 0x40 → “Prošlý”
- 🇹🇼 0x40 → “ຫາມິດອາຍຸ”
- 🇬🇧 0x40 → “Expired”

# USER FEEDBACK REVERT FLOW

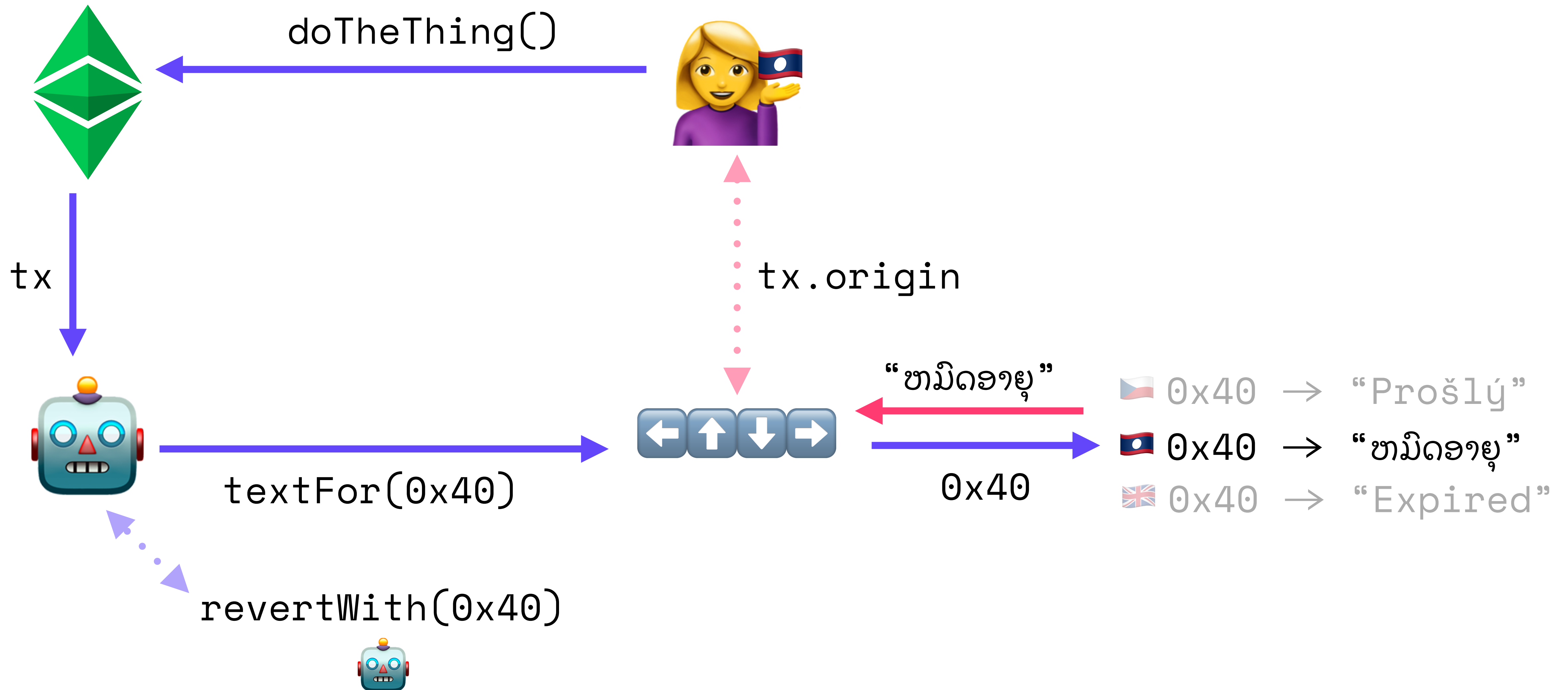


- 🇸🇰 0x40 → “Prošlý”
- 🇹🇼 0x40 → “ຫມົດອາຍຸ”
- 🇬🇧 0x40 → “Expired”

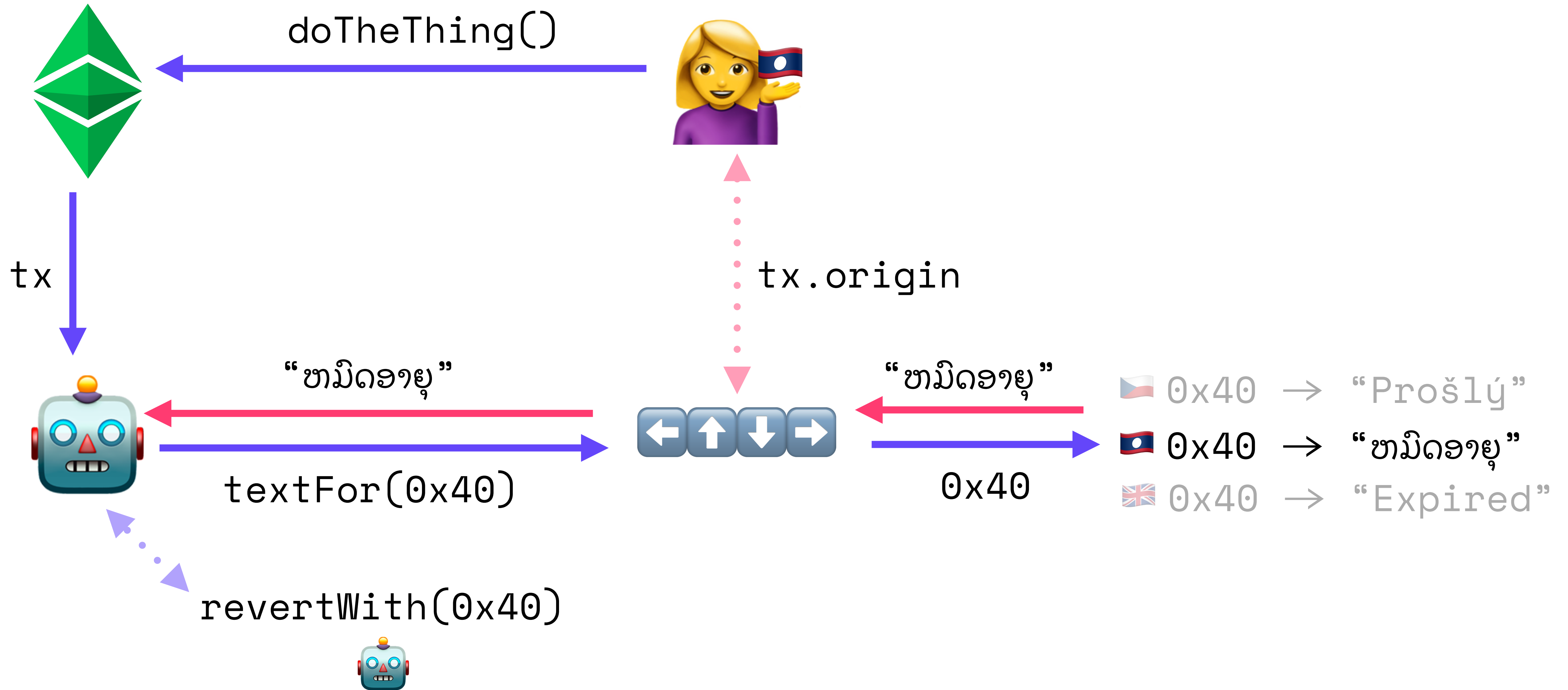
# USER FEEDBACK REVERT FLOW



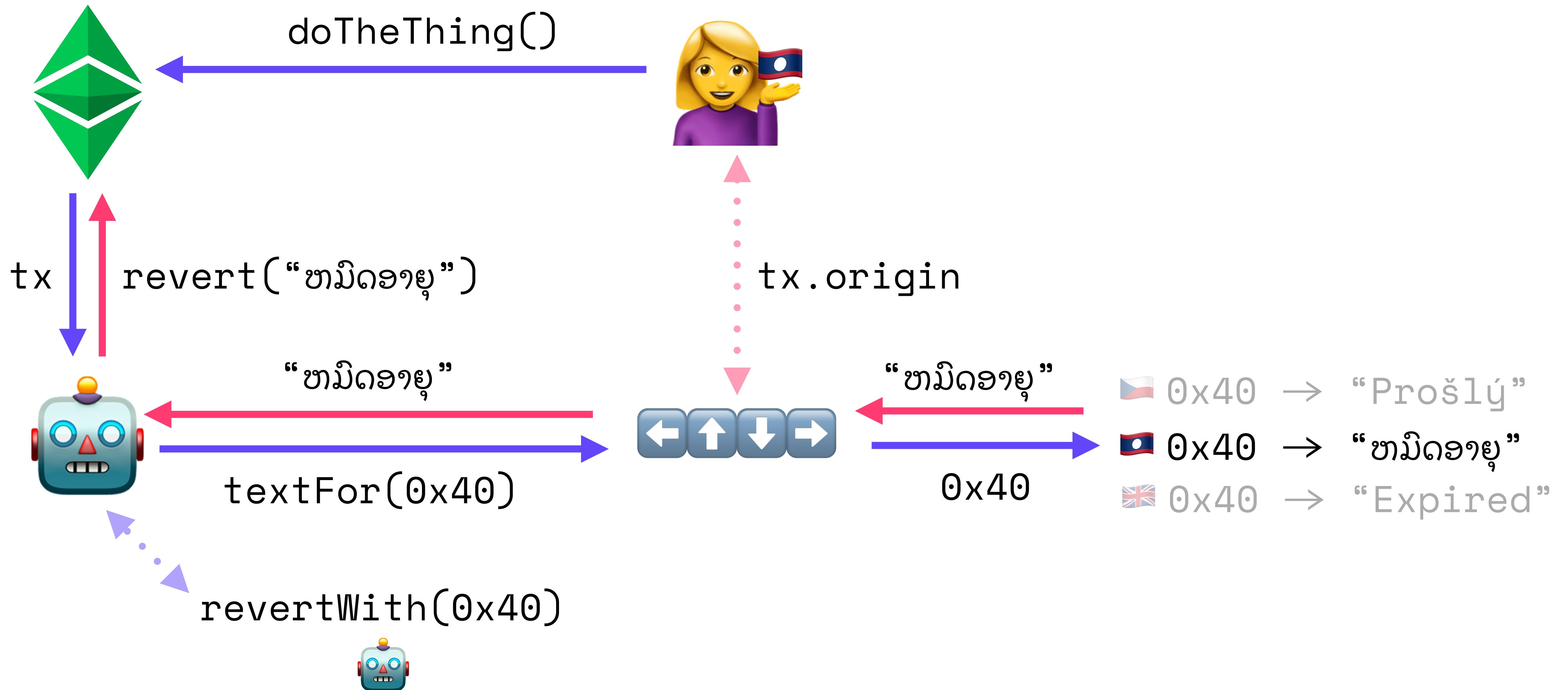
# USER FEEDBACK REVERT FLOW



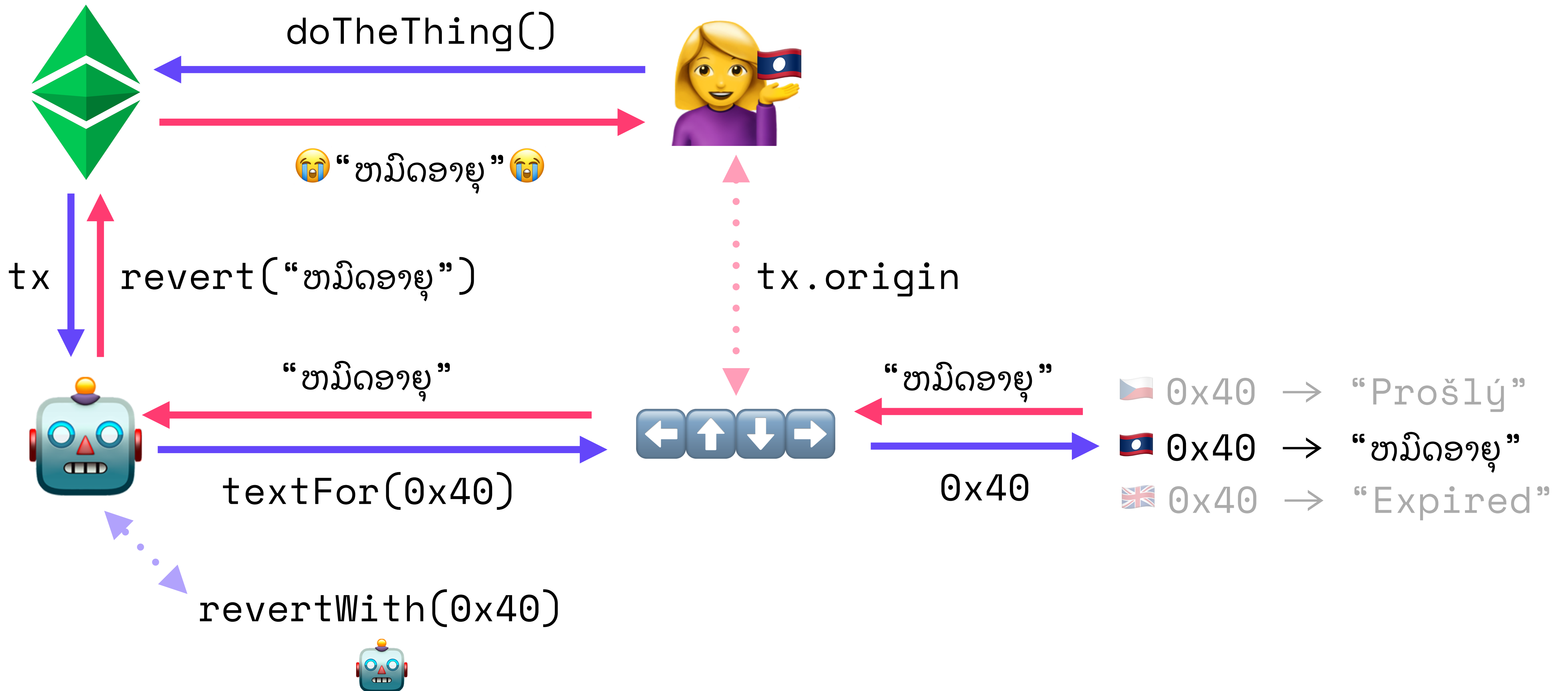
# USER FEEDBACK REVERT FLOW



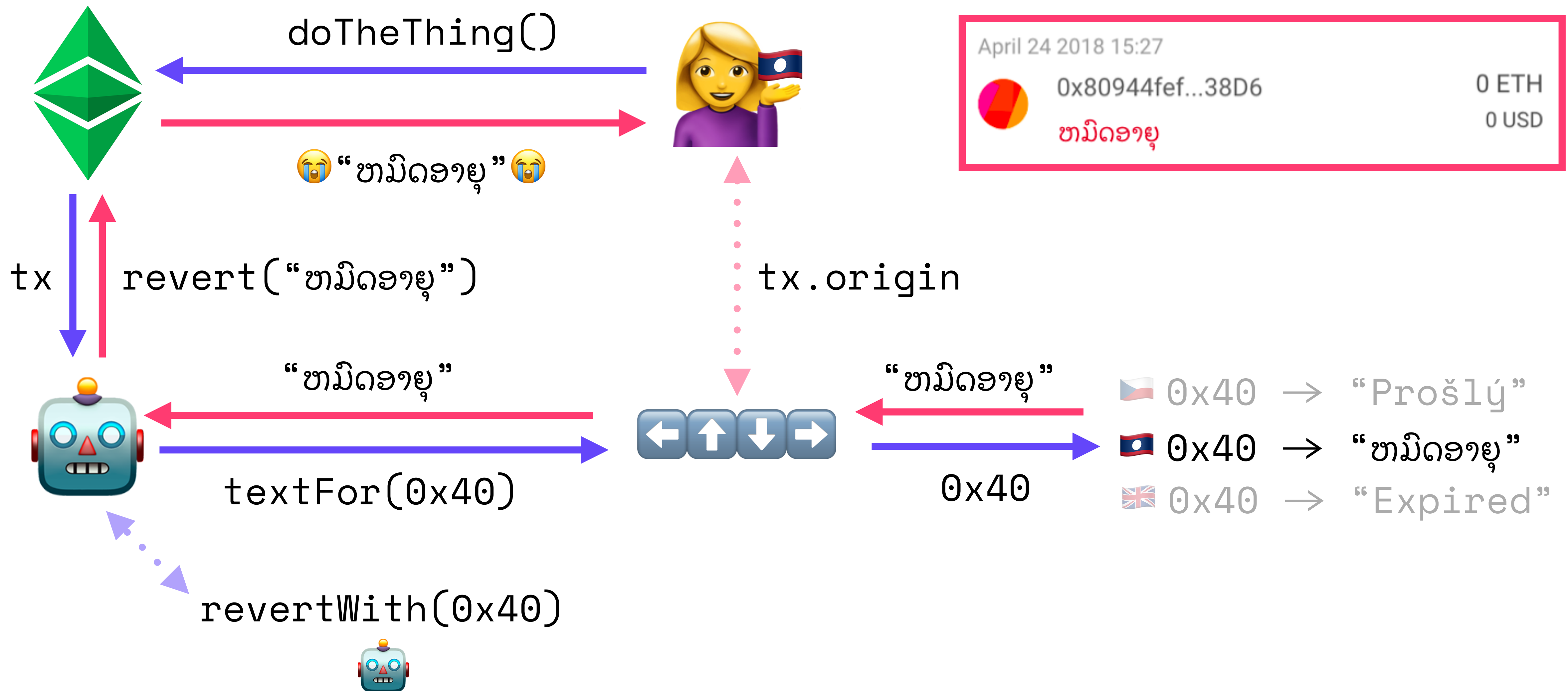
# USER FEEDBACK REVERT FLOW



# USER FEEDBACK REVERT FLOW



# USER FEEDBACK REVERT FLOW





WEB OF CONTRACTS

# WEB OF CONTRACTS



WEB OF CONTRACTS

A FUTURE ALONGSIDE UNIX & HTTP 🚀

WEB OF CONTRACTS

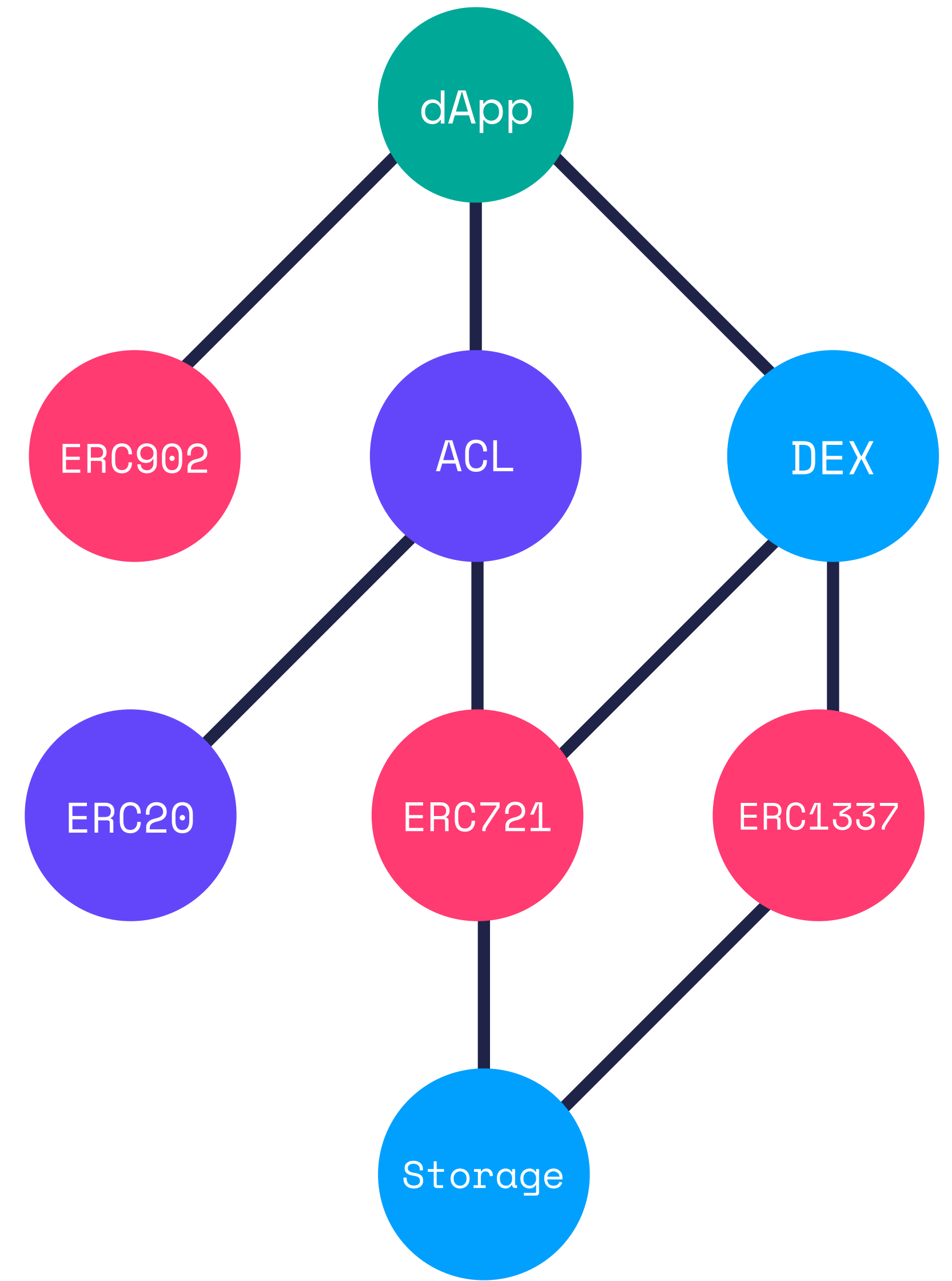
A FUTURE ALONGSIDE UNIX & HTTP 🚀

- What do Unix and HTTP have in common?
- ETC is a shared system — can we leverage each other's contacts?
- Can high value data & utilities make money on-chain?

WEB OF CONTRACTS

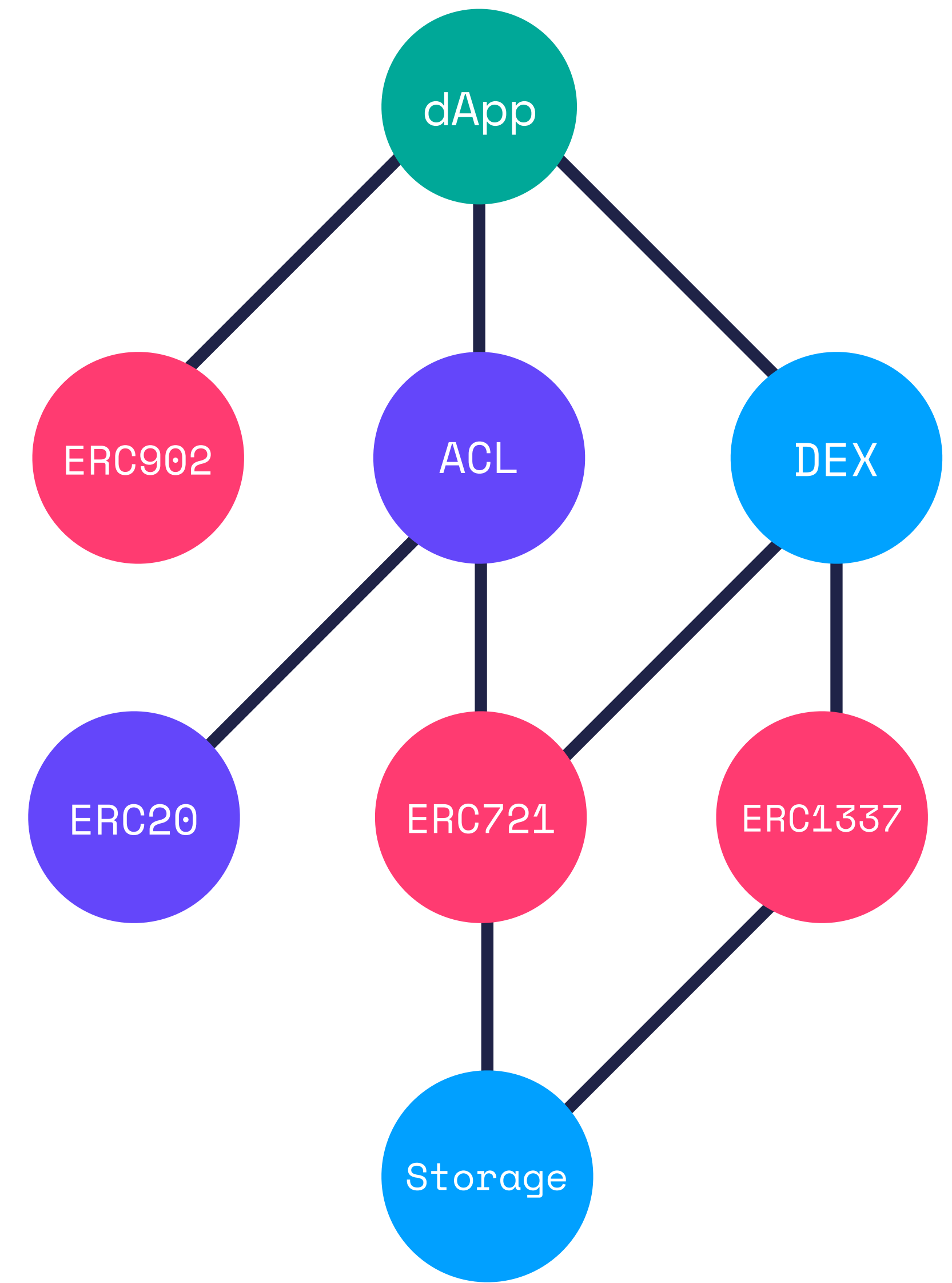
ON-CHAIN MICROSERVICES

WEB OF CONTRACTS  
ON-CHAIN MICROSERVICES



# WEB OF CONTRACTS ON-CHAIN MICROSERVICES

- “Web of contracts”
- Leverage shared infrastructure (pluggable)
- High quality smart contracts
- Efficient, reviewed, security hardened
- Compose new protocols
- New biz models for high-value service contracts



`https://fission.codes`  
`https://tools.fission.codes`



THANK YOU, ETC SUMMIT!



`brooklyn@fission.codes`  
`github.com/expede`  
`@expede`

