# Blockchain for Industrial Engineers: Decentralized Application Development

## บล็อกเชนสำหรับวิศวกรอุตสาหการ: การพัฒนาแอปพลิเคชันแบบกระจายศูนย์

# Auction

# How it works

- Like ebay.
- Auction has `owner` (seller), `start`, `end`.
- `owner` can cancel auction or can finalize the auction after `end` time.
- Users bid by sending ETH to the contract.
  - The contract will store addresses and bid amount.

# How it works

- The current price ( `highestBindingBid` ) will be the previous highest bid plus an `increment` .
- After the auction ends,
  - `highestBindingBid` is the selling price.
  - `highestbidder` is the buyer.
  - `owner` gets the `highestBindingBid`
  - Everybody else get their money back.

# Declare variables and constructor

- Enums

- Mapping

# Enums

- Enums restrict a variable to have one of only a few predefined values.
- Reduce the number of bugs in your code.

```
enum State {Open, Closed}
```

# Mapping

- Data structure that holds `key`, `value` pairs.
  - Similar to `dict` in Python
- All keys must have the same type.
- All values must have the same type.
- Key cannot be `mapping`, `dynamic array`, `enum`, or `struct`.

# Mapping

- Always saved in storage.

- Lookup time is constant **no matter of the size**.

- Cannot iterate keys.

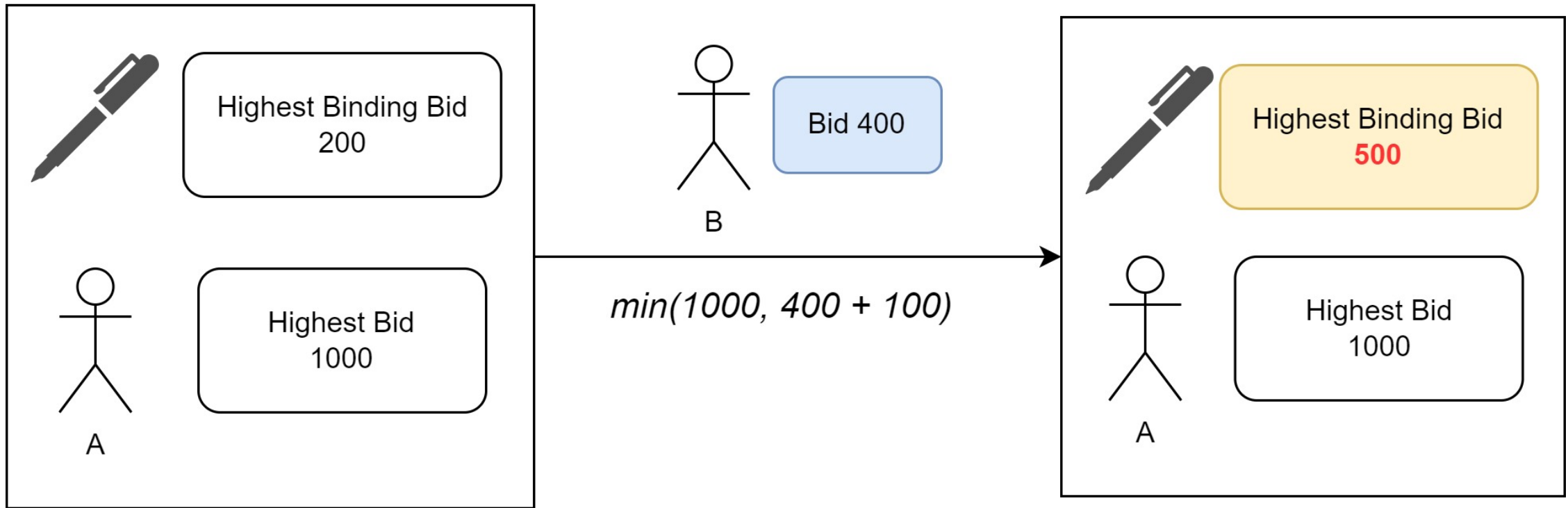- The value of an **non-existent** key is a default value.

```
mapping(address => uint) public bids;
```

# Function modifier

- Used to modifer behavior of a function.

- Can be used to test a condition.
  - Avoid writing redundant code.

- Don't `return`.

- Defined by `modifier` keyword.

# Bidding logic

BidIncrement = 100

Highest Binding Bid
200

Highest Bid
1000

A

B

Bid 400

$min(1000, 400 + 100)$

Highest Binding Bid
**500**

Highest Bid
1000

A

# Bidding logic

BidIncrement = 100



min(1200, 1000 + 100)

Left box:
- Highest Binding Bid 200
- A — Highest Bid 1000

Middle: B — Bid 1200

Right box:
- Highest Binding Bid **1100**
- B — Highest Bid **1200**