https://slides.com/concise/js/

concise JavaScript

A concise and accurate JavaScript tutorial/notes written for those entering the JavaScript world for the first time but already have experience with other languages

Some slides extracted from above reference

Basic Concepts About Variables

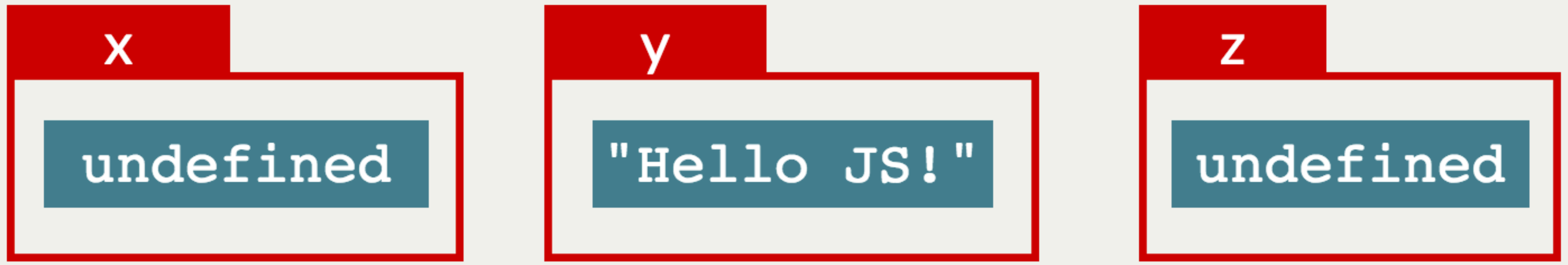
Definition

A variable is a named container for a ***value***

The ***name*** that refers to a variable
is sometime called *an **identifier***

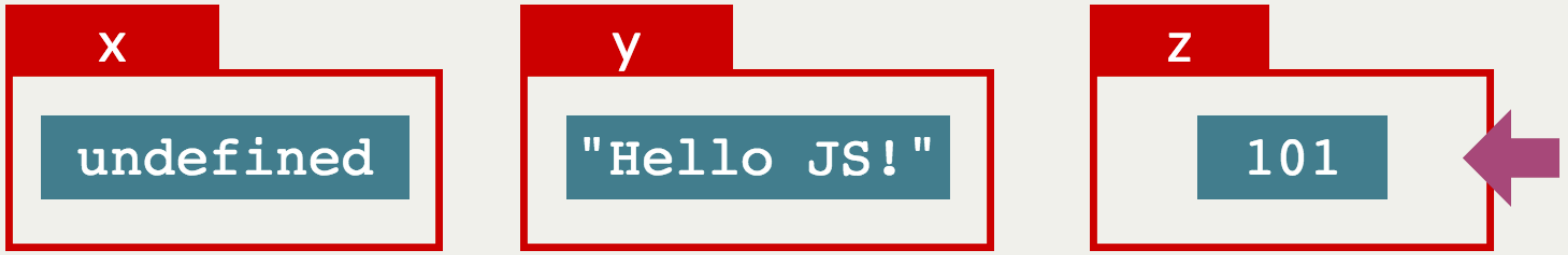
```
var x;
var y = "Hello JS!";
var z;
```

These red boxes are ***variables***, and each of them has a ***name (identifier)***



Any ***JavaScript value*** can be contained within these boxes

```
var x;
var y = "Hello JS!";
var z;
z = false;
z = 101;
```



We can ***assign*** another ***value*** to a variable later after its creation

Curly-brace blocks do *not* introduce new variable scopes in JavaScript

```
// What is i, $, p, and q afterwards?

var i = -1;

for (var i = 0; i < 10; i += 1) {
    var $ = -i;
}
if (true) {
    var p = 'FOO';
} else {
    var q = 'BAR';
}

// Check the next slide for an answer...
```

The code in previous page actually works like this one:

```
var i, $, p, q; // all undefined

i = -1;

for (i = 0; i < 10; i += 1) {
    $ = -i;
}
if (true) {
    p = 'FOO';
} else {
    q = 'BAR';
}

// i=10, $=-9, p='FOO', q=undefined
```

When the program runs, all variable declarations are moved up ***to the top of the current scope***.

let & **const** do NOT behave like **var**

They introduce ‘Block Scoped’ variables that:
 - cannot be redefined
 - can only be used in the scope they are declared in

I.E. They closely match the way Java Local Variables are scoped.

const & let are Block Scoped

```
const greeting = 'hello';

{
  const greeting = ‘howdy’;
  console.log(greeting);
}

console.log(greeting);
```

- 2 variables called **greeting** defined in two separate scopes

```
howdy
hello
```

var is not Block Scoped

```
var greeting = 'hello';
{
  var greeting = 'howdy';
  console.log(greeting);
}
console.log(greeting);
```

```
howdy
howdy
```

- 1 variable called **greeting** defined.
- Second **greeting** is ***Hoisted*** to the outer scope

let & **const** VS **var**

Because they are more predictable, we will always prefer **let** & **const** to **var**

Reserved Words

Some keywords can not be used as variable names:

```
null true false break do instanceof typeof
case else new var catch finally return void
continue for switch while debugger function
this with default if throw delete in try
class enum extends super const export import

implements let private public yield
interface package protected static
```

We don't need to remember them all. Just be aware of the possible cause for some SyntaxError exceptions in our program.

Basic Concepts About Values & Types

Definition

A value represents the most basic data we can deal with

value

A type is a ***set*** of data values, and there are exactly 6 types

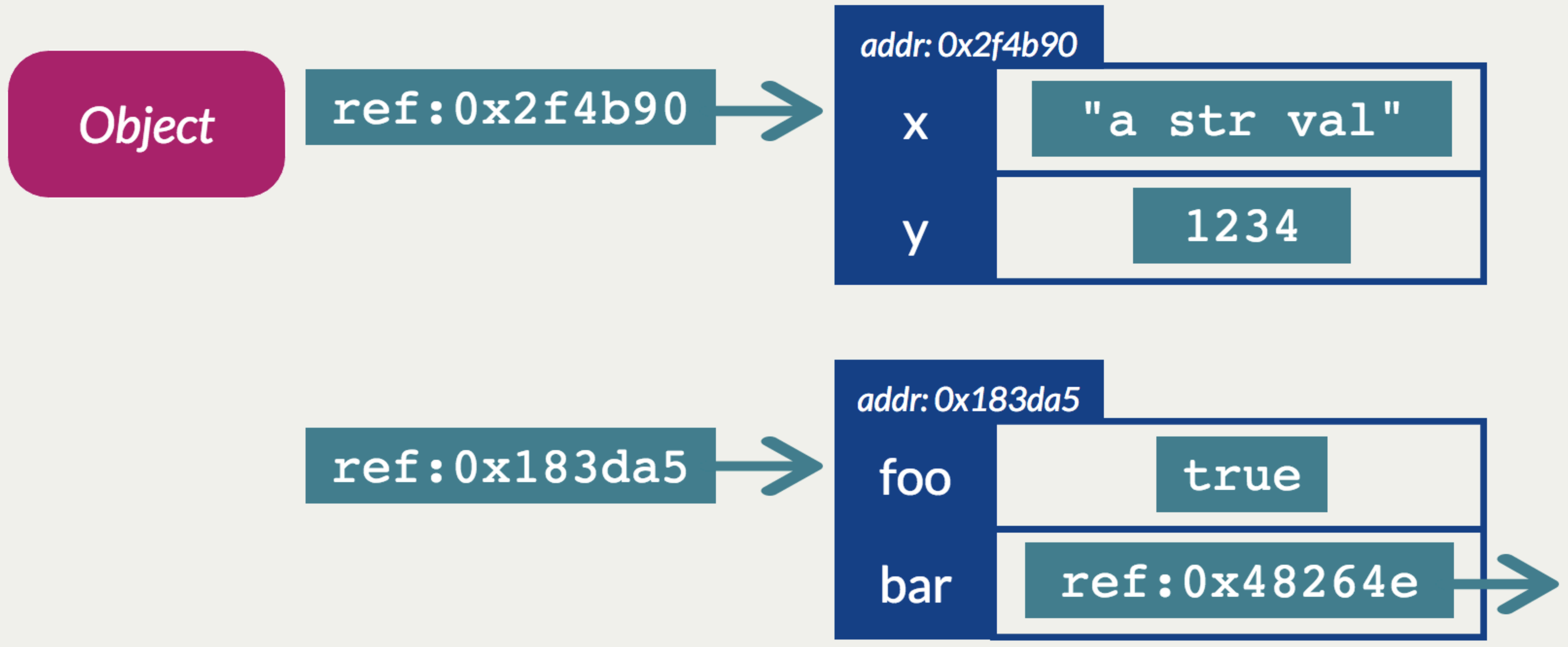
Type :: { v1 , v2 , v3 , ... }

There are 5 primitive (non-Object) types

Undefined	`undefined`
Null	`null`
Boolean	`true` `false`
Number (IEEE754 64-bit doubles)	`.33` `-3.14` `011` `7e-2` `-Infinity` `0x101` `NaN`
String (Any finite ordered sequence of 16-bit unsigned integers)	`""` `"Hello world!"` `"哈囉。"` `"\n"` `"\""` `'w Single Quotes'`

Any value here is called ***a primitive value***

And then there is the "Object" type



Any value of this type is ***a reference to some "object"***;
sometimes we would simply call such value ***an object***

Definition

An object is a
collection of ***properties***

A property is a
named container for a ***value***
w/ some additional attributes

Definition

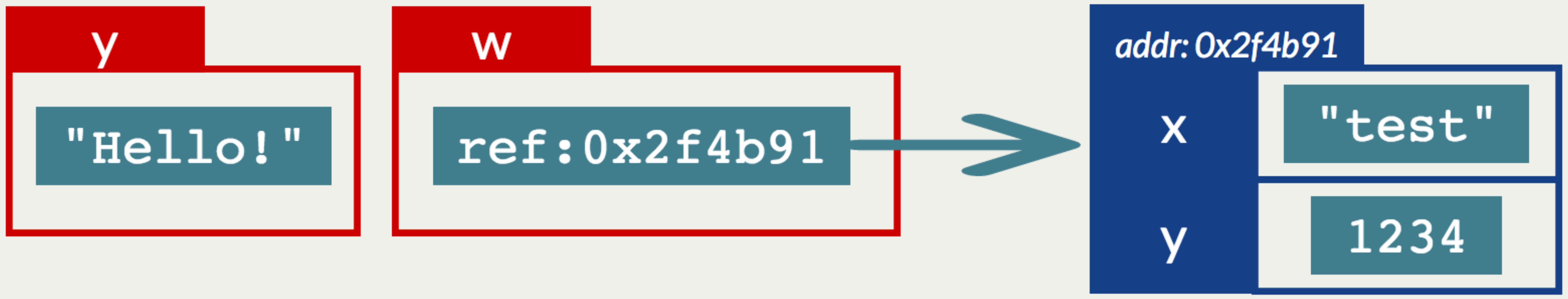
The ***name of a property*** is called ***a key***;
thus, ***an object*** can be considered as
a collection of key-value pairs.

There are similar concepts in other programming languages,
e.g., *Map*, *Dictionary*, *Associative Array*, *Symbol Table*, *Hash Table*, ...

To Refer To A Value

- ***Literal notation*** for the value
- Expression involving a ***variable***
  or a ***property within some object***
  to get the value indirectly
- More complex expression involving
  function ***calls*** and ***operators***

A “*variable*” vs a “*property*” in an object



```
// Value containers
var y = "Hello!";
var w = {
    x: "test",
    y: 1234
};
```

```
// To get the values
y;       // "Hello!"
w;       // (the object ref)
w.x;     // "test"
w['x'];  // "test"
w.y;     // 1234
w["y"];  // 1234
```

Object Initialiser (Object Literal)

The notation using a pair of curly braces
to ***initialize*** a new JavaScript object.

```
var w = {
    x: "test",
    y: 1234,
    z: {},
    w: {},
    "": "hi"
};
```

```
var w = new Object();
w.x = "test";
w.y = 1234;
w.z = new Object();
w.w = new Object();
w[""] = "hi";
```

The code on the left-hand side has exactly the
same result as the one on the right-hand side

Add/Get/Set/Remove A Property

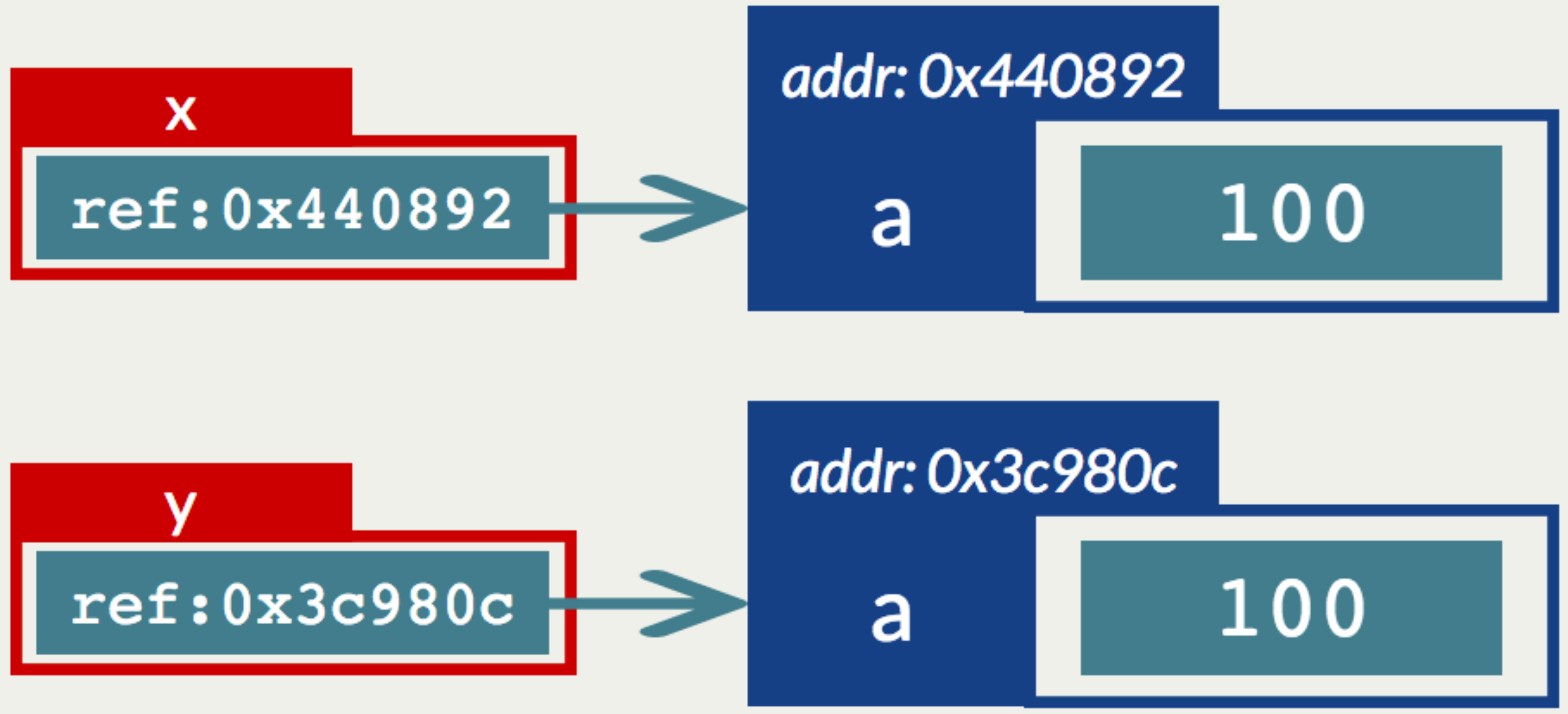
We can dynamically modify an object after its creation

```
var obj = {
    1  : "Hello",
    "3": "Good",
    x  : "JavaScript",
    foo: 101,
    bar: true,
    "" : null
};

obj["2"] = "World";      // *1 Add & Set
obj["1"];                // *2 Get        -> "Hello"
obj[2];                  // *3 Get        -> "World"
obj[3];                  // *4 Get        -> "Good"
obj.foo = 202;           // *5 Set
delete obj.bar;          // *6 Remove
delete obj[""];          // *7 Remove
```

Don't Forget Any Value Of The Object Type Is Actually A “Reference”

```
var x = { a: 100 };
var y = { a: 100 };
```

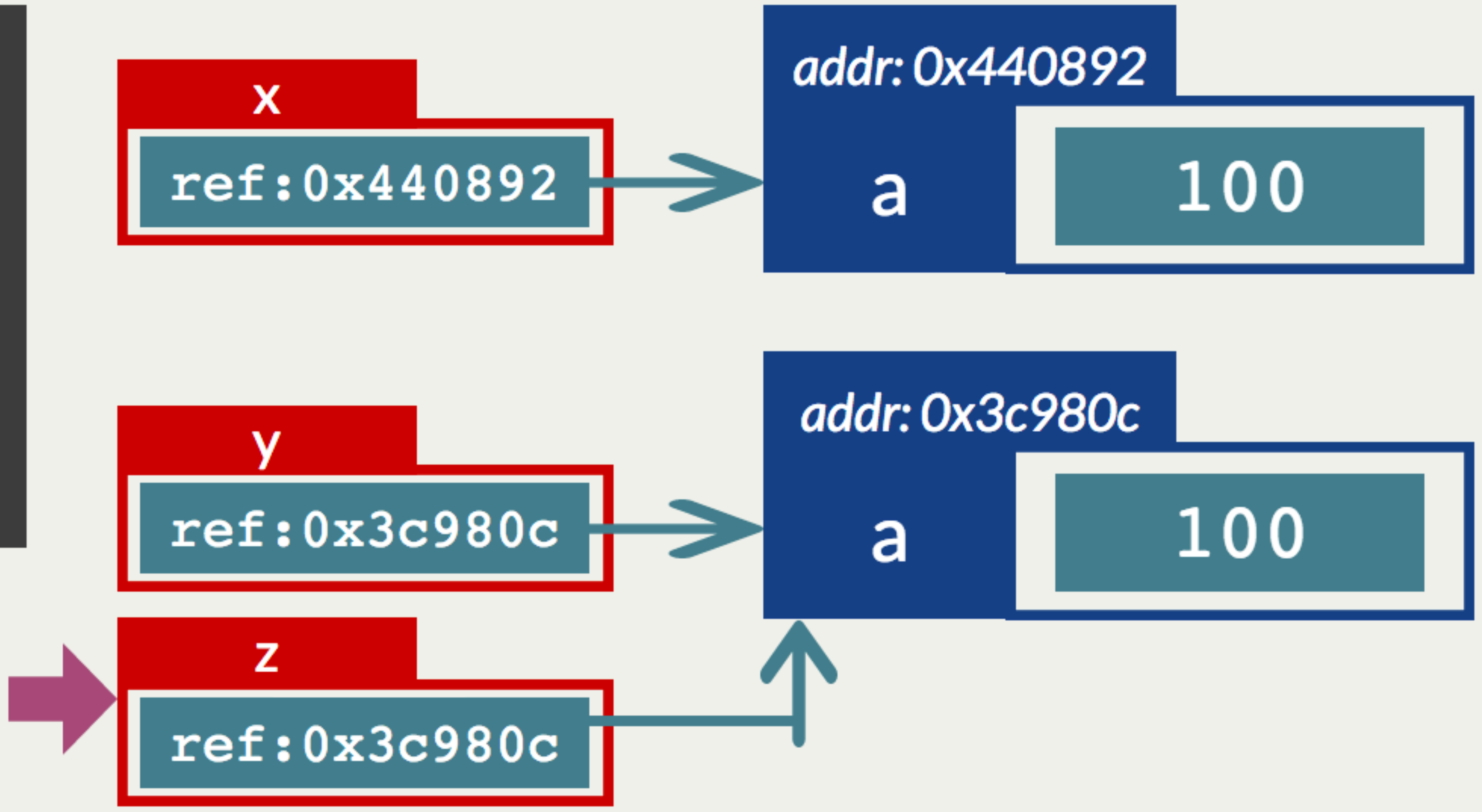


Similar to the “pointer” / “address” concept in programming languages like C or C++

Don't Forget Any Value Of The Object Type Is Actually A "Reference"

```
var x = { a: 100 };
var y = { a: 100 };
var z = y;

x === y; // false
y === z; // true
```

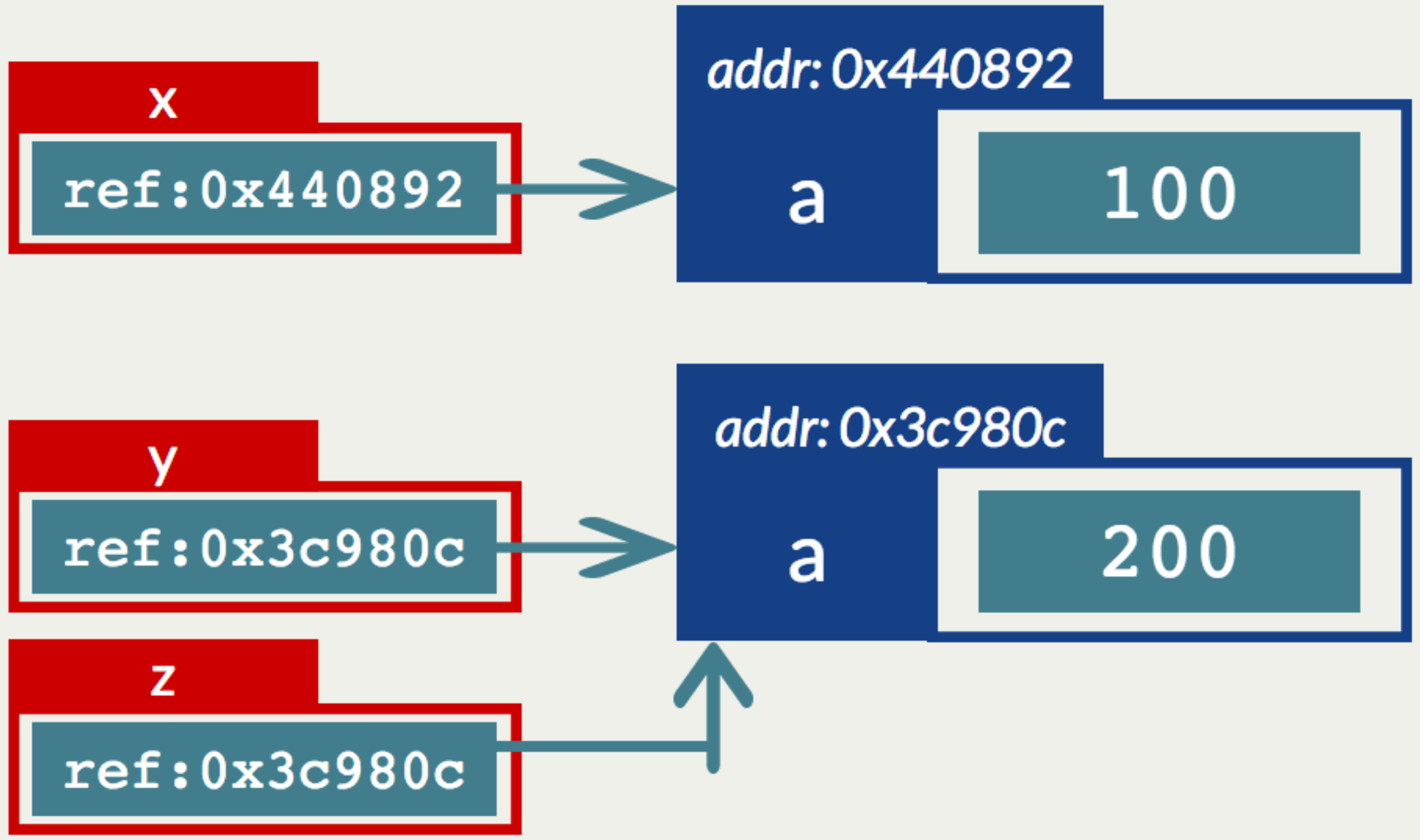


Don't Forget Any Value Of The Object Type Is Actually A "Reference"

```
var x = { a: 100 };
var y = { a: 100 };
var z = y;

x === y; // false
y === z; // true


z.a = 200;
```



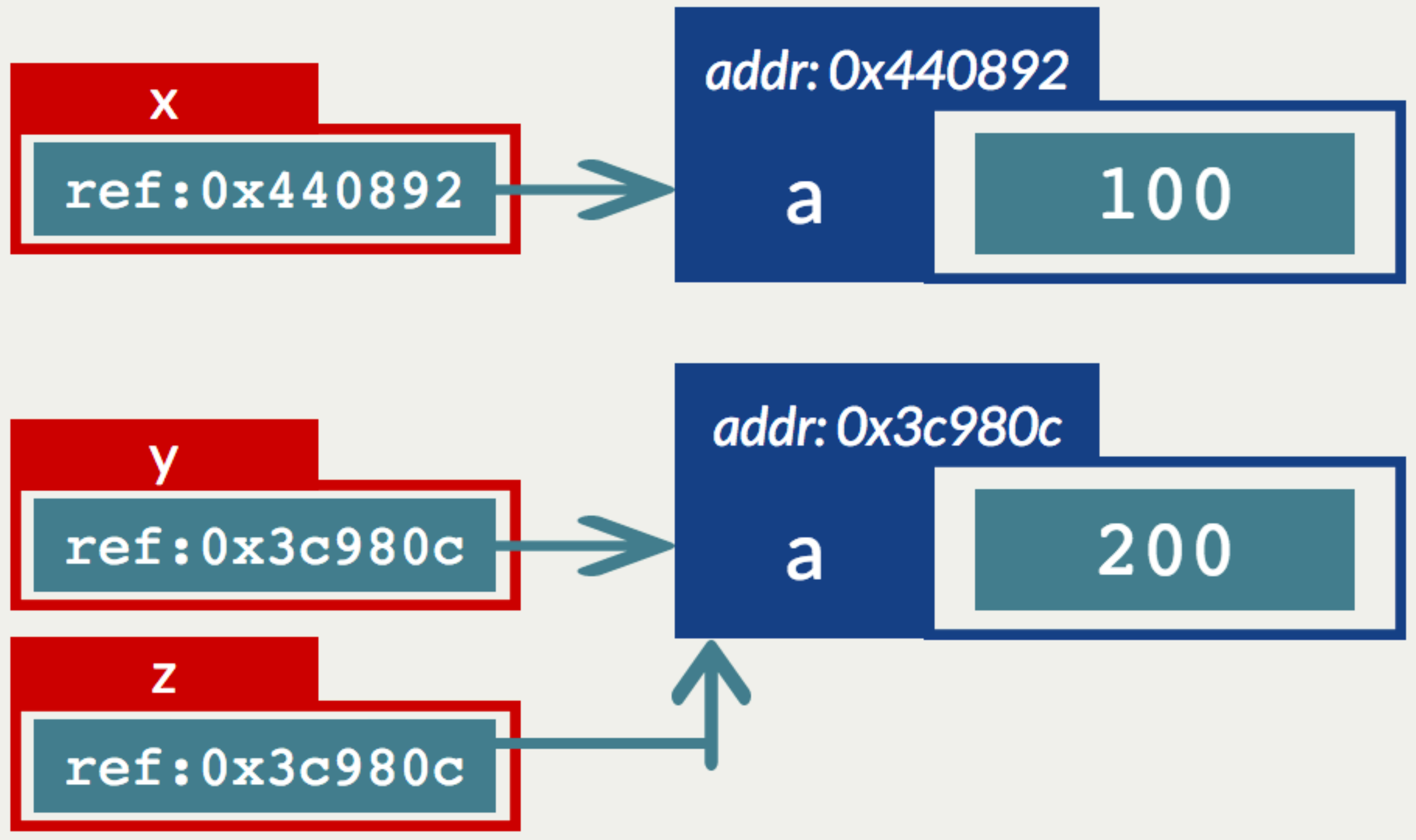
Don't Forget Any Value Of The Object Type Is Actually A "Reference"

```
var x = { a: 100 };
var y = { a: 100 };
var z = y;

x === y; // false
y === z; // true


z.a = 200;

x.a; // 100
y.a; // 200
z.a; // 200
```



x
ref:0x440892
addr: 0x440892
a
100
y
ref:0x3c980c
z
ref:0x3c980c
addr: 0x3c980c
a
200