Week 13 - Day 1 (Call-by-value)

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# Week 13 - Day 1 (Call-by-value)

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## Navigate using audio

# CALL-BY-VALUE

* CALL-BY-VALUE
  + every modern language
    - except c++
      * Audio 0:02:30

int swap(int a, int b) {  
 int temp=a;  
 a = b;  
 b = temp;  
}

… but in c

int x = 5  
int y = 13;  
// x still = 5  
swap(x,y);  
// x equals the old value of y now  
swap(&x,&y);  
int \*z = &y;  
// now x = old value of y, z still equals address of y  
// Audio 0:07:30  
swap(&x,z);  
// you can change what z points to, but you can't change z itself

* Call by value means you can’t change the value of a variable by passing it to a function

## CALL-BY-REFERENCE

int swap(int &a, int &b) {  
 int temp=a;  
 a = b;  
 b = temp;  
}

… now

int x = 5;  
int y = 13;  
// now this swaps   
swap(x, y);

Audio 0:10:10

## We can do it in SCAM too

## Call-by-reference

; We capture the calling environment with "#"  
(define (swap # $a $b)  
 ; Audio 0:11:43  
 (define temp (# $a))  
 ; Set $a in the calling environment to whatever $b is in the calling environment  
 (set $a (# $b) #)  
 ; Audio 0:12:24  
 ; Set $b to whatever temp is in the calling environment  
 (set $b (temp #))  
)

Audio 0:13:40

You can avoid needing a complicated macro pattern with call-by-reference

Usually just syntactic sugar for passing pointers around

Audio 0:15:50

## Call-by-value-result (Ada)

## Ada

* Ada had 500 keywords
* It also had a call-by-value-result

function f(a,b) {  
 a = 0;  
 // right before we return from the function, we update to be call-by-reference  
 // Audio 0:19:03  
 return expr;  
}

Got distracted…

Sorry

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