Lecture 7, 1 September 2026

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Programming and Data Structures with Python

Type errors

Forgetting to initialize empty dictionary / list

Error is only detected when code is run

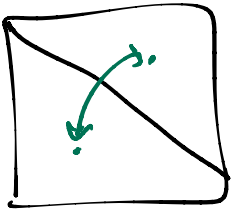
In a "good" PL, type errors should be caught syntactically, before execution

Indexing nested collections

`l[i][j]` not `l[i,j]`

Matrix transpose

Square



M[i][j] ← M[j][i]

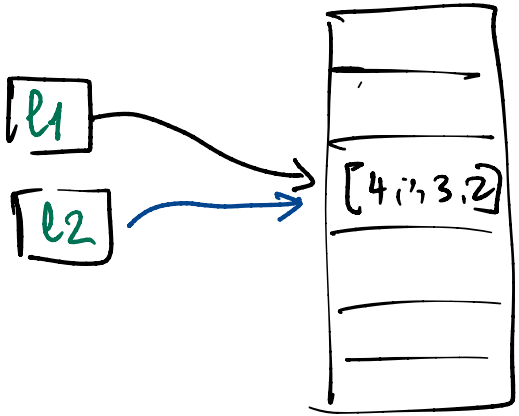
M[j][i] ← M[i][j]

$M_{ij}, M_{ji} = M_{ji}, M_{ij}$

Mutability

$l_1 = [4,1,3,2] \Rightarrow$

$l_2 = l_1$



zero_row = [0, 0, 0, 0, 0]

zero_matrix = [zero_row, zero_row, ..., zero_row]

zero_matrix[0] = zero_row

zero_matrix[1] = zero_row

Call by reference ≃ mutable Lists, Dictionaries

Call by value ≃ immutable Everything else

int

float

bool

tuples

string

Calling functions

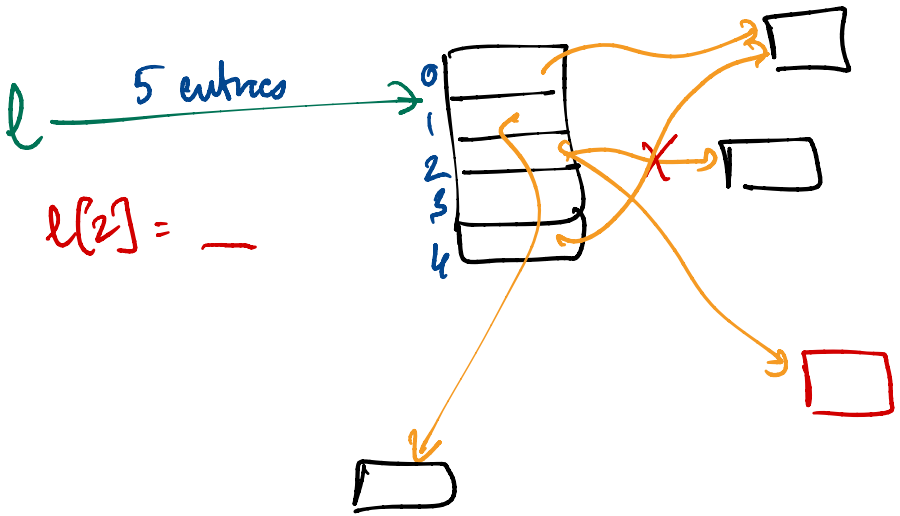
```
def mysum(a,b):
    return (a+b)
```

```
x = 5
y = 7
z = mysum(x,y)
```

```
a = x
b = y
return (a+b)
```

|| obeys rules of mutability

Mutable collection



Swap

$t = y$

$y = x$

$x = t$

myswap(x, y):

$t = y$

$y = x$

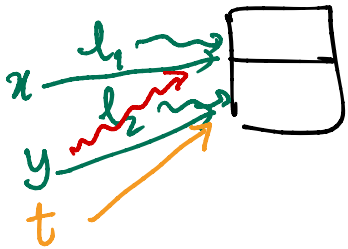
$x = t$

new y

∴ myswap(l1, l2)

$x = l1$

$y = l2$



Reassign a mutable name in a function,

it becomes a new name