

lab 4 : Posted

quiz 4 : Today

Quiz review

① write a fn that concatenates 2 lists.

```
def cat(A, B):  
    return (A + B)  
# end cat()
```

what if you don't have + then

```
def cat(A, B):  
    C = A[:] # or C = list(A)  
    for i in range(len(B)):  
        C.append(B[i])  
    # end for  
    return C  
# end cat()
```

② write a fn. that interleaves
2 lists

e.g. $A = [1, 2, 3]$ $\rightarrow$ $[1, 4, 2, 5, 3, 6]$
 $B = [4, 5, 6]$

e.g. $[1, 2, 3, 4]$ $\rightarrow$ $[1, 5, 2, 6, 3, 4]$
 $[5, 6]$

```
def interleave(A, B): # assume len(A) == len(B)
    C = []
    for i in range(len(A)):
        C.append(A[i])
        C.append(B[i])
    # end for
    return C
# end interleave()
```

Built in list functions

- append() ✓
- insert(): adds a value to a given index in list ✓
- count(): counts # of occurrence of an item. ✓
- reverse: reverse a list ✓
- pop(): deletes & returns last element
pop(i): deletes & returns ith element ✓
- remove(): deletes an element (value) ✓

Ex. Suppose you wish to square everything in a list, replacing elements.

one way

```
for i in range(len(L)):
```

$$L[i] = L[i] ** 2$$

another way

```
for (i, x) in enumerate(L):
```

$$L[i] = x ** 2$$

another way: list comprehension

$$L = [x ** 2 \text{ for } x \text{ in } L]$$

Nested Lists

A matrix is a rectangular array of numbers.

$$M = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \quad \begin{matrix} \text{size} \\ 3 \times 3 \end{matrix}$$

can be represented as a list of lists.

$$[[1, 2, 3], [4, 5, 6], [7, 8, 9]]$$

matrix addition:

$$\begin{pmatrix} 2 & 7 \\ 0 & 3 \end{pmatrix}_{2 \times 2} + \begin{pmatrix} 5 & -1 \\ 6 & 2 \end{pmatrix}_{2 \times 2} = \begin{pmatrix} 7 & 6 \\ 6 & 5 \end{pmatrix}_{2 \times 2}$$

In Python

$$([[2, 7], [0, 3]], [[5, -1], [6, 2]]) \rightarrow [[7, 6], [6, 5]]$$

define this

Questions : Pa 7

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builtin fun : `sum()`

$T = (1, 5, 2, 7)$ 4 random throw of a 10-sided die

• `sum(T)` returns 15

`freq = [0, 0, 0, ..., 0]` ↖ max pos sum = 40 in this case

`freq[15] += 1`

now `freq = [0, 0, ..., 1, ..., 0]` 15 40