extra problems

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26 September 2019

## Matrix diagonal

1. Extract the diagonal of a square matrix
2. Extract the specified **off-diagonal** values of a square matrix.

e.g.

* mdiag(x) = [x11, x22, x33, x44]
* mdiag(x,-1) = [x12,x23,x34]
* mdiag(x,1) = [x21, x32, x43]

## Matrix multiplication

The formal definition of matrix multiplication for two matrices and is

where is the number of columns of and the number of rows of (these dimensions must be the same, or the matrices are *non-conformable* and can’t be multiplied).

As an example, if

then their product is

## Remove-all

* Write a remove\_all(x,v) function that removes *all* occurrences of a value v within a list x and returns the result. It should still work (i.e. it should return x unchanged) if there are no occurrences in the list.

**example:**

x = ['a','z','y','z']  
remove\_all(x,'z')  
## answer: returns  
['a','y']

## primes

1. Write a function prime1 that tests whether a specified natural number n is prime and returns a boolean value. In order to do this, you need to test whether it is divisible by any number between 2 and (hint: your range should end at round(math.sqrt(n))+1; don’t forget to import math).
2. Write a function allprimes that uses a for or while loop and calls prime1 to generate and return a list of all of the primes between 2 and a specified natural number n (inclusive)

More efficient: [Sieve of Eratosthenes](https://www.geeksforgeeks.org/python-program-for-sieve-of-eratosthenes/)