Linear Algebra

The *NumPy* module also comes with a number of built-in routines for linear algebra calculations. These can be found in the sub-module *linalg*.

linalg.det

The *linalg.det* tool computes the determinant of an array.

```
print numpy.linalg.det([[1 , 2], [2, 1]])       #Output : -3.0
```

linalg.eig

The *linalg.eig* computes the eigenvalues and right eigenvectors of a square array.

```
vals, vecs = numpy.linalg.eig([[1 , 2], [2, 1]])
print vals                                   #Output : [ 3. -1.]
print vecs                                    #Output : [[ 0.70710678 -0.70710678]
                                         #         [ 0.70710678  0.70710678]]
```

linalg.inv

The *linalg.inv* tool computes the (multiplicative) inverse of a matrix.

```
print numpy.linalg.inv([[1 , 2], [2, 1]])       #Output : [[-0.33333333  0.66666667]
                                         #         [ 0.66666667 -0.33333333]]
```

Other routines can be found here

Task

You are given a square matrix A with dimensions NXN. Your task is to find the determinant.

Input Format

The first line contains the integer N.
The next N lines contains the N space separated elements of array A.

Output Format

Print the determinant of A.

Sample Input

```
2
1.1 1.1
1.1 1.1
```

Sample Output

```
0.0
```