



## NumPy (Hands-on 2)

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**Problem Statement:**

Numpy library package from python is one of the most useful while conducting any statistical analysis in data science. Familiarize yourself with the nitty gritty of the numpy and various modules that it comes with.

**Tasks to be Performed:**

1. Given two numpy arrays A and B that have values [1,2,3,4] and [5,6,7,8] respectively. Perform the following operations.
  - a. Add the two arrays
  - b. Subtract the two arrays
  - c. Multiply the two arrays:
    - i. With 5
    - ii. With each other.
  - d. Divide the two arrays:
    - i. By 2
    - ii. Divide A with B
    - iii. Divide B with A.
2. For the given two arrays A and B.  
`a = np.array([[2,9],[6,13]])`  
`b = np.array([[1,4],[3,11]])`  
Perform the following operations,
  - a. Cross product of A and B.
  - b. Dot product of A and B.
  - c. Matrix multiplication of A and B.
  - d. Square root of A and B.
3. Create a 3x3 matrix with random values, flatten the array with the `reshape()` method and print the shape of the flattened array and the resultant array.
4. Create an array that will have days from an entire year in the datetime format using the `datetime64` numpy method.
5. Given two arrays A and B, perform the following operations  
`A = np.array([[2,3],[6,4]])`  
`B = np.array([[3,6],[4,9]])`
  - a. Horizontal stacking
  - b. Vertical Stacking
  - c. Row Stacking
  - d. Column Stacking
  - e. Depth Stacking
  - f. Append A to B
  - g. Concatenate A and B
6. Given an array A, perform the following operations

```
A = np.array([[1,2,3],[4,5,6],[7,8,9],[10,11,12],[13,14,15], [16,17,18]])
```

- a. Horizontal split
  - b. Vertical Split
  - c. Row Split
  - d. Column Split
7. For a given 3x3 matrix, perform the following operations.  

```
A = np.array([[1,4,7],[3,1,9],[2,8,11]])
```

  - a. Find the rank of the matrix
  - b. Find the trace of the matrix
  - c. Find the inverse of the matrix
  - d. Find the transpose of the matrix
  - e. Find the determinant of the matrix
  - f. Find the eigenvalues and eigenvectors the matrix
8. For the given two arrays A and B, find the correlation coefficients.  

```
A = np.array([[11,17,42],[21,19,27]])  
B = np.array([[12,44,39],[62,81,10]])
```