# NPTEL Course: Programming, Data Structures and Algorithms in Python (*by* Prof. Madhvan Mukund)

## *Tutorial (Week 4)*

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# Problem 1: Convert all the digits of a number to respective word

Idea here is to convert the digits of a number to word, for example, 1234 will be read as 'One Two Three Four'.

*Approach:*

➢ First of all, we shall check for the validity of the user input.

➢ For a valid user input, we shall start with a base case, where 0 will return 'Zero'

➢ Now we shall *recursively* assign the word for respective digit.

➢ However, we need to be careful while printing our output as printing before recursion call can produce a reversed output (see example in the *notebook* used).

# Problem 2: Converting a dictionary with values as a list to flat dictionary.

In real life problems the memory required to store the data could be quite large. In practice it is handy to wisely store the data in a variable in such a manner that it takes minimum possible memory.

For example, a dictionary {'seq_in_year' : [1, 2, 3, 4 ….] , 'month' :  ['JAN', 'FEB', 'MARCH', ….]} can be rewritten as: {1: 'JAN', 2: 'FEB', 3: 'MAR' ….}, this will not only save some memory stored in the variable, but will also simplify the iterations when required for calculations.

*Approach:*

➢   Using *inbuilt* functions like zip() and dict() we can easily simplify our dictionary.
➢   Example for the same and importance is discussed in the *notebook* discussed during tutorial.

# Problem 3: Standard deviation of the numeric values in a tuple of the form (('str1',num1),('str2',num2)..so on)

*Standard deviation*** is the statistical measure of the spread about the mean in a dataset.

$$mean\ (\bar{x})\ =\ \frac{1}{N}\sum_{i=1}^{N} x_i$$

$$standard\ deviation\ (\sigma)\ =\ \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i\ -\ \bar{x})^2}$$

*Approach:*

➢ As the standard deviation is meaningful only for numeric value, hence second element of the nested tuple is of importance.

➢ We need to carefully iterate over the numeric element of the nested tuple to compute the mean and then standard deviation.

➢ However, there are numerous standard libraries in python to compute the statistical parameters.