What is Recursion?

The process in which a function calls itself directly or indirectly is called recursion and the corresponding function is called as recursive function. Using recursive algorithm, certain problems can be solved quite easily. Examples of such problems are Towers of Hanoi (TOH), Inorder/Preorder/Postorder Tree Traversals, DFS of Graph, etc.

A Mathematical Interpretation

Let us consider a problem that a programmer have to determine the sum of first n natural numbers, there are several ways of doing that but the simplest approach is simply add the numbers starting from 1 to n. So the function simply looks like,

approach(1) – Simply adding one by one

$f(n) = 1 + 2 + 3 + \ldots\ldots + n$

but there is another mathematical approach of representing this,

approach(2) – Recursive adding

$$f(n) = 1 \qquad n=1$$

$$f(n) = n + f(n-1) \quad n>1$$

There is a simple difference between the approach (1) and approach(2) and that is in approach(2) the function " f( ) " itself is being called inside the function, so this phenomenon is named as recursion and the function containing recursion is called

recursive function, at the end this is a great tool in the hand of the programmers to code some problems in a lot easier and efficient way.

What is base condition in recursion?

In the recursive program, the solution to the base case is provided and the solution of the bigger problem is expressed in terms of smaller problems.