**Hash Function in Data Structure:**

There are almost 150 Zettabytes of data getting generated each day, which is equivalent to 150 trillion Gigabytes of data. With such an enormous speed of data growth, there emerges a need to store this data in an effective and efficient manner. By an effective and efficient manner of storage, we mean a way that will provide us the flexibility of retrieving the data in a minimal amount of time, because the more time required for an operation will directly increase the cost associated with that particular operation. So, in order to reduce the cost of an operation and do that task in an efficient manner, we need to reduce the retrieval time of the data for that particular task. And the solution for reducing the retrieval time is the Hash function or hash table. The hash function is used to map or bind the data to a particular hash value and then that hash value will be used as an index or a key to store that value in the hash table. The main benefit of storing data in the hash tables is that the retrieval time of the data stored in the hash tables is of unit time. That means the data that is stored in the hash table can be read with time complexity of O(1). So, in this way, the hash tables play an important role in drastically reducing the time required for reading the data from the hash tables. And for the working of the hash tables, it requires a hash function. Now let us see what is a hash function and how it works.

Hash Function can be defined as an algorithm or a function that is used to map or convert data of bigger size or length to a fixed or small index or hash value. In other words, a hash function can be defined as an algorithm that will be used to convert the data of higher length or size to data that is within a fixed range or size.

The input parameter that is passed to a hash function is the input data that needs to map to some hash data. And the output or result provided by a hash function depicts the hash value or the hashes that are associated with that input parameter value. The hash functions are associated with the hash tables that will actually store the data in the memory and the hash function is used only to map those values to the hash tables. The hash value returned by the hash function for the data item passed as an input parameter is then further used as an index to map or store that input data into the hash table. Or, we can say that the hash value returned by the hash function for the data item passed as an input parameter is used as a key for storing that data which will help in the easy and efficient retrieval of the stored data.