**Hashing**

A mathematical technique in which **an infinite set of input values is mapped to a finite set of output values**, called hash values.

Hashing is useful for rapid lookups of data in a hash table.

Hash functions are primarily used to generate fixed-length output data that acts as a shortened reference to the original data. This is useful when the original data is too cumbersome to use in its entirety.

Hash functions are primarily used in hash tables, to quickly locate a data record given its search key (the headword).

Specifically, the **hash function** is used **to map** the **search key** to an **index**; the index gives the place in the hash table where the corresponding record should be stored. Hash tables, in turn, are used to implement associative arrays and dynamic sets.

Hash table

An in-memory data structure that associates join keys with rows in a hash join.

For example, in a join of the employees and departments tables, the join key might be the department ID. A hash function uses the join key to generate a hash value. This hash value is an index in an array, which is the hash table.

Hash function

A function that operates on an arbitrary-length input value and returns a fixed-length hash value.

**Hashing in Java**

Hashing is a way to assigning a unique code for any variable/object after applying any formula/algorithm on its properties.

A true Hashing function must follow this rule:

Hash function should return the same hash code each and every time, when function is applied on same or equal objects.

In other words, two equal objects must produce same hash code consistently.

All objects in java inherit a default implementation of hashCode() function defined in Object class.

This function produce hash code by typically converting the internal address of the object into an integer, thus producing different hash codes for all different objects.

**Usage of hashCode() and equals()**

hashCode() method is used to get a unique integer for given object.

This integer is used for determining the bucket location, when this object needs to be stored in some HashTable like data structure. By default, Object’s hashCode() method returns and integer representation of memory address where object is stored.

equals() method, as name suggest, is used to simply verify the equality of two objects.

Default implementation simply check the object references of two objects to verify their equality.