Hash tables are data structures that store data as a collection of key-value pairs. In Python these are implemented as dictionaries. Hash tables generally provide very fast(O(1)) lookups, insertions and deletions, so you they can be found wherever high performance searching is a requirement. While in arrays, elements are referenced by their integer indexes, in hash tables (or dictionaries) elements/values are referenced by their keys, which can be of any data type.

The position of the data within the array is determined by applying a hashing algorithm (aka hash function) to the key - a process called hashing. There are different types of hash functions (http://www.miraclesalad.com/webtools/md5.php | i.e: MD5, SHA1, SHA256) which are used to convert the keys into hashes that are unique for each key.

The process of hashing is similar to having a box with slots and then assign hashes to those slots. They can store the key and value pair associated with the hashes, or in a data structure within the slot (like, linked lists) that would work with them.

In general, the lookup, insert and delete operations are quite quick, in the order of O(1), but in some cases, several keys can lead to the same slot (called a collision), which slightly increases the time complexity. However, collisions can be resolved with various techniques, such as linear probing (open addressing).

In [1]:
```
dictionary = dict()
dictionary = {'one':234, 'two': 'hello', 'three': 'world', 'four':9, 'five
print(dictionary)
```

```
{'one': 234, 'two': 'hello', 'three': 'world', 'four': 9, 'five': 5}
```

In [2]:
```
print(dictionary.keys())
```

```
dict_keys(['one', 'two', 'three', 'four', 'five'])
```

In [3]:
```
print(dictionary.values())
```

```
dict_values([234, 'hello', 'world', 9, 5])
```

In [4]:
```
print(dictionary.items())
```

```
dict_items([('one', 234), ('two', 'hello'), ('three', 'world'), ('four', 9)
, ('five', 5)])
```

In [5]:
```
print(dictionary['one']) # Accessing a value by its key in O(1) time
```

```
234
```

In [6]:
```
dictionary['six'] = 'Porto' # Inserting the value 'Porto' for the key 'six
print(dictionary)
```

```
{'one': 234, 'two': 'hello', 'three': 'world', 'four': 9, 'five': 5, 'six':
'Porto'}
```