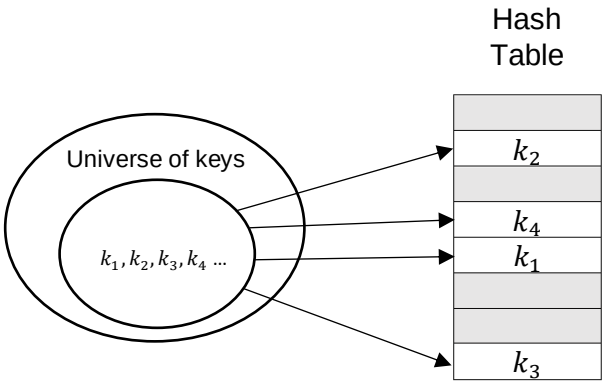
TAD Hash Table

Hash Table $= \{(k_1, v_1), (k_2, v_2), (k_3, v_3) \dots (k_n, v_n)\}$
Where the element (k_n, v_n) is the last element added

Graphic representation



This hash table is worked with open addressing, so that each key has only one and unique value

$\{inv: k_1 = v_1, k_2 = v_2, k_3 = v_3 \dots k_n = v_n\}$

Primitive Operations

Name	Input	Output
HashTable	…	HashTable
AddElement	HashTable x key x value	HashTable
Remove	HashTable x key	HashTable
IsFull	HashTable	Boolean
IsEmpty	HashTable	Boolean
Search	HashTable x key	Boolean
GetSize	HashTable	Integer

HashTable( ) : Constructor
"Create a new empty hash table"
$pre = \{true\}$ $pos = \{new\ hash\ table\ empty\}$

AddElement(K key, V value) : Modifier
"Adds a new element to the hash table, this element has a key and a value"
$pre = \{hashTable\ created\}$ $pos = \{new\ key\ included\ through\ open\ addressing\}$

Remove(K key) : Modifier
"Removes an element from the hash table according to the key"
$pre = \{hashTable\ created\ and\ k\ is\ in\ the\ hashTable\}$ $pos = \{key\ doesn't\ exist\ in\ the\ hashTable\ and\ slot\ null\}$

isFull( ) : Validation
“To know if all slots of the hash table are full”
$pre = \{hashTable\ created\}$ $pos = \{true\ if = \{\forall x \mid x\ \in Slots, x\ \neq null\}, false\ if\ not\}$

isEmpty( ) : Validation
"Allows to check if the hash table has elements or not".
$pre = \{hashTable\ created\}$ $pos = \{true\ if\ the\ hashTable\ is\ empty, false\ if\ not\ it\}$

Search(K key) : Validation
“Allows to determine if a key is in the hash table”
$pre = \{hashTable\ created\ and\ hashTable\ != empty\}$ $pos = \{true\ if\ the\ key\ is\ in\ the\ hashTable, false\ if\ not\ it\}$

getSize( ) : Validation
“Determines how many slots are being used”
$pre = \{hashTable\ created\}$ $pos = \{integer\ acording\ the\ amount\ of\ slots\ != null\}$