Diagram

Description automatically generated**MAPS AND THE Map INTERFACE**

The Map is related to the Set

Mathematically, a Map is a set of ordered pairs whose elements are known as the key and the value

Keys must be unique, but values need not be unique

You can think of each key as a “mapping” to a particular value

A map provides efficient storage and retrieval of information in a table

A map can have many-to-one mapping: (B, Bill), (B2, Bill)

A map cannot have one-to-many mapping. We cannot have (J, Bob), if we have (J, Jane). A key should be unique.

In an onto mapping, all the elements of valueSet have a corresponding member in keyset, there is no element in the valueSet that is not mapped by a key value.

The Map interface should have methods of the form:

* V get (Object key)
* V put (K key, V value)
  + If there is an old value for the key K, it is returned and new K,V pair will be added.
  + If key is new, null reference will be returned.

When information about an item is stored in a table, the information should have a unique ID

A unique ID may or may not be a number

This unique ID is equivalent to a key

Table

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Diagram

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Map Interface

Table

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Building a Map object:

Diagram, venn diagram

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aMap.get(“B1”) 🡪 This returns : “Bob”

aMap.get(“Bill”) 🡪 This returns : null (“Bill” is a value, not a key)

How can we implement Map?

You can use 2 arrays for key references and value references.

You can use a set of (key, value) pairs.

BST or HashSet can also be used. Any set can be used to implement map interface.

Creating an Index of Words

We have used a binary search tree to store an index of words occurring in a term paper before.

Each element in the bst consisted of a word followed by a three digit line number

If we store the index in a Map, we can store all the line number occurrences for a word in a single index entry

Map<String, ArrayList<Integer>> index;

String may be “a” and 5, 7, 12 are the line numbers for word “a”.

Each time a word is encountered, its list of line numbers is retrieved (using the word as key)

The most recent line number is appended to this list.

Text, letter

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index is the map.