

1 ADT: Map

A *map* (also called *associative array*) is a collection of unique keys and a collection of values, where each key is associated with a single value. Supported operations are:

- creating an empty map;
- querying whether a map contains a given key;
- lookup of a value associated with a given key, if the key is present;
- inserting a key and a value to be associated with it, if the key is *not* already present;
- removing a key (together with the associated value), if the key is present.

Design an abstract data type MAP that corresponds to the specification given above.

TYPES

MAP [K, V]

FUNCTIONS

- *new*
- *has*
- *item*
- *put*
- *remove*

PRECONDITIONS

- P1
- P2
- P3

AXIOMS

- A1
- A2
- A3
- A4
- A5
- A6
- A7
- A8

