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1. Suppose that the set of loans made by a library is to be represented in a data structure. Each book in the library may be electronically checked out by multiple patrons at a time. Moreover, a single patron may be able to check out multiple books. To be able to efficiently determine whether a patron has a given book, the library data structure is best represented by a dictionary where:

A. the patrons are the keys and the books are the values.
B. None of the other answers are correct.
C. [Your Answer] unique indices starting from 0 are the keys and the pair (books,patrons) is the value.
D. [Correct Answer] a concatenated string `books+patrons` is the key and a boolean is the value.
E. the books are the keys and the patrons are the values.

2. Which of the following is a correct way to declare an instance of a `list` whose parameterized type is a `sphere` pointer?

A. [Correct Answer] [Your Answer] `list<sphere *> s;`
B. More than one of the declarations are correct.
C. `sphere<list> * s;`
D. None of the declarations are correct.
E. `list s(sphere *);`

3. How many data structures in this list can used to implement a Dictionary so that all of its functions have a worst case running time strictly better than $O(n)$?

- Stack
- Queue
- Binary-Search Tree
- AVL Tree
- Linked List

A. [Your Answer] 4
B. 5
C. 2
D. [Correct Answer] 1
E. 3

4. One of the main operations associated with the dictionary ADT is:

A. given a value, find the set of keys mapped to that value
B. [Your Answer] given a value, remove the entry that contains the value
C. given a value, return the key of the dictionary entry with the given value
D. [Correct Answer] given a key, remove the entry that contains the key
E. remove the first item in the dictionary