

1. Assume that you have a templated Latte class, and another coffee class. Which of the following correctly declares a variable called beverages which is a dynamic array of type Latte whose parameterized type is a coffee pointer?

- A. **[Your Answer]** None of the other options is correct.
- B. More than one of the other options are correct.
- C. `Latte * beverages = new coffee[size];`
- D. **[Correct Answer]** `Latte<coffee *> * beverages;`
- E. `Latte<coffee> * beverages;`

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

3. How many data structures in this list can be 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. 4
  - B. 2
  - C. 3
  - D. 5
  - E. **[Correct Answer]** **[Your Answer]** 1

4. Which of the following collection of function signatures corresponds to the Dictionary ADT?

- A. Exactly 2 of the other items can be considered to be Dictionaries.
- B. `void insert(key, value); void remove(key, value); void find(key);`
- C. `void insert(key, value); key remove(value); void find(value);`
- D. None of the other items describe a dictionary.
- E. **[Correct Answer]** **[Your Answer]** `void insert(key, value); void remove(key); value find(key);`