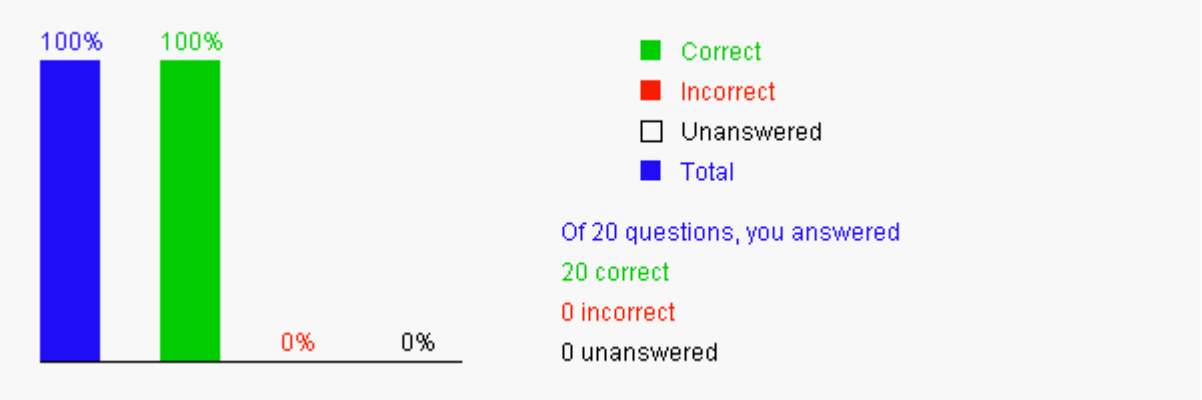
This quiz is for students to practice. A large number of additional quiz is available for instructors using Quiz Generator from the Instructor's Resource Website. Videos for Java, Python, and C++ can be found at https://yongdanielliang.github.io/revelvideos.html.

Chapter 24 Implementing Lists, Stacks, Queues, and Priority Queues



Please send suggestions and errata to Dr. Liang at y.daniel.liang@gmail.com. Indicate which book and edition you are using. Thanks!

Section 24.3 Array Lists

24.1 _____ is a data structure to store data in sequential order.

- (●) A. A list
- ( ) B. A set
- ( ) C. A tree
- ( ) D. A stack
- ( ) E. A queue

Your answer is correct ✔

24.2 Which of the following operations are supported by a list?

- [x] A. Retrieve an element from this list.
- [x] B. Insert a new element to this list.
- [x] C. Delete an element from this list.
- [x] D. Find how many elements are in this list.
- [x] E. Find whether an element is in this list.

Your answer is correct ✔

24.3 Which of the following statements are true?

- [x] A. MyArrayList and MyLinkedList are two concrete implementations of MyList.
- [x] B. MyArrayList is implemented using an array. The array is dynamically created. If the capacity of the array is exceeded, create a new larger array and copy all the elements from the current array to the new array.
- [x] C. MyLinkedList is implemented using a linked structure.
- [x] D. A linked structure consists of nodes. Each node is dynamically created to hold an element. All the nodes are linked together to form a list.

Your answer is correct ✔

24.4 In the implementation of MyArrayList, which of the following are true?

- [x] A. size indicates the number of elements in the list.
- [x] B. capacity is the length of the array used to store the elements in the list.
- [ ] C. capacity is always greater than size.
- [x] D. size is reduced by 1 if an element is deleted from the list.
- [ ] E. capacity is reduced by 1 if an element is deleted from the list.

Your answer is correct ✔
Explanation: (C) is not correct because capacity may equal to size.

24.5 In the implementation of MyArrayList, which of the following are true?

- [ ] A. size never reduces.
- [x] B. capacity never reduces.
- [x] C. Inside MyArrayList, a regular array is used to store elements.
- [x] D. If the current capacity equals to size, capacity is doubled when a new element is added to MyArrayList

Your answer is correct

Section 24.4 Linked Lists

24.6 In the implementation of MyLinkedList, which of the following are true?

- [x] A. MyLinkedList contains all the methods defined in MyList. Additionally, MyLinkedList defines several new methods that are appropriate for processing a linked list.
- [x] B. MyArrayList does not introduce new methods. All the methods in MyArrayList are defined in MyList.
- [x] C. You can use a linked list to improve efficiency for adding and removing an element anywhere in a list.
- [x] D. You should use an array list if your application does not require adding and removing an element anywhere in a list.

Your answer is correct

24.7 In the implementation of MyLinkedList, which of the following are true?

- [x] A. Node is defined as an inner class inside MyLinkedList.
- [x] B. Node is defined as a static inner class inside MyLinkedList because it does not reference any instance data fields in MyLinkedList.
- [x] C. Node has a property named next that links to the node after this node.
- [x] D. Node has a property named element that stores an element.

Your answer is correct

24.8 In the implementation of MyLinkedList, which of the following are true?

- [ ] A. MyLinkedList has a capacity property.
- [x] B. MyLinkedList has the properties named first and last to point to the nodes in a linked list.
- [x] C. If a linked list is empty, first is null and last is null.
- [ ] D. If a linked list contains one element, first points to the node and last is null.
- [x] E. last.next is always null.

Your answer is correct
Explanation: (D) is partially wrong, last and first points to the same node if a linked list contains one node.

24.9 MyArrayList is more efficient than MyLinkedList for the following operations:

- ( ) A. Insert/delete an element in the middle of the list.
- ( ) B. Insert/delete an element in the beginning of the list.
- ( ) C. Append an element at the end of the list.
- (•) D. Retrieve an element at given the index.

Your answer is correct
Explanation: See Table 24.1.

24.10 MyLinkedList is more efficient than MyArrayList for the following operations:

- ( ) A. Insert/delete an element in the middle of the list.
- (•) B. Insert/delete an element in the beginning of the list
- ( ) C. Append an element at the end of the list.
- ( ) D. Retrieve an element at given the index.

Your answer is correct
Explanation: See Table 24.1.

24.11 Suppose list1 is a MyArrayList and list2 is a MyLinkedList. Both contains 1 million double values. Analyze the following code:

```
A:
while (list1.size() > 0)
  list1.remove(0);

B:
while (list2.size() > 0)
  list2.remove(0);
```

- ( ) A. Code fragment A runs faster than code fragment B.
- (•) B. Code fragment B runs faster than code fragment A.
- ( ) C. Code fragment A runs as fast as code fragment B.

Your answer is correct

24.12 Suppose list1 is an MyArrayList and list2 is a MyLinkedList. Both contains 1 million double values. Analyze the following code:

```
A:
while (list1.size() > 0)
  list1.remove(size() - 1);

B:
while (list2.size() > 0)
  list2.remove(size() - 1);
```

- (●) A. Code fragment A runs faster than code fragment B.
- ( ) B. Code fragment B runs faster than code fragment A.
- ( ) C. Code fragment A runs as fast as code fragment B.

Your answer is correct

24.13 Suppose list1 is an MyArrayList and list2 is a MyLinkedList. Both contains 1 million double values. Analyze the following code:

```
A:
for (int i = 0; i < 100000; i++)
  list1.add(0, i);

B:
for (int i = 0; i < 100000; i++)
  list2.add(0, i);
```

- ( ) A. Code fragment A runs faster than code fragment B.
- (●) B. Code fragment B runs faster than code fragment A.
- ( ) C. Code fragment A runs as fast as code fragment B.

Your answer is correct

24.14 Suppose list1 is an MyArrayList and list2 is a MyLinkedList. Both contains 1 million double values. Analyze the following code:

```
A:
for (int i = 0; i < 100000; i++)
  list1.add(i);

B:
for (int i = 0; i < 100000; i++)
  list2.add(i);
```

- ( ) A. Code fragment A runs faster than code fragment B.
- ( ) B. Code fragment B runs faster than code fragment A.
- (●) C. Code fragment A runs as fast as code fragment B.

Your answer is correct

24.15 Suppose list1 is a MyArrayList and list2 is a MyLinkedList. Both contains 1 million double values. Analyze the following code:

```
A:
for (int i = 0; i < list1.size(); i++)
  sum += list1.get(i);

B:
for (int i = 0; i < list2.size(); i++)
  sum += list2.get(i);
```

- (●) A. Code fragment A is more efficient that code fragment B.
- ( ) B. Code fragment B is more efficient that code fragment A.
- ( ) C. Code fragment A is as efficient as code fragment B.

Your answer is correct

Section 24.5 Stacks and Queues

24.16 Which of the following are true?

- [x] A. A stack can be viewed as a special type of list, where the elements are accessed, inserted, and deleted only from the end, called the top, of the stack.
- [x] B. A queue represents a waiting list. A queue can be viewed as a special type of list, where the elements are inserted into the end (tail) of the queue, and are accessed and deleted from the beginning (head) of the queue.
- [x] C. Since the insertion and deletion operations on a stack are made only at the end of the stack, you can use either an ArrayList or a LinkedList. However, ArrayList has less overhead than LinkedList.
- [x] D. Since deletions are made at the beginning of the list, it is more efficient to implement a queue using a LinkedList than an ArrayList.

Your answer is correct
Explanation: See the first paragraph.

24.17 In the implementation of MyStack and MyQueue, which of the following are true?

- [ ] A. MyStack contains all the methods defined in MyArrayList.
- [ ] B. MyQueue contains all the methods defined in MyLinkedList.
- [x] C. MyStack contains an array list for storing elements.
- [x] D. MyQueue contains a linked list for storing elements.

Your answer is correct 

Section 24.6 Priority Queues

24.18 Which data structure is appropriate to store patients in an emergency room?

- ( ) A. Stack
- ( ) B. Queue
- (•) C. Priority Queue
- ( ) D. Linked List

Your answer is correct 

24.19 Which data structure is appropriate to store customers in a clinic for taking flu shots?

- ( ) A. Stack
- (•) B. Queue
- ( ) C. Priority Queue
- ( ) D. Array List
- ( ) E. Linked List

Your answer is correct 

24.20 Suppose the rule of the party is that the participants who arrive later will leave earlier. Which data structure is appropriate to store the participants?

- (•) A. Stack
- ( ) B. Queue
- ( ) C. Array List
- ( ) D. Linked List

Your answer is correct