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Session 1 – with Solutions
Question 1

Last lecture, in the design of our FriendsBook application, we identified 3 possible classes: Person, List and FriendsBook. Why having a data collection (in this case a List) as a possible class?

A. Because it is the first data collection we are investigating.  
B. Because it was one of the requirements.
C. Because of the single responsibility principle.
D. All of the above
E. None of the above

The problem statement (or its requirements) does not say that “we must use a List”. It does, however, say that the application must maintain the data (several objects of the Person class) for a simple social network. Therefore, we know that our application will deal with lots of data, so we shall need a data collection class.

The single responsibility principle says that each class should have only one responsibility. In this application, the List class has the responsibility of managing the data (Person objects).
Question 2

Why is it advantageous to design and implement our data collections as Abstract Data Types (ADTs)?

A. Because they can be reused easily.
B. Because their implementation can be modified without affecting client code.
C. Because they ease s/w development team work.
D. All of the above
E. None of the above

For an explanation of the above three advantages, please, see Slides 12 to 15 of Lecture 5 - Data Collection as ADT Part 3 on our course web site.
Question 3

What must be known about the ADT Bag in order for a client code to use it?

A. How elements in the bag are modelled.
B. How bag operations are implemented.
C. How many elements can be stored in the bag.
D. The public interface of the bag.
E. None of the above
Question 4

The elements of a List are always ...

A. Sorted.
B. Unique (not duplicated).
C. Accessed using their position in the List.
D. Stored in an array.
E. None of the above

The List is a very flexible data collection. Very few constraints are put on its elements. Its elements can appear once in the List (unique) or they can appear more than once (duplicated). Its elements can be in sort order or not. The data structure implementing the List could be an array or some form of linked list. Finally, a List can be position-oriented or value-oriented.
Question 5

In C++, we create ADTs by ...

A. By using the class mechanism
B. By encapsulating data and operations into a class
C. By using private and public access modifiers
D. All of the above
E. None of the above
Question 6

What can be said about arrays?

A. Their capacity can be over or under estimated (disadvantage).

B. They are indexing data structures, hence allowing direct access, i.e., O(1), to each of their elements (if the index of the element is known).

C. As data structure, they are part of an ADT’s implementation.

D. All of the above

E. None of the above