CS260 Quiz 2

Attempt to answer the questions with your mind alone and then go online or get together with other CS people to verify, expand, or possibly find the answers to the following questions:

1. If we are trying to design a generic Node object, what are a few ways we could make it generic?  
     
   When building the node class, we are able to create a fairly generic node by getting the value of current value, and next value’s location. We can save this as a base, and expand it from there, but this is as basic as it seems to get.
2. What is an interface in java and what could it be used for? Are there any alternatives to using an interface that might be effective for similar uses?  
     
   An interface is a collection of abstract methods, it’s similar to a ~~method~~ class. It does not contain any constructors, and all of the methods are abstract. From what I am able to read online, you can use a class as a suitable substitute, only if you do not need to get similarity between unrelated objects, because class will force a relationship.
3. Why would we use something like the Iterator interface for any of our data structures?  
     
   We could use the iterator for looking through a list of objects, we can check if next object exists, what the next object is, and we can remove items through this method.
4. What behaviors do you think are necessary to represent an Abstract Data Type for a list? How difficult would it be to implement each of those behaviors?  
     
   from my research, many abstract data types use a collection of methods like:

Add – not too difficult to implement.

Remove – not too bad, unless you are removing from the middle of a list.

Search – a little more challenging, need to iterate through the list to find what user is looking for.

Peek – just look at most recent value, not too bad.

1. Does order matter for storing items in any lists that you use? Could you imagine anywhere order is very important?

Depending on the situation, order can matter in a list. An example is if you have a standard and premium member ‘line’ you may sort it such that premium members are the first to get service, then the standard members.

1. Write a short function that takes an array of int values and checks if it contains a certain element (say finding the number 6 in the list [3, 8, 4, 1, 99, -2, 44, 6, 3, 2, 7]).

See other file in folder.

1. Would your search function look a bit different if you could assume that the list was sorted?

If it was previously sorted, I could look at an image, and get a hardcoded point to find, but with my method, you could also see how many occurrences the value has. It all depends on context, and what the programmer may see as useful.

1. Knowing what you now know about lists, elements, and simple operations (without actually writing the function!) could you write a function that takes a list of elements (say [3, 8, 4, 1, 99, -2, 44, 6, 3, 2, 7]) and returns a sorted list of those numbers? What are a few ways that could you approach this? Which way do you think you would start with? Would you be willing to try a few ways and see which is better?

I could write the function, one idea that comes to mind because of how quick it can be to implement is to do a bubble sort, where we scan for highest value and compare it to all others, if in the end it is the largest value, then it gets placed at the end of a temp array. We then iterate through and get every value its respective position.

A few other methods that could be used are selection, merge, and quick sorts. I would be willing to try these if It was deemed needed for our complexity analysis.