For this lab you will implement several methods to determine if a reference-based list of integers in a certain
range contains duplicate elements. We will implement reference-based lists using the class iNode, defined as
follows:

```java
public class iNode{
    public int item;
    public iNode next;

    public iNode(int i, iNode n){
        item = i;
        next = n;
    }

    public iNode(int i){
        item = i;
        next = null;
    }
}
```

Write a method that receives two integers \( n \) and \( m \) and builds and returns the reference to the first element
of a list of iNodes of length \( n \) that contains random integers in the \( 0 \) to \( m - 1 \) range. Then implement the
following methods to determine if the list contains duplicates:

1. Compare every element in the list with every other element in the list using nested loops.
2. Sort the list using bubble sort, then determine if there are duplicates by comparing each item with the
   item that follows it in the list (if there are duplicates in the original list, they must be neighbors in the
   sorted list).
3. Sort the list using merge sort, then determine if there are duplicates by comparing each item with the
   item that follows it in the list.
4. Take advantage of the fact that the range of the integers in the list is fixed (\( 0 \) to \( m - 1 \)). Use a Boolean
   array \( S \) of length \( m \) to indicate if elements in the array have been seen before. Then determine if there
   are duplicates by performing a single pass through the unsorted list. Hint: while traversing the list, \( S[i] = true \)
   if integer \( i \) has been seen before in the search.

Determine the big-O running time of each of the previous methods (1 to 4) with respect to \( n \) and run
experiments with several different values of \( n \) and \( m \) (with \( m < n \)). Illustrate your results by means of plots
and/or tables. Discuss whether the theoretical results match the outcomes of the experiments, making sure
you evaluate the algorithms’ behavior with a wide range of values of \( n \). Write a report describing your work,
as stated in the syllabus.