Lab Exercise 2
Implement and run the IntArrayBag Class

This lab exercise will have you finish implementing a partially implemented `IntArrayBag` class which uses a dynamically sized array as its underlying data structure. You will also write a test case for the `add` method and use invariants to test and find bugs in the `add` and `remove` methods.

1 Implement the IntArrayBag Class

1. Import lab2:

   `/afs/cs.uwm.edu/users/classes/cs351/401/pantherid/git/lab2.git`

2. Implement the `ensureCapacity` method for the `IntArrayBag` class. A stub for this method exists at the bottom of the provided file.

3. Within `TestIntArrayBag.java`, we have already provided a test case for the `ensureCapacity` method. Ensure your implementation passes this test case.

2 Find the Error with JUnit

1. Within `TestIntArrayBag.java`, you need to add assertions to `testAdd` until you have a failed test that uncovers the bug in the method.

   **Note 1:** Do NOT correct the bug in the `IntArrayBag.java` though you must be able to explain what is wrong.

   **Note 2:** JUnit Asserts

   - `assertTrue( condition )`, when you expect the condition to return true
   - `assertFalse( condition )`, when you expect the condition to return false
   - `assertEquals( result , expression)`, when you expect the expression to evaluate to the result.

   Since the integer array `data` is a private field, you cannot access them directly in the assertions. We provide the `countOccurrences(Integer)` method in `IntArrayBag`. It returns the number of occurrences of the argument, refer to `testEnsureCapacity` for how to use it in assertions.

3 Find the Error with Invariant

1. Within `IntArrayBag.java`, you need to add the 2nd invariant checker to `.wellFormed`. This will also help point out bugs in your program.

2. After writing the 2nd invariant, run assertions by right-click on the project, and click `Run Configurations`. This will open the Run Dialog. Displayed in Figure 1 on the following page.

3. Click the `Arguments` tab, and in the `VM Arguments` box, enter `-ea`

   Similar to the Figure 2 on the following page.

4. Click Run

   **Note:** Do not correct the bug in `IntArrayBag.java` though you must be able to explain what is wrong.

Once these steps have been completed, please see your TA to receive credit for this lab.
Figure 1:

Figure 2: