[**You may use a single side of an 8.5×11 in sheet of paper for reference.**] Show all of your work clearly in the space provided or on the additional page at the end of the exam. If the additional page is used, clearly identify to which exam question it is related. Be sure to **read each problem carefully**. Note that the exam is double sided. In this exam, wk5.ArrayList refers to the ArrayList implementation created in lecture, and wk6.LinkedList refers to the LinkedList implementation created in lecture.

1. (10 points) When should you use a try-with-resources block?

2. (10 points) Explain why, as a general rule, exceptions should be caught in the controller.

3. (10 points) Implement the following method without using any loops that, given a list of non-negative integers, will return a list of those numbers multiplied by 2, omitting any of the resulting numbers that end in 2.

```
public static List<Integer> functionalQuestion(List<Integer> nums) {

}
```

4. Consider the following FXML file:

```
<VBox fx:controller="exam1.Controller" prefHeight="50" prefWidth="200"
          xmlns="http://javafx.com/..." xmlns:fx="http://javafx.com/fxml/1">
  <children>
    <Label text="Enter a phrase and hit enter to see how many vowels were entered." />
    <TextField fx:id="inputField" onAction="#processInput" />
    <Label fx:id="vowelCount" text="You haven't typed enter yet." />
  </children>
</VBox>
```

(a) (10 points) Sketch what the UI specified in the FXML file would look like.

(b) (15 points) Implement the controller class corresponding to the FXML file. Include everything necessary for the Java source file except `import` statements.

5. Consider the following method:

```
public static void populateList(List<String> list) {
  list.add("I");
  list.add("E");
  list.add(1, null);
  list.add("o");
}
```

(a) (10 points) Draw a memory diagram (similar to the ones drawn in lecture) showing the contents of the list after the method above is run when passed an empty wk5.ArrayList.

(b) (10 points) Draw a memory diagram (similar to the ones drawn in lecture) showing the contents of the list after the method above is run when passed an empty java.util.ArrayList.

6. (5 points) Implement the get(int index) method for the wk5.ArrayList. You may not use any other methods in the wk5.ArrayList class.

7. (5 points) Implement the clear() method for the wk6.LinkedList. You may not use any other methods in the wk6.LinkedList class.

8. (15 points) Implement the indexOf(Object target) method for the wk6.LinkedList. You may not use any other methods in the wk6.LinkedList class.