

Mode-Histogram Lab

Part I: Implement these methods as given below. The **ModeHistogram.java** file has been started for you

Part II: Re-implement these methods using ArrayList instead of int[]. In the java file, you will see each method repeated twice (**overloading**)– once you'll use built-in java arrays and the other time you'll use ArrayList.

1. A *mode* is a value in an array that is larger than both the value immediately before it in the array and the value immediately after it. In other words, a mode occurs at index k in the array A if $A[k] > A[k-1]$ and $A[k] > A[k+1]$. The array is *unimodal* if the value increase until they reach a mode, then decrease, so that there is only one mode. For example, the array A shown below is unimodal with its mode occurring at index 4. Assume that the mode does not occur at the first or last entry in the array.

<u>Index k</u>	<u>A[k]</u>
0	3
1	5
2	9
3	10
4	12
5	11
6	9
7	4

- a) Write method **isMode**. `isMode` returns true if `data[k]` is larger than `data[k-1]` and larger than `data[k+1]`; otherwise, it returns false. In the example above, the call `isMode(A, 4)` returns true and the call `isMode(A, 5)` returns false.
- b) Write method **modeIndex**. `modeIndex` returns the index of the mode of data. You may assume that `data` is unimodal and the mode occurs at an index k , where $0 < k < \text{data.length}() - 1$. In the example above, the call `modeIndex(A)` returns 4.

