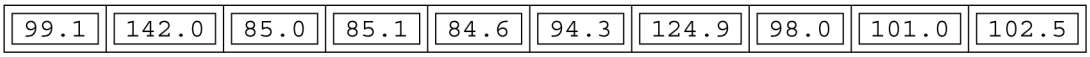
3. This question involves the analysis of weather data. The following `WeatherData` class has an instance variable, `temperatures`, which contains the daily high temperatures recorded on consecutive days at a particular location. The class also contains methods used to analyze that data. You will write two methods of the `WeatherData` class.

```
public class WeatherData
{
    /** Guaranteed not to be null and to contain only non-null entries */
    private ArrayList<Double> temperatures;

    /**
     *  Cleans the data by removing from temperatures all values that are less than
     *  lower and all values that are greater than upper, as described in part (a)
     */
    public void cleanData(double lower, double upper)
    {  /* to be implemented in part (a) */  }

    /**
     *  Returns the length of the longest heat wave found in temperatures, as described in
     *  part (b)
     *  Precondition: There is at least one heat wave in temperatures based on threshold.
     */
    public int longestHeatWave(double threshold)
    {  /* to be implemented in part (b) */  }

    // There may be instance variables, constructors, and methods that are not shown.
}
```

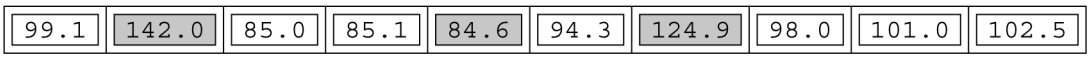
GO ON TO THE NEXT PAGE.

(a) Write the `cleanData` method, which modifies the `temperatures` instance variable by removing all values that are less than the `lower` parameter and all values that are greater than the `upper` parameter. The order of the remaining values in `temperatures` must be maintained.

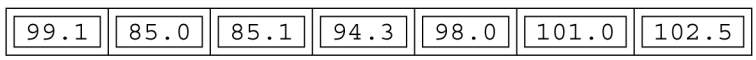
For example, consider a `WeatherData` object for which `temperatures` contains the following.



The three shaded values shown would be removed by the method call `cleanData(85.0, 120.0)`.



The following shows the contents of `temperatures` after the three shaded values are removed as a result of the method call `cleanData(85.0, 120.0)`.



Complete method `cleanData`.

```
/**
 *  Cleans the data by removing from temperatures all values that are less than
 *  lower and all values that are greater than upper, as described in part (a)
 */
public void cleanData(double lower, double upper)
```

GO ON TO THE NEXT PAGE.

(b) Write the `longestHeatWave` method, which returns the length of the longest heat wave found in the `temperatures` instance variable. A heat wave is a sequence of two or more consecutive days with a daily high temperature greater than the parameter `threshold`. The `temperatures` instance variable is guaranteed to contain at least one heat wave based on the `threshold` parameter.

For example, consider the following contents of `temperatures`.

100.5	98.5	102.0	103.9	87.5	105.2	90.3	94.8	109.1	102.1	107.4	93.2

In the following sample contents of `temperatures`, all heat waves based on the `threshold` temperature of `100.5` are shaded. The method call `longestHeatWave(100.5)` would return `3`, which is the length of the longest heat wave.

100.5	98.5	102.0	103.9	87.5	105.2	90.3	94.8	109.1	102.1	107.4	93.2

In the following sample contents of `temperatures`, all heat waves based on the `threshold` temperature of `95.2` are shaded. The method call `longestHeatWave(95.2)` would return `4`, which is the length of the longest heat wave.

100.5	98.5	102.0	103.9	87.5	105.2	90.3	94.8	109.1	102.1	107.4	93.2

Complete method `longestHeatWave`.

```
/**
 *  Returns the length of the longest heat wave found in temperatures, as described in
 *  part (b)
 *  Precondition: There is at least one heat wave in temperatures based on threshold.
 */
public int longestHeatWave(double threshold)
```