< Object Oriented Programming - Assignments #3>

1. You are given a two-dimensional array of values that give the height of a terrain at different points in a square. Write a constructor

   public Terrain(double[][] heights)

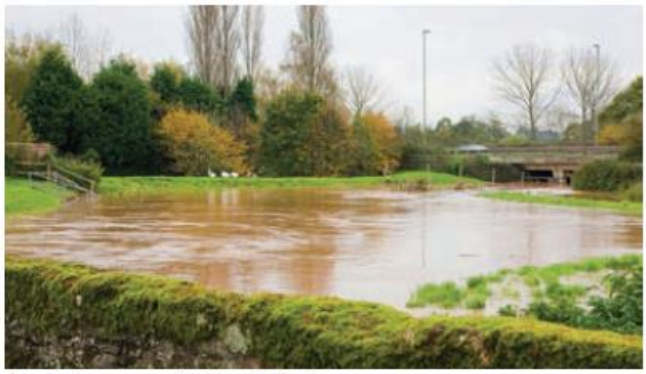
   and a method

   public void printFloodMap(double waterLevel)

   that prints out a flood map, showing which of the points in the terrain would be flooded if the water level was the given value. In the flood map, print a * for each flooded point and a space for each point that is not flooded.

   Here is a sample map:

```
* * * *         * *
* * * * *     * * *
* * * *         * *
* * *           * *
* * * *   *     * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                  * *
                * * *
```



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   Then write a program that reads one hundred terrain height values and shows how the terrain gets flooded when the water level increases in **ten steps** from the lowest point in the terrain to the highest.

   [Score Criteria]

   - Comments in javadoc format for all classes and methods [1pt]
   - Implementing the Terrain method to store height values with array [1pt]
   - Implementing the method to calculate the minimum height value [1pt]
   - Implementing the method to calculate the maximum height value [1pt]
   - Implementing the printFloodMap method to print the flood status in ten steps increments from the lowest point in the terrain to the highest point [1pt]
   - Providing the appropriate output results and documentation (submission with external report combining all the sourcecode) [1pt]
   - Code accuracy with the various input cases [1pt]

   [Input Height Values]

   10.0 18.0 18.0 19.0 40.0 37.0 39.0 38.0 19.0 17.0
   15.0 19.0 19.0 20.0 21.0 39.0 39.0 20.0 18.0 17.0
   10.0 11.0 13.0 14.0 40.0 39.0 39.0 39.0 18.0 17.0
   12.0 13.0 14.0 39.0 38.0 38.0 38.0 13.0 13.0 12.0
   13.0 14.0 13.0 15.0 39.0 12.0 38.0 12.0 13.0 11.0
   18.0 16.0 16.0 14.0 16.0 17.0 13.0 12.0 16.0 12.0
   10.0 12.0 39.0 37.0 16.0 17.0 16.0 39.0 38.0 39.0
   10.0 39.0 39.0 38.0 15.0 17.0 16.0 15.0 39.0 18.0
   40.0 39.0 39.0 39.0 39.0 39.0 38.0 38.0 15.0 12.0
   39.0 40.0 40.0 39.0 39.0 38.0 38.0 15.0 14.0 16.0

[Example Prompt]

```
Enter height values:10.0 18.0 18.0 19.0 40.0 37.0 39.0 38.0 19.0 17.0
15.0 19.0 19.0 20.0 21.0 39.0 39.0 20.0 18.0 17.0
10.0 11.0 13.0 14.0 40.0 39.0 39.0 39.0 18.0 17.0
12.0 13.0 14.0 39.0 38.0 38.0 38.0 13.0 13.0 12.0
13.0 14.0 13.0 15.0 39.0 12.0 38.0 12.0 13.0 11.0
18.0 16.0 16.0 14.0 16.0 17.0 13.0 12.0 16.0 12.0
10.0 12.0 39.0 37.0 16.0 17.0 16.0 39.0 38.0 39.0
10.0 39.0 39.0 38.0 15.0 17.0 16.0 15.0 39.0 18.0
40.0 39.0 39.0 39.0 39.0 39.0 38.0 38.0 15.0 12.0
39.0 40.0 40.0 39.0 39.0 38.0 38.0 15.0 14.0 16.0
Lowest Height: 10.0
Highest Height: 40.0
Water Level: 10.0
```

```
Water Level: 13.333333333333334
*

* * *
* *           * * *
*   *     *   * * *
            * *   *
* *
*
                  *

Water Level: 16.666666666666668
*
*
* * * *
* * *         * * *
* * * *   *   * * *
  * * * *   * * * *
* *     *   *
*       *   * *
                * *
              * * *
Water Level: 20.0
* * * *         * *
* * *           * *
* * * *         * *
* * *         * * *
* * * *   *   * * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                * *
              * * *
Water Level: 23.333333333333336
* * * *         * *
* * * * *     * * *
* * * *         * *
* * *         * * *
* * * *   *   * * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                * *
              * * *
Water Level: 26.666666666666668
* * * *         * *
* * * * *     * * *
* * * *         * *
* * *         * * *
* * * *   *   * * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                * *
              * * *
Water Level: 30.0
* * * *         * *
* * * * *     * * *
* * * *         * *
* * *         * * *
* * * *   *   * * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                * *
              * * *
Water Level: 33.33333333333333
* * * *         * *
* * * * *     * * *
* * * *         * *
* * *         * * *
* * * *   *   * * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                * *
              * * *
Water Level: 36.66666666666667
* * * *         * *
* * * * *     * * *
* * * *         * *
* * *         * * *
* * * *   *   * * *
* * * * * * * * * *
* *     * * *
*       * * * *   *
                * *
              * * *
Water Level: 40.0
* * * *   * * * * *
* * * * * * * * * *
* * * *   * * * * *
* * * * * * * * * *
* * * * * * * * * *
* * * * * * * * * *
* * * * * * * * * *
* * * * * * * * * *
  * * * * * * * * *
*     * * * * * * *
```