1. Write a method named **histogram** with the following specification.

   **Parameters:** limit, a non-negative integer
   data, an array of integers containing values in the range 0 to limit-1

   **Return value:** a new array where each slot i contains the number of times the value i appears in data

   Example: If the input is 5 and [2 4 1 2 0 1 1 4], the return value would be [1 3 2 0 2]
   because 0 occurs once in data, 1 occurs three times, 2 occurs twice, 3 never occurs,
   and 4 occurs twice.

   ```java
   int[] histogram(int limit, int[] data) {
       int[] result = new int[limit];
       for (int v : data) {
           result[v]++;
       }
       return result;
   }
   ```

2. Write a method named **checkerboard** with the following specification.

   **Parameters:** grid, a square two dimensional array of booleans (that is, an array of arrays of booleans)

   **Effect:** Fill the grid with values such that:
   - grid[0][0] is false,
   - every entry has a different value from its up/down/left/right neighbors
   - every entry has the same value as its diagonal neighbors.

   Example: If the given array has 3 rows of 3 elements, the result would be

   ```java
   Approach 1: Use even/odd index
   void checkerboard(boolean[][] grid) {
       for (int i = 0; i < grid.length; i++) {
           for (int j = 0; j < grid[i].length; j++) {
               grid[i][j] = (i % 2 != j % 2);
           }
       }
   }
   ```

   ```java
   Approach 2: alternate true/false
   void checkerboard(boolean[][] grid) {
       boolean v = false;
       for (int i = 0; i < grid.length; i++) {
           for (int j = 0; j < grid[i].length; j++) {
               grid[i][j] = v;
               v = !v;
           }
       }
   }
   ```