Código:

Array2D.java × Arreglos2dMain.java

```java
package ico.fes.aragon.unam.arreglos;

import java.util.Arrays;
import java.util.concurrent.Callable;

public class Array2D {  3 usages
     //Atributos
    private static final Character VIVO = '1';  4 usages
    private static final Character MUERTO = '0';  3 usages
    private Character[][] data;  9 usages
    private int rowSize;  8 usages
    private int colSize;  8 usages

    //Constructores

    public Array2D(){}  no usages

    public Array2D( int ren, int col){  1 usage
        this.rowSize = ren;
        this.colSize = col;
        this.data =  new Character[ren][col];

        for (int i = 0; i < rowSize; i++) {
            for (int j = 0; j < colSize; j++) {
                this.data[i][j] = MUERTO;
            }
        }
    }

    // Metodos

    public void clear(Character dato){  no usages
            for (int i = 0; i < rowSize; i++) {
                for (int j = 0; j < colSize; j++) {
                   this.data[i][j] = dato;
                }
            }
    }


    public int getRowSize(){  no usages
        return rowSize;
    }
    public int getColSize(){  no usages
        return colSize;
    }

    @Override
```

```java
    public String toString() {
        String str = " ";
        for (int i = 0; i < this.rowSize;i++){
            for(int j = 0; j < this.colSize;j++){
                str = str + this.data[i][j] +" , ";
            }
            str = str + "\n";
        }
        return str;
    }

    public void setItem(int ren, int col, Character dato){  4 usages
        if( ren >= 0 && ren <= this.rowSize && col >= 0 && col <= this.colSize){
            this.data[ren][col] = dato;
        }else{
            System.out.println("Indices fuera de rango...");
        }
    }

    public Character getItem(int ren, int col) {  no usages
        if (ren >= 0 && ren < this.rowSize && col >= 0 && col < this.colSize) {
            return this.data[ren][col];
        } else {
            System.out.println("Indices fuera de rango...");
        }
        return '\0';
    }
    public void imprimir() {  3 usages
        for (int i = 0; i < rowSize; i++) {
            for (int j = 0; j < colSize; j++) {
                System.out.print(data[i][j] + " ");
            }
            System.out.println();
        }
        System.out.println();
    }

    public void numeroDeGeneraciones(int generaciones){  1 usage
        for (int i = 0; i < generaciones; i++) {
            this.data = evolucionar(this.data);
            System.out.println("Generación " + (i + 1) + ":");
            imprimir();
        }
    }

    public  Character[][] evolucionar(Character[][] matriz) {  1 usage
        int n = matriz.length;
        Character[][] nuevaMatriz = new Character[n][n];

        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                int vivos = contarVecinosVivos(matriz, i, j);

                if (matriz[i][j] == VIVO) {
                    if (vivos < 2 || vivos > 3) {
                        nuevaMatriz[i][j] = MUERTO;
                    } else {
                        nuevaMatriz[i][j] = VIVO;
                    }
                } else {
                    if (vivos == 3) {
                        nuevaMatriz[i][j] = VIVO;
                    } else {
                        nuevaMatriz[i][j] = MUERTO;
                    }
                }
            }
        }

```

```java
    }
    private static int contarVecinosVivos(Character[][] matriz, int x, int y) {  1 usage
        int n = matriz.length;
        int vivos = 0;
        for (int i = -1; i <= 1; i++) {
            for (int j = -1; j <= 1; j++) {
                if (i == 0 && j == 0) continue;
                int nuevoX = x + i;
                int nuevoY = y + j;

                if (nuevoX >= 0 && nuevoX < n && nuevoY >= 0 && nuevoY < n) {
                    if (matriz[nuevoX][nuevoY] == VIVO) {
                        vivos++;
                    }
                }
            }
        }
        return vivos;
    }
}

```

Código MAIN:

Array2D.java | Arreglos2dMain.java

```java
package ico.fes.aragon.unam.main;
import ico.fes.aragon.unam.arreglos.Array2D;
public class Arreglos2dMain {

    public static void main(String[] args) {
        Array2D rejilla = new Array2D( ren: 5, col: 5);
        rejilla.imprimir();

        rejilla.setItem( ren: 1, col: 3, dato: '1');
        rejilla.setItem( ren: 2, col: 2, dato: '1');
        rejilla.setItem( ren: 3, col: 2, dato: '1');
        rejilla.setItem( ren: 0, col: 4, dato: '1');
        rejilla.imprimir();

        rejilla.numeroDeGeneraciones(5);
    }
}

```

Ejecución del programa:

```
"C:\Program Files\Java\jdk-22\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2024.2.0.1\lib\idea_rt.jar=
Matriz inicializada
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0

Ingresamos datos en la matriz
0 0 0 0 1
0 0 0 1 0
0 0 1 0 0
0 0 1 0 0
0 0 0 0 0

Generación 1:
0 0 0 0 0
0 0 0 1 0
0 0 1 1 0
0 0 0 0 0
0 0 0 0 0

Generación 2:
0 0 0 0 0
0 0 1 1 0
0 0 1 1 0
0 0 0 0 0
0 0 0 0 0

Generación 3:
0 0 0 0 0
0 0 1 1 0
0 0 1 1 0
0 0 0 0 0
0 0 0 0 0

Generación 4:
0 0 0 0 0
0 0 1 1 0
0 0 1 1 0
0 0 0 0 0
0 0 0 0 0

Generación 5:
0 0 0 0 0
0 0 1 1 0
0 0 1 1 0
0 0 0 0 0
0 0 0 0 0


Process finished with exit code 0
```