AC unidimensional

```
In[ ]:= (*Método Auxiliar*)
GenerarPatronBinario[n_] := Module[{indice, binariosInvertidos, patrones},
                                   módulo
  binariosInvertidos = Reverse[IntegerDigits[n, 2, 8]];
                       invierte ··· dígitos de entero
  patrones = {{0, 0, 0}, {0, 0, 1}, {0, 1, 0}, {0, 1, 1},
    {1, 0, 0}, {1, 0, 1}, {1, 1, 0}, {1, 1, 1}};
  Do[AppendTo[patrones[[indice]], binariosInvertidos[[indice]]],
  r··· añade al final
   {indice, 1, Length[binariosInvertidos]}];
                longitud
  patrones];
```

```
In[ ]:= (*Método Auxiliar*)
EstadoSiguiente[reg_, estado_] := Module[
                                  módulo
  {plantilla, posicion, nuevoEstado, anterior, siguiente, fila}, nuevoEstado = {};
  plantilla = GenerarPatronBinario[reg];
  For[posicion = 1, posicion ≤ Length[estado], posicion++,
  para cada                    longitud
   anterior = If[posicion == 1, estado[[-1]], estado[[posicion - 1]]];
              si
   siguiente = If[posicion == Length[estado], estado[[1]], estado[[posicion + 1]]];
               si              longitud
   fila = Flatten[Cases[plantilla, {anterior, estado[[posicion]], siguiente, _}]];
          aplana   casos
   AppendTo[nuevoEstado, Last[fila]];];
   añade al final          último
  nuevoEstado];
```

```
In[ ]:= GenerarPatronBinario[54]
Out[ ]= {{0, 0, 0, 0}, {0, 0, 1, 1}, {0, 1, 0, 1}, {0, 1, 1, 0},
         {1, 0, 0, 1}, {1, 0, 1, 1}, {1, 1, 0, 0}, {1, 1, 1, 0}}
```

```
In[ ]:= GenerarPatronBinario[55]
Out[ ]= {{0, 0, 0, 1}, {0, 0, 1, 1}, {0, 1, 0, 1}, {0, 1, 1, 0},
         {1, 0, 0, 1}, {1, 0, 1, 1}, {1, 1, 0, 0}, {1, 1, 1, 0}}
```

```
In[ ]:= GenerarPatronBinario[56]
Out[ ]= {{0, 0, 0, 0}, {0, 0, 1, 0}, {0, 1, 0, 0}, {0, 1, 1, 1},
         {1, 0, 0, 1}, {1, 0, 1, 1}, {1, 1, 0, 0}, {1, 1, 1, 0}}
```

In[•]:=
```
EjecutarAC[inicial_, regla_, pasos_] :=
 Module[{contador, resultado}, resultado = {inicial};
  For[contador = 1, contador ≤ pasos, contador++,
   AppendTo[resultado, EstadoSiguiente[regla, resultado[[contador]]]]];
  resultado];
```
módulo
para cada
añade al final

In[•]:=
```
EjecutarAC[{1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0}, 60, 100]
```

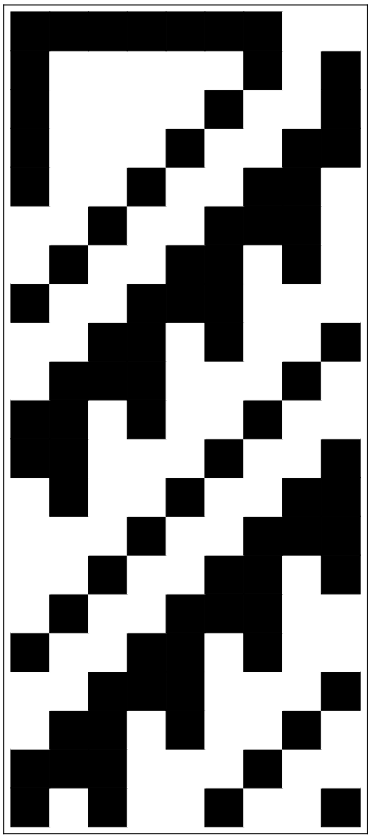
Out[•]=
```
{{1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0},
 {1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1}, {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0},
 {0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1},
 {1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0}, {1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1},
 {0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1}, {1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1},
 {0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1}, {1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0},
 {1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0}, {1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1},
 {0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1},
 {1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0}, {1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1},
 {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0}, {0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0},
 {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1}, {1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0},
 {1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1}, {0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1},
 {1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1}, {0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1},
 {1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0}, {1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0},
 {1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1}, {0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0},
 {0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1}, {1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0},
 {1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1}, {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0},
 {0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1},
 {1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0}, {1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1},
 {0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1}, {1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1},
 {0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1}, {1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0},
 {1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0}, {1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1},
 {0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1},
 {1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0}, {1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1},
 {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0}, {0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0},
 {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1}, {1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0},
 {1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1}, {0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1},
 {1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1}, {0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1},
 {1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0}, {1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0},
 {1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1}, {0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0},
 {0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1}, {1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0},
 {1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1}, {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0},
 {0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1},
 {1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0}, {1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1},
 {0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1}, {1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1},
 {0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1}, {1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0},
 {1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0}, {1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1},
 {0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1},
 {1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0}, {1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1},
 {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0}, {0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0},
 {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1}, {1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0},
```

```
{1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1}, {0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1},
{1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1}, {0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1},
{1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0}, {1, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0},
{1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1}, {0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0},
{0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1}, {1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0},
{1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 1, 1}, {0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0},
{0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0}, {0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1},
{1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0}, {1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1},
{0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1}, {1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1},
{0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 1}, {1, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0}}
```

In[ ]:=
```
frames2 = EjecutarAC[{1, 1, 1, 1, 1, 1, 1, 0, 0}, 74, 20];
ArrayPlot[frames2]
```

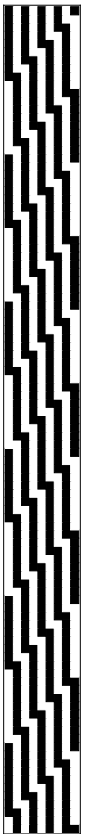
representación de arreglo

Out[ ]=



In[•]:=
```
frames = EjecutarAC[{1, 0, 1, 0, 1, 0, 1, 0, 1}, 84, 100];
ArrayPlot[frames]
```
representación de arreglo

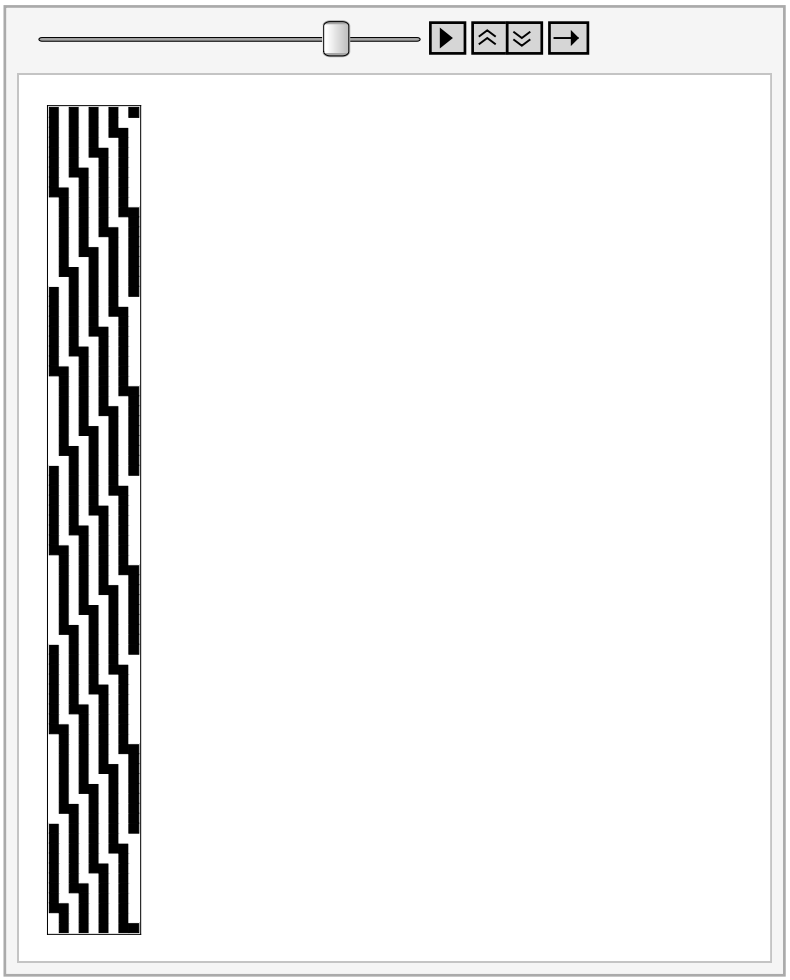
Out[•]=



In[•]:=
```
ConstruirHistorial[datos_] :=
  Module[{acumulado, temporal, fila, col}, acumulado = {{}};
  módulo
   For[fila = 1, fila ≤ Length[datos], fila++, temporal = {};
   para cada                  longitud
    For[col = 1, col ≤ fila, col++,
    para cada
     AppendTo[temporal, datos[[col]]];
     añade al final
    AppendTo[acumulado, temporal];];
    añade al final
   acumulado];
```

In[ ]:=
```
ListAnimate[Map[ArrayPlot, ConstruirHistorial[frames]]]
```
anima lista apl·· representación de arreglo

Out[ ]=



Juego de la vida con reglas de Conway

In[ ]:=
```
(*Método auxiliar*)
ContarEntorno[matriz_, fila_, col_] := Module[{dx, dy, vecinos, fx, fy}, vecinos = 0;
                                       módulo
  For[dx = -1, dx ≤ 1, dx++,
  para cada
   For[dy = -1, dy ≤ 1, dy++,
   para cada
    If[dx == 0 && dy == 0, Continue[]];
    si                     continúa iteración
    fx = Mod[dx + fila - 1, Length[matriz]] + 1;
         operación módulo   longitud
    fy = Mod[dy + col - 1, Length[matriz]] + 1;
         operación módulo   longitud
    vecinos += matriz[[fx]][[fy]];]];
  vecinos];
```

In[ ]:=
```
EvolucionarVida[estadoInicial_, generaciones_] := Module[
                                                  módulo
  {historial, actual, paso, x, y, nuevaMatriz, nuevaFila}, historial = {estadoInicial};
  actual = estadoInicial;
  For[paso = 1, paso ≤ generaciones, paso++,
  para cada
   nuevaMatriz = {};
   For[x = 1, x ≤ Length[actual], x++,
   para cada      longitud
    nuevaFila = {};
    For[y = 1, y ≤ Length[actual], y++,
    para cada      longitud
     Switch[True, ContarEntorno[actual, x, y] > 3 || ContarEntorno[actual, x, y] < 2,
     evalúa···    verdadero
       AppendTo[nuevaFila, 0], actual[[x]][[y]] == 1 && ContarEntorno[actual, x, y] ≥ 2,
       añade al final
       AppendTo[nuevaFila, 1], actual[[x]][[y]] == 0 && ContarEntorno[actual, x, y] ≥ 3,
       añade al final
       AppendTo[nuevaFila, 1], True, AppendTo[nuevaFila, 0]];];
       añade al final                  verd···  añade al final
    AppendTo[nuevaMatriz, nuevaFila];];
    añade al final
   AppendTo[historial, nuevaMatriz];
   añade al final
   actual = nuevaMatriz;];
  historial];
```

In[ ]:=
```
glider = {{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, 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},
  {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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 0, 0},
{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 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, 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, 1, 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, 0, 0, 0},
{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 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, 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, 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, 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, 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, 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, 0, 0, 0, 0,
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In[•]:=
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ListAnimate[Map[ArrayPlot, EvolucionarVida[glider, 100]]]
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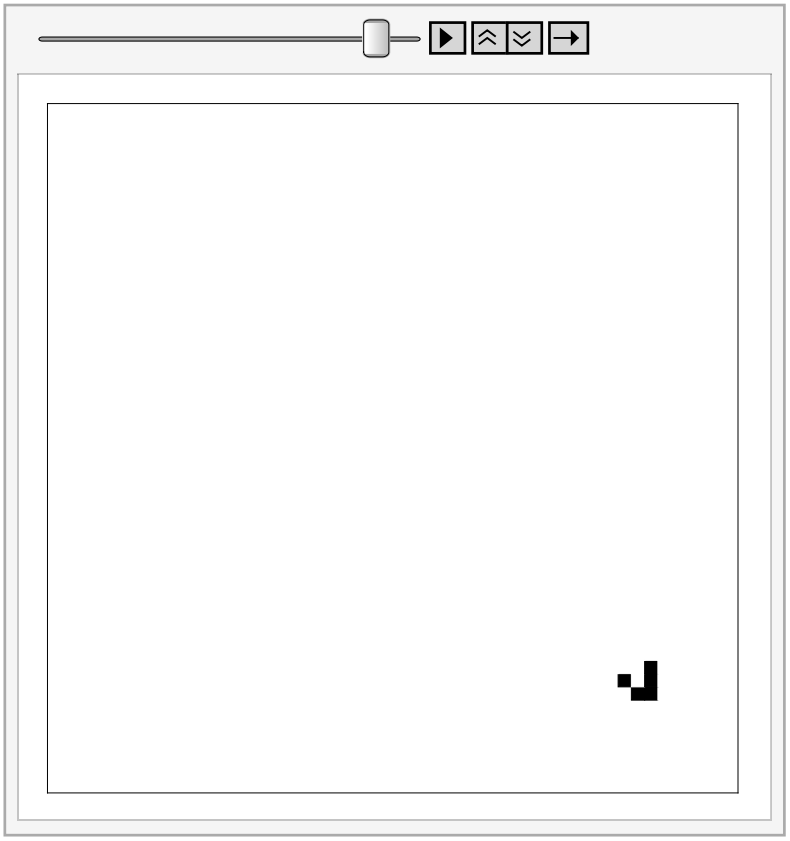
anima lista apl·· representación de arreglo

Out[∘]=



In[∘]:=

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{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, 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}};
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```
In[∘]:= ListAnimate[Map[ArrayPlot, EvolucionarVida[gunsglider, 100]]]
        anima lista   apl·· representación de arreglo
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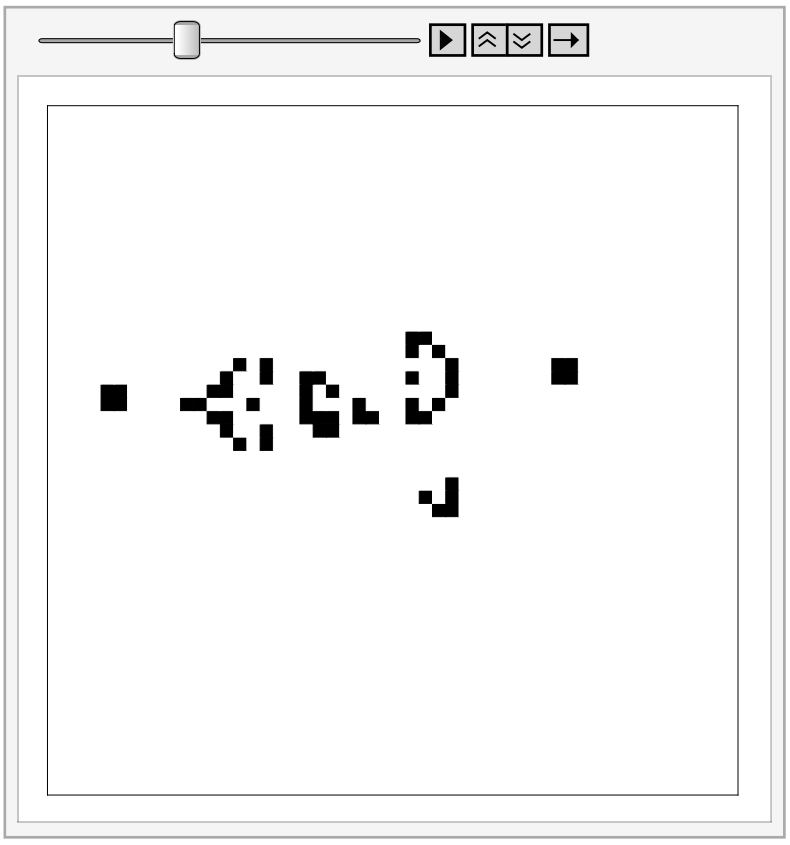
Out[∘]=



```
In[∘]:= invariante = {{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, 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},
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{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, 0,
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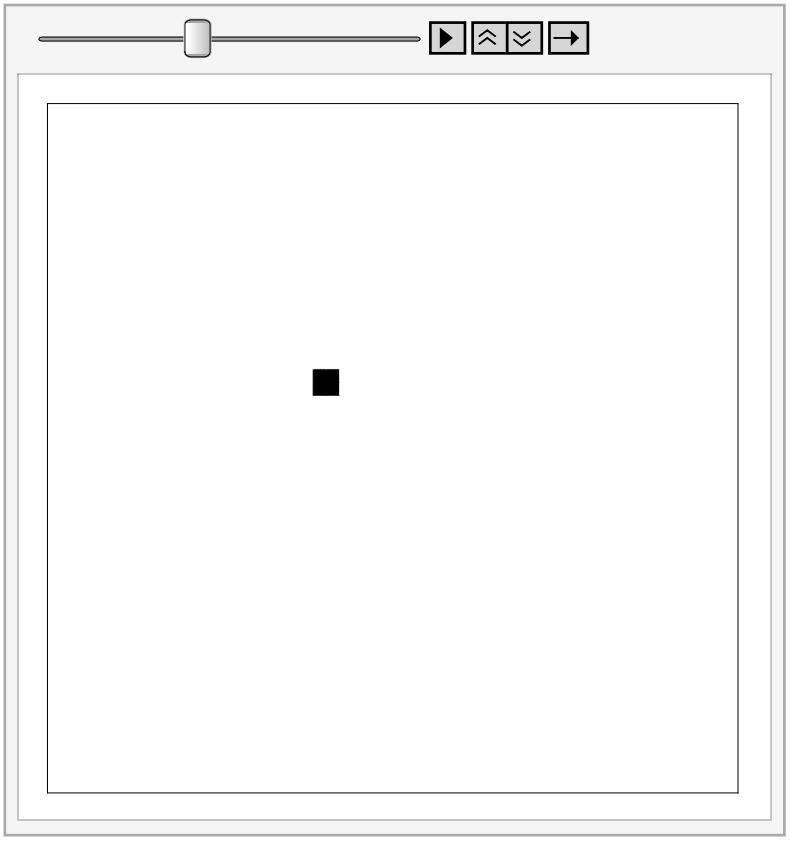
In[◦]:=
```
ListAnimate[Map[ArrayPlot, EvolucionarVida[invariante, 100]]]
```
anima lista · apl·· · representación de arreglo

Out[]=



In[]:=
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    {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, 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},
    {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, 0,
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    {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, 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},
    {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, 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},
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 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}};
```
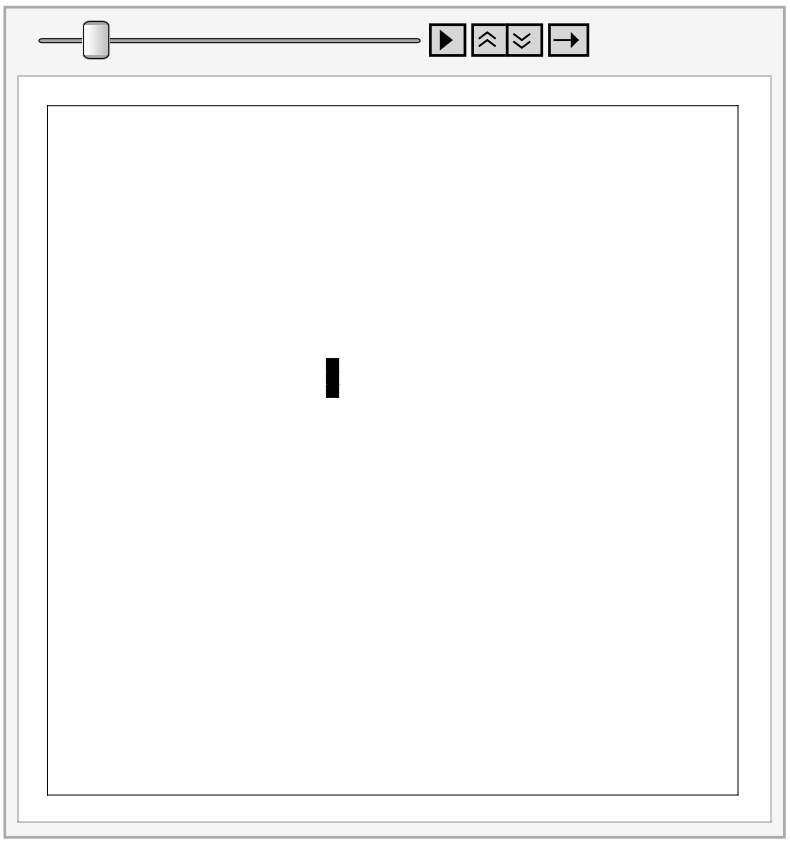

```
In[•]:= ListAnimate[Map[ArrayPlot, EvolucionarVida[oscilador, 100]]]
        ⌊anima lista    ⌊apl·· ⌊representación de arreglo
```

Out[•]=



AC unidireccional por la izquierda

```
In[•]:= (*Método auxiliar*)
AvanzarIzquierda[reglas_, estado_] :=
  Module[{tam, resultado, i, coincidencias, siguiente}, tam = Length[estado];
  módulo                                                longitud
   resultado = {estado[[1]]};
   For[i = 2, i ≤ tam, i++,
   para cada
    coincidencias = Cases[reglas, {estado[[i - 1]], estado[[i]], siguiente_} :> siguiente];
                    casos
    If[Length[coincidencias] > 0,
     si  longitud
     AppendTo[resultado, First[coincidencias]], AppendTo[resultado, estado[[i]]];];
     añade al final          primero              añade al final
   resultado];
```

```
In[•]:= AceptarPorIzquierda[automata_, entrada_] :=
  Module[{estados, transiciones, finales, quiescente, configInicial,
  módulo
    configActual, longitud, paso}, {estados, transiciones, finales} = automata;
   quiescente = estados[[1]];
   longitud = Length[entrada];
              longitud
   configInicial = Prepend[entrada, quiescente];
                   añade al principio
   configActual = configInicial;
   For[paso = 1, paso ≤ longitud, paso++,
   para cada
    configActual = AvanzarIzquierda[transiciones, configActual];];
   MemberQ[finales, configActual[[longitud + 1]]]];
   ¿contenido en?
```

```
In[•]:= Ejemplo1 =
  {{q, p, r, s, a, b}, {{q, a, p}, {q, b, r}, {p, a, p}, {p, b, r}, {r, a, s}, {r, b, r},
    {s, a, s}, {s, b, s}, {a, a, a}, {a, b, b}, {b, a, a}, {b, b, b}, {q, p, p}, {q, r, r},
    {p, p, p}, {q, q, q}, {r, r, r}, {s, s, s}, {p, r, r}, {r, s, s}}, {q, p, r}}
```

```
Out[•]= {{q, p, r, s, a, b}, {{q, a, p}, {q, b, r}, {p, a, p}, {p, b, r}, {r, a, s}, {r, b, r},
  {s, a, s}, {s, b, s}, {a, a, a}, {a, b, b}, {b, a, a}, {b, b, b}, {q, p, p}, {q, r, r},
  {p, p, p}, {q, q, q}, {r, r, r}, {s, s, s}, {p, r, r}, {r, s, s}}, {q, p, r}}
```

```
In[•]:= cadenaEjemplo = {a, b, b, b};
```

```
In[•]:= cadenaEjemplo1 = {b, a, a, b};
```

```
In[•]:= AceptarPorIzquierda[Ejemplo1, cadenaEjemplo]
```

```
Out[•]= True
```

```
In[•]:= AceptarPorIzquierda[Ejemplo1, cadenaEjemplo1]
```

```
Out[•]= False
```

```
In[•]:= Ejemplo2 = {{q, a, b, p, i}, {{q, a, i}, {q, b, i}, {i, a, p},
          {i, b, p}, {p, a, i}, {p, b, i}, {i, p, p}, {p, p, p}, {p, i, i}, {i, i, i},
          {q, i, i}, {q, p, p}, {a, a, a}, {a, b, b}, {b, a, a}, {b, b, b}}, {i}}
Out[•]= {{q, a, b, p, i}, {{q, a, i}, {q, b, i}, {i, a, p}, {i, b, p},
          {p, a, i}, {p, b, i}, {i, p, p}, {p, p, p}, {p, i, i}, {i, i, i},
          {q, i, i}, {q, p, p}, {a, a, a}, {a, b, b}, {b, a, a}, {b, b, b}}, {i}}

In[•]:= cadenaEjemplo2 = {a, b, b, b, b};

In[•]:= cadenaEjemplo3 = {b, a, a, a};

In[•]:= AceptarPorIzquierda[Ejemplo2, cadenaEjemplo2]
Out[•]= True

In[•]:= AceptarPorIzquierda[Ejemplo2, cadenaEjemplo3]
Out[•]= False

In[•]:= Ejemplo3 = {{q, p, r, s, a, b}, {{q, a, r}, {q, b, p}, {r, a, r}, {r, b, s}, {p, a, p},
          {p, b, p}, {s, a, r}, {s, b, s}, {a, a, a}, {a, b, b}, {b, a, a}, {b, b, b},
          {q, r, r}, {q, p, p}, {r, r, r}, {s, r, r}, {p, p, p}, {r, s, s}, {s, s, s}}, {s}}
Out[•]= {{q, p, r, s, a, b}, {{q, a, r}, {q, b, p}, {r, a, r}, {r, b, s}, {p, a, p},
          {p, b, p}, {s, a, r}, {s, b, s}, {a, a, a}, {a, b, b}, {b, a, a}, {b, b, b},
          {q, r, r}, {q, p, p}, {r, r, r}, {s, r, r}, {p, p, p}, {r, s, s}, {s, s, s}}, {s}}

In[•]:= cadenaEjemplo4 = {a, b, b, a, b, b};

In[•]:= cadenaEjemplo5 = {a, a, a, b, a};

In[•]:= cadenaEjemplo6 = {b, b, b, a, b};

In[•]:= AceptarPorIzquierda[Ejemplo3, cadenaEjemplo4]
Out[•]= True

In[•]:= AceptarPorIzquierda[Ejemplo3, cadenaEjemplo5]
Out[•]= False

In[•]:= AceptarPorIzquierda[Ejemplo3, cadenaEjemplo6]
Out[•]= False
```