Rain

This guide explains how to **recreate this project from scratch** in WebGPU Studio (without loading an example).

1) Goal and principle

We will create the buffers, paste the WGSL helper functions, write the compute shaders, then configure the Pass.

Steps (in order):

- **Pipeline 1**

2) Create a new project

1. Launch WebGPU Studio.
2. Click `New`.

3) Create the buffers (Buffers tab)

Create the following buffers (names must match exactly):

- **Env**: size `128×128×64`, type `int`, fill `random`

After each change, click `Apply`.

4) Add the helper library (Functions tab)

For each entry below:

1. Paste the WGSL.

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```
const SX = 128 ;
const SY = 128 ;
const SZ =  64 ;
fn hash3(u : vec3<u32>, step : u32) -> f32 {
    // 32-bit mix, renvoie dans [0,1)
    var x = u.x * 0x27d4eb2du + u.y * 0x85ebca6bu + u.z * 0xc2b2ae35u +
step * 0x165667b1u;
    x ^= x >> 15;
    x *= 0x2c1b3c6du;
```

```
    x ^= x >> 12;
    x *= 0x297a2d39u;
    x ^= x >> 15;
    return f32(x) / f32(0xffffffffu);
}
```

5) Create the compute shaders (Compute Shaders tab)

For each shader:

1. Paste the WGSL.

Shader `Compute1`

Workgroup: `8×8×1`

```
@compute @workgroup_size(4, 4, 4)
fn Compute1(@builtin(global_invocation_id) gid : vec3<u32>) {
    let index = gid.z * SX * SY + gid.y * SX + gid.x;
    // Pluie
    let r = hash3(gid, step) ; // r dans [0,1]
    if ( r < 0.8 && gid.y < SY-1) {
        Env[index] = Env[index+SX] ;
    }
    // Ajout
    if ( gid.y == SY-2 ) {
        if ( r < 0.1 ) {
            Env[index] = bitcast<i32>(0xF6FF00FFu) + i32(step) ;
        } else {
            Env[index] = bitcast<i32>(0x06FF0000u) ;
        }
    }
    // Fond
    if ( gid.x%(SX-1) == 0 || gid.y%(SY-1) == 0 || gid.z%(SZ-1) == 0 ) {
        Env[index] = bitcast<i32>(0x06FF0000u) ;
    }
    // Bordure
    if ( (gid.x%(SX-1) == 0 && gid.y%(SY-1) == 0) || (gid.x%(SX-1) == 0
&& gid.z%(SZ-1) == 0) ||  (gid.z%(SZ-1) == 0 && gid.y%(SY-1) == 0) ) {
        Env[index] = bitcast<i32>(0xFF0000FFu) ;
    }
}
```

6) Configure the Pass (Pass tab)

Create the pipelines/steps in the following order:

- **Pipeline 1**: dispatch `32×32×16`

7) Compile and run

1. In the `Buffers` tab, select **`Env`**.
2. View it in `2D` or `3D`.
3. Click `Compile`.
4. Click `Run` (or use `Step`).

8) Quick checks (if it doesn’t work)

- `Console` tab: read WGSL errors.
- Check buffer **names** match the WGSL code.
- Check buffer sizes (X/Y/Z) and Pass dispatch.

9) Save

Click `Save` to export the project as a `.wgstudio` file.