

# Plasma (Tsoding)

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):

- **texture1**: size **256×256×1**, type **uint**, 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 SXf = 256.0 ;  
const SYf = 256.0 ;  
const PI = 3.14159 ;
```

## 5) Create the compute shaders (Compute Shaders tab)

For each shader:

1. Paste the WGSL.

## Shader Compute2

Workgroup: 8×8×1

```
@compute @workgroup_size(8, 8, 1)
fn Compute2(@builtin(global_invocation_id) gid : vec3<u32>) {
    let index = gid.y * u32(SXf) + gid.x;
    let x = gid.x;
    let y = gid.y;
    let w = SXf ;
    let h = SYf ;
    let r = vec2<f32>(w, h) ;
    let t = (f32( step ) / 240.0) * 2.0 * PI;
    let FC = vec2<f32>(f32(x), f32(y));
    let p = (FC * 2.0 - r) / r.y;
    var l = vec2<f32>(0.0, 0.0);
    var i = vec2<f32>(0.0, 0.0);
    let s = 4.0 - 4.0 * abs(0.7 - dot(p, p));
    l = l + vec2<f32>(s, s);
    var v = p * l;
    // o accum
    var o = vec4<f32>(0.0, 0.0, 0.0, 0.0);
    for (var k : i32 = 1; k <= 8; k = k + 1) {
        let iy = f32(k);
        i.y = iy;
        let s4 = sin(vec4<f32>(v.x, v.y, v.y, v.x)) + vec4<f32>(1.0);
        o = o + s4 * abs(v.x - v.y);
        let c2 = cos(vec2<f32>(v.y, v.x) * iy + i + vec2<f32>(t, t)) /
iy + vec2<f32>(0.7, 0.7);
        v = v + c2;
    }
    let py4 = p.y * vec4<f32>(-1.0, 1.0, 2.0, 0.0);
    let num = 5.0 * exp(vec4<f32>(1.x - 4.0) - py4);
    let eps = vec4<f32>(1e-6);
    o = tanh(num / max(abs(o), eps));
    let R = u32(o.x * 255.0) ;
    let G = u32(o.y * 255.0) ;
    let B = u32(o.z * 255.0) ;
    texture1[index] = 0xFF000000u + ( R << 16) + (G << 8) + B ;
}
```

## 6) Configure the Pass (Pass tab)

Create the pipelines/steps in the following order:

- **Pipeline 1:** dispatch 32×32×1

## 7) Compile and run

1. In the **Buffers** tab, select **texture1**.
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.