

LUASCRIP**T** Gaussian Blobs GSS Tutorial

Welcome to the Future of Visual Prototyping!

This tutorial will guide you through using the LUASCRIP**T** IDE to prototype Gaussian blob graphics using our revolutionary GSS (Gaussian Splatting Syntax) language.

What You'll Learn

1. Basic GSS syntax and structure
2. Creating and manipulating Gaussian blobs
3. Using blend modes for complex effects
4. Tape-deck interface controls
5. Advanced prototyping techniques

Chapter 1: Understanding Gaussian Blobs

What is a Gaussian Blob?

A Gaussian blob is a smooth, organic shape created using a Gaussian (bell curve) function. Unlike hard-edged circles or rectangles, Gaussian blobs have naturally soft, feathered edges that blend beautifully with other elements.

Why Use Gaussian Blobs?

- **Organic aesthetics:** Perfect for natural, flowing designs
- **Smooth blending:** Multiple blobs combine seamlessly
- **Performance:** Mathematically efficient rendering
- **Versatility:** From UI elements to particle effects

Chapter 2: Your First Gaussian Blob

Basic Syntax


```
gaussian_blob {  
  center = {x = 250, y = 200},  
  radius = 80,  
  smoothness = 0.8,  
  color = {r = 100, g = 150, b = 255}  
}
```

Parameter Breakdown

- **center:** Position on canvas (x, y coordinates)
- x: 0 (left) to 500 (right)

- y: 0 (top) to 400 (bottom)
- **radius**: Size of the blob in pixels
- Recommended: 20-150 for most uses
- Larger values create bigger, softer blobs
- **smoothness**: Edge softness (0.0 to 1.0)
- 0.0: Hard edges (like a circle)
- 0.5: Medium softness
- 1.0: Very soft, diffuse edges
- **color**: RGB color values (0-255 each)
- r: Red component
- g: Green component
- b: Blue component

Try It!

1. Copy the code above into the IDE editor
2. Click the **PLAY**  button
3. Watch your first blob appear!



Chapter 3: Multiple Blobs and Blending

Creating Multiple Blobs

Simply add more `gaussian_blob` blocks:

```
gaussian_blob {
  center = {x = 200, y = 200},
  radius = 80,
  smoothness = 0.8,
  color = {r = 255, g = 100, b = 100}
}

gaussian_blob {
  center = {x = 300, y = 200},
  radius = 80,
  smoothness = 0.8,
  color = {r = 100, g = 100, b = 255}
}
```

Blend Modes

Control how blobs interact with each other:

Additive Blending

```
blend_mode "additive"
```

Colors add together, creating bright, glowing effects. Perfect for:

- Light effects
- Energy fields
- Glowing UI elements

Multiply Blending

```
blend_mode "multiply"
```

Colors multiply, creating darker, richer tones. Great for:

- Shadows
- Depth effects
- Organic textures

Screen Blending

```
blend_mode "screen"
```

Inverse multiply, creates bright, soft combinations. Ideal for:

- Soft lighting
- Atmospheric effects
- Dreamy visuals



Chapter 4: Tape-Deck Interface

The Controls

The tape-deck interface gives you VCR-style control over your prototypes:

PLAY

- Executes your GSS code
- Renders all blobs to canvas
- Shows console output

STOP

- Halts current execution
- Useful for long-running animations

REWIND

- Clears the canvas
- Resets to blank state
- Ready for new prototype

Examples

- Pre-loaded demonstration code
- Learn by example
- Modify and experiment

Workflow Tips

1. **Write** your GSS code in the editor
2. **Play** to see results
3. **Modify** parameters
4. **Replay** to see changes
5. **Rewind** when starting fresh



Chapter 5: Practical Examples

Example 1: Simple Overlap

Create two overlapping blobs to see basic blending:

```
gaussian_blob {  
  center = {x = 200, y = 200},  
  radius = 100,  
  smoothness = 0.8,  
  color = {r = 255, g = 100, b = 100}  
}  
  
gaussian_blob {  
  center = {x = 300, y = 200},  
  radius = 100,  
  smoothness = 0.8,  
  color = {r = 100, g = 100, b = 255}  
}
```

What to observe: Notice how the blobs blend in the overlap area, creating a purple region.

Example 2: Additive Galaxy

Create a glowing, galaxy-like effect:

```
blend_mode "additive"

gaussian_blob {
  center = {x = 250, y = 200},
  radius = 120,
  smoothness = 0.9,
  color = {r = 100, g = 50, b = 200}
}

gaussian_blob {
  center = {x = 280, y = 220},
  radius = 80,
  smoothness = 0.85,
  color = {r = 200, g = 100, b = 50}
}

gaussian_blob {
  center = {x = 220, y = 220},
  radius = 60,
  smoothness = 0.9,
  color = {r = 50, g = 200, b = 100}
}
```

What to observe: The additive blend creates bright, glowing intersections.

Example 3: Organic Cluster

Create a natural, organic grouping:

```
blend_mode "screen"

gaussian_blob {
  center = {x = 150, y = 150},
  radius = 70,
  smoothness = 0.85,
  color = {r = 255, g = 200, b = 100}
}

gaussian_blob {
  center = {x = 250, y = 180},
  radius = 90,
  smoothness = 0.8,
  color = {r = 100, g = 255, b = 200}
}

gaussian_blob {
  center = {x = 350, y = 150},
  radius = 65,
  smoothness = 0.9,
  color = {r = 200, g = 100, b = 255}
}

gaussian_blob {
  center = {x = 250, y = 280},
  radius = 80,
  smoothness = 0.87,
  color = {r = 255, g = 150, b = 200}
}
```

What to observe: Screen blend creates soft, luminous combinations.

Chapter 6: Advanced Techniques

Technique 1: Layered Depth

Create depth by varying smoothness and size:

```
-- Background layer (large, soft)
gaussian_blob {
    center = {x = 250, y = 200},
    radius = 150,
    smoothness = 0.95,
    color = {r = 50, g = 50, b = 100}
}

-- Middle layer (medium)
gaussian_blob {
    center = {x = 250, y = 200},
    radius = 100,
    smoothness = 0.85,
    color = {r = 100, g = 100, b = 200}
}

-- Foreground layer (small, sharp)
gaussian_blob {
    center = {x = 250, y = 200},
    radius = 50,
    smoothness = 0.7,
    color = {r = 200, g = 200, b = 255}
}
```

Technique 2: Color Gradients

Create smooth color transitions:

```
blend_mode "additive"

-- Red to yellow gradient
gaussian_blob {
    center = {x = 150, y = 200},
    radius = 80,
    smoothness = 0.9,
    color = {r = 255, g = 0, b = 0}
}

gaussian_blob {
    center = {x = 250, y = 200},
    radius = 80,
    smoothness = 0.9,
    color = {r = 255, g = 255, b = 0}
}

gaussian_blob {
    center = {x = 350, y = 200},
    radius = 80,
    smoothness = 0.9,
    color = {r = 0, g = 255, b = 0}
}
```

Technique 3: Asymmetric Compositions

Break symmetry for dynamic designs:

```
gaussian_blob {
  center = {x = 100, y = 100},
  radius = 60,
  smoothness = 0.8,
  color = {r = 255, g = 100, b = 150}
}

gaussian_blob {
  center = {x = 350, y = 250},
  radius = 90,
  smoothness = 0.85,
  color = {r = 100, g = 200, b = 255}
}

gaussian_blob {
  center = {x = 200, y = 320},
  radius = 70,
  smoothness = 0.9,
  color = {r = 200, g = 255, b = 100}
}
```

Chapter 7: Best Practices

Performance Tips

1. **Limit blob count:** 5-10 blobs render smoothly
2. **Optimize radius:** Smaller radii = faster rendering
3. **Use appropriate smoothness:** Higher values = more computation

Design Guidelines

1. **Start simple:** Begin with 2-3 blobs
2. **Experiment with blend modes:** Each creates different moods
3. **Consider color theory:** Complementary colors create vibrant effects
4. **Use asymmetry:** Avoid perfect symmetry for natural looks
5. **Layer strategically:** Background to foreground progression

Debugging Tips

1. **Check console output:** Watch for rendering messages
 2. **Test one blob at a time:** Isolate issues
 3. **Verify coordinates:** Ensure blobs are on canvas (0-500, 0-400)
 4. **Adjust smoothness:** If blobs look wrong, try different values
-

Chapter 8: Next Steps

What's Coming

- **Animation support:** Keyframe-based blob animation

- **Particle systems:** Dynamic, moving blobs
- **Physics integration:** Realistic blob interactions
- **Real-time tweaking:** Adjust parameters while running
- **Export options:** Save your creations

Keep Experimenting!

The best way to learn is by doing. Try:

1. Recreating real-world objects with blobs
2. Making abstract art compositions
3. Designing UI elements (buttons, backgrounds)
4. Creating animated effects
5. Building your own examples



Quick Reference

Complete Syntax

```
-- Set blend mode (optional)
blend_mode "additive" -- or "multiply", "screen"

-- Create blob
gaussian_blob {
    center = {x = 250, y = 200},      -- Position (0-500, 0-400)
    radius = 80,                      -- Size (10-200)
    smoothness = 0.8,                 -- Edge softness (0.0-1.0)
    color = {r = 100, g = 150, b = 255} -- RGB (0-255 each)
}
```

Keyboard Shortcuts

- **Ctrl+Enter:** Run code (same as PLAY)
- **Ctrl+R:** Reset canvas (same as REWIND)

Common Values

- **Small blob:** radius = 30-50
- **Medium blob:** radius = 60-100
- **Large blob:** radius = 110-150
- **Soft edges:** smoothness = 0.8-0.95
- **Sharp edges:** smoothness = 0.5-0.7



Congratulations!

You've completed the LUASCRIPt Gaussian Blobs GSS tutorial! You now have the knowledge to:

- ✓ Create beautiful Gaussian blob graphics
- ✓ Use blend modes for complex effects
- ✓ Navigate the tape-deck interface

- ✓ Apply advanced prototyping techniques
- ✓ Follow best practices for performance and design

Now go create something amazing! 🚀

📞 Support & Community

- **Documentation:** See README.md in the repository
- **Issues:** Report bugs on GitHub
- **Examples:** Check the Examples folder
- **Community:** Join our Discord (coming soon!)

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