

Trail Renderer - Ben Delaney-Brownlow - C00199438

Github URL: <https://github.com/BenDB925/RWM3>

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Introduction

This GDD describes my Trail Renderer component for Real World Modelling problem 3.

Technical Note

My demo uses the SDL_TTF library and SDL2_GFX. The basic implementation, however, only needs the SDL2_GFX library.

Features

[Link to youtube playlist of Features](#)

Basic Particle Effect [60]

The user can create a particle system that will emit textures as particles.



Conditions of satisfaction

- A particle system will emit textures as particles.
- The user can parent the particle manager to a changing position
- The user can change the particle manager's offset from this parented position
- The user can change the emission rate of the particle system

- The user can change the starting velocity of the particles
- The user can change the final velocity of the particles
- The user can change the angle of projection for the particles from the system itself.
- The user can change the minimum time to live and the maximum time to live
- The user can change the size of the particles that are emitted
- The user can change the starting scale of the particles that are emitted
- The user can change the final scale of the particles that are emitted
- The user can change the texture assigned to the particles that are emitted

Manual Test

- Created a ParticleManager with the texture variable of the ParticleManagerSettings object assigned.
- Ran the game and saw the particles that were emitted

Parenting the ParticleManager

- The user assigned the parentPosition variable in the ParticleManagerSettings object to a variable they can edit later.
- When they change this variable later to have different x and y coordinates, the system moves with it

Changing the offset of the ParticleManager

- The user assigned the offset variable in the ParticleManagerSettings object
- The ParticleManager was emitting with an offset from the parentPosition equivalent to the value passed in

Changing the emission rate of the ParticleManager

- The user assigned the emission rate variable in the ParticleManagerSettings object
- The ParticleManager emitted particles at the rate specified

Starting Velocity Test

- The user changed the starting velocity variable for the ParticleManagerSettings object to 0
- The particles, when emitted, didn't move initially (they will lerp to the final velocity).

Final Velocity Test

- The user changed the final velocity variable for the ParticleManagerSettings object
- The particles, when emitted, lerp towards the final velocity specified

Angle of Projection Test

- The user changed the velocity variation variable for the ParticleManagerSettings object
- The particles velocities were added a random value between zero and the value specified

Minimum/ Maximum Time to Live Test

- The user changed the minimum/maximum time to live variable for the ParticleManagerSettings object
- The particles maximum time to live was changed to this value, the user should see some particles dying sooner if this value was decreased, or living longer if this value was increased.

Particle Size Test

- The user changed the particle size variable for the ParticleManagerSettings object
- The emitted particles were the size specified.

Particle Scale Test

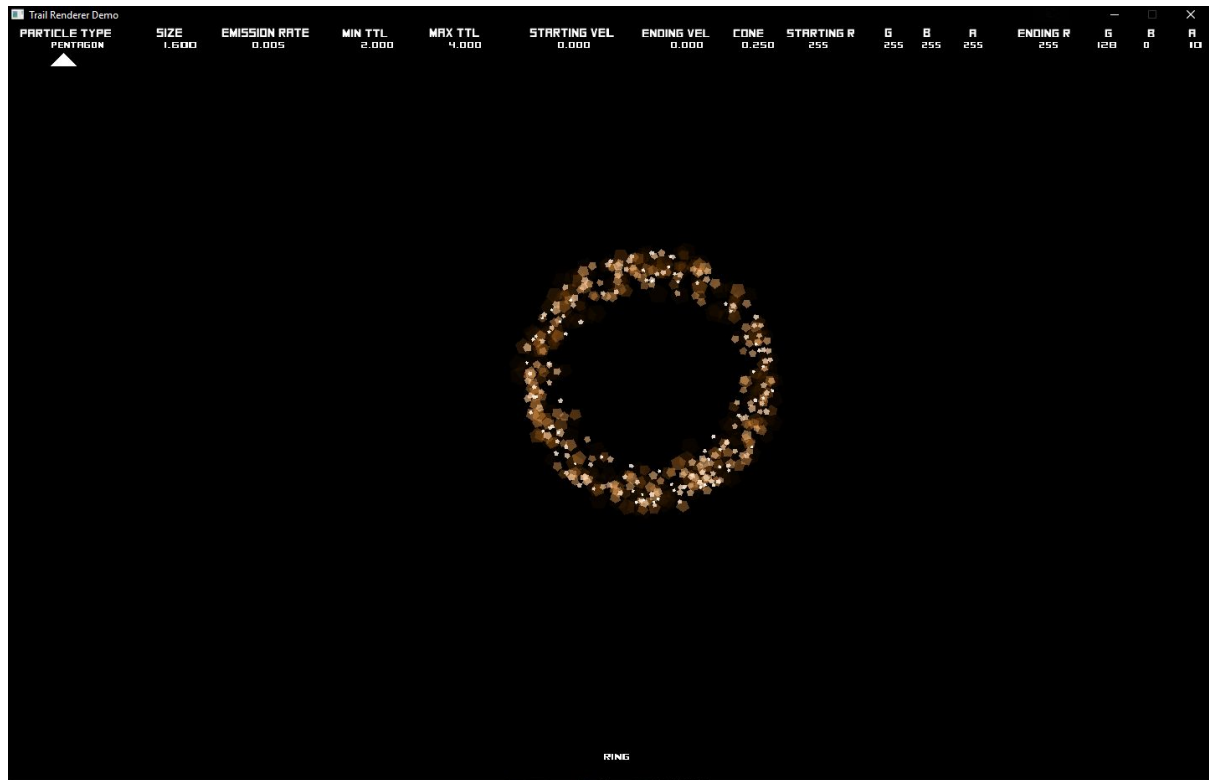
- The user changed the starting or ending scale variable for the ParticleManagerSettings object
- The emitted particles lerp from the starting scale to the ending scale throughout their life

Texture Test

- The user changed the texture variable for the ParticleManagerSettings object
- The texture that the particle's use was changed

Shaped Particle Effects [63]

The user can create a particle system that will emit particles randomly in a user defined shape, such as the ring below.



Conditions of satisfaction

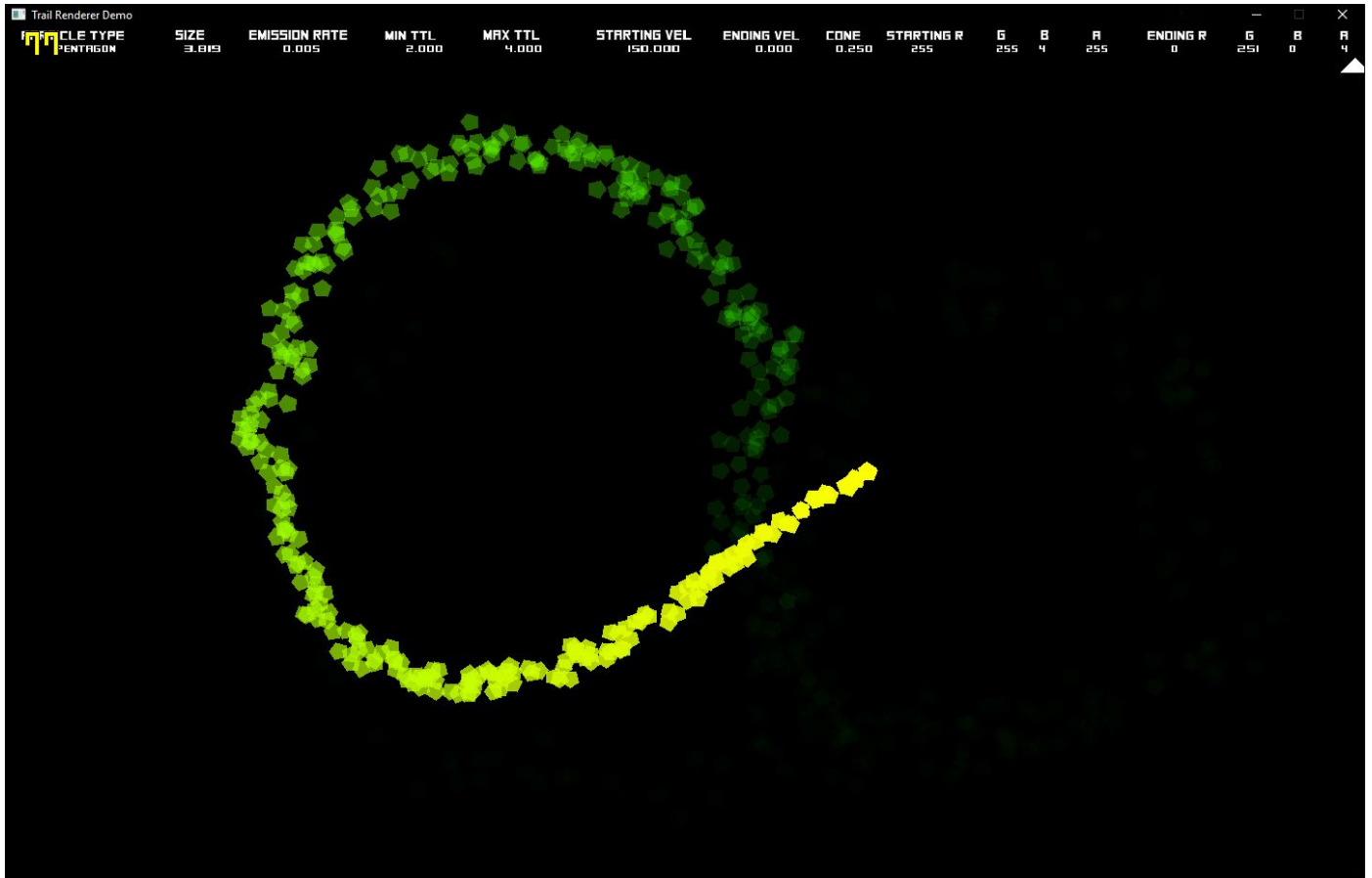
- A particle system will emit particles randomly within the following shapes:
 - Rectangle
 - Ring
 - Circle
 - Triangle
- The users can still decide to simply have the particles emit from a point
- The users can edit the shape they want the particles to emit from in the following ways
 - Rect
 - Width and height of the rectangle
 - Ring
 - The radius of both the inner empty circle, and the outer circle
 - Circle
 - The radius of the circle
 - Triangle
 - The vertex coordinates of the triangle

Manual Test

- Created a ParticleManager with the “_emissionShape” variable assigned to be of type:
 - *EmissionRect* for rectangle shaped emitter
 - *EmissionRing* for ring shaped emitter
 - *EmissionCircle* for circle shaped emitter
 - *EmissionTriangle* for triangle shaped emitter
 - *EmissionPoint* for a single point that particles will emit from
- Assigned the variables for the constructor of said shape
- Ran the demo and saw that the particles randomly from within that shape

Shaped Particles (Primitives) [130]

The user can create a particle system that will emit primitives as particles.



Conditions of satisfaction

- A particle system will emit primitive shapes as particles.
- The user can switch the shape type between the following:
 - Pentagon
 - Triangle
 - Square
 - Star
- The user can specify the colours the shape will be throughout it's lifetime and the duration it will be each colour. The shape's colour will lerp between each colour specified.
- The user can decide the rotational speed of the shapes
- The user should have access to all the variables available to the basic particle system, aside from specifying a texture. (minimum/maximum time to live, particle size etc.)

Manual Test

- Created a ParticleManager without assigning the texture variable of the ParticleManagerSettings.
- Ran the game and saw the primitives that were emitted

Shape Type Test

- The user changed the shape type variable for the ParticleManagerSettings object
- The particles, when emitted, were of the shape type specified

Rotational Velocity Test

- The user changed the rotational velocity variable for the ParticleManagerSettings object
- The particles, when emitted, rotated at the velocity specified

Colour Lerp Test

- The user added to the colour lerp list of the ParticleManagerSettings object by creating ColourLerper's and defining a colour and a duration for each transition
- The particles, when emitted, lerped between the colours given to the Particle Manager

Other Variables Test

- The user changed a variable as seen in the corresponding test in the basic particle system
- The particles, when emitted, followed the expected result as seen in the basic particles system.

Particle System Presets [104]

The user can select between four different pre-made presets of trails.



Conditions of satisfaction

- The user can copy a preset particle system I have made
- The user can edit any of my presets as they would a custom particle system they define themselves
- The four presets are as follows:
 - Footprints trailing the system
 - A rocket thruster
 - A tron-bike style trail
 - A generic star type trail

Manual Test

- Created a ParticleManager by copying a preset
- Ran the game and saw the preset in the default position without the user having to define any custom variables