



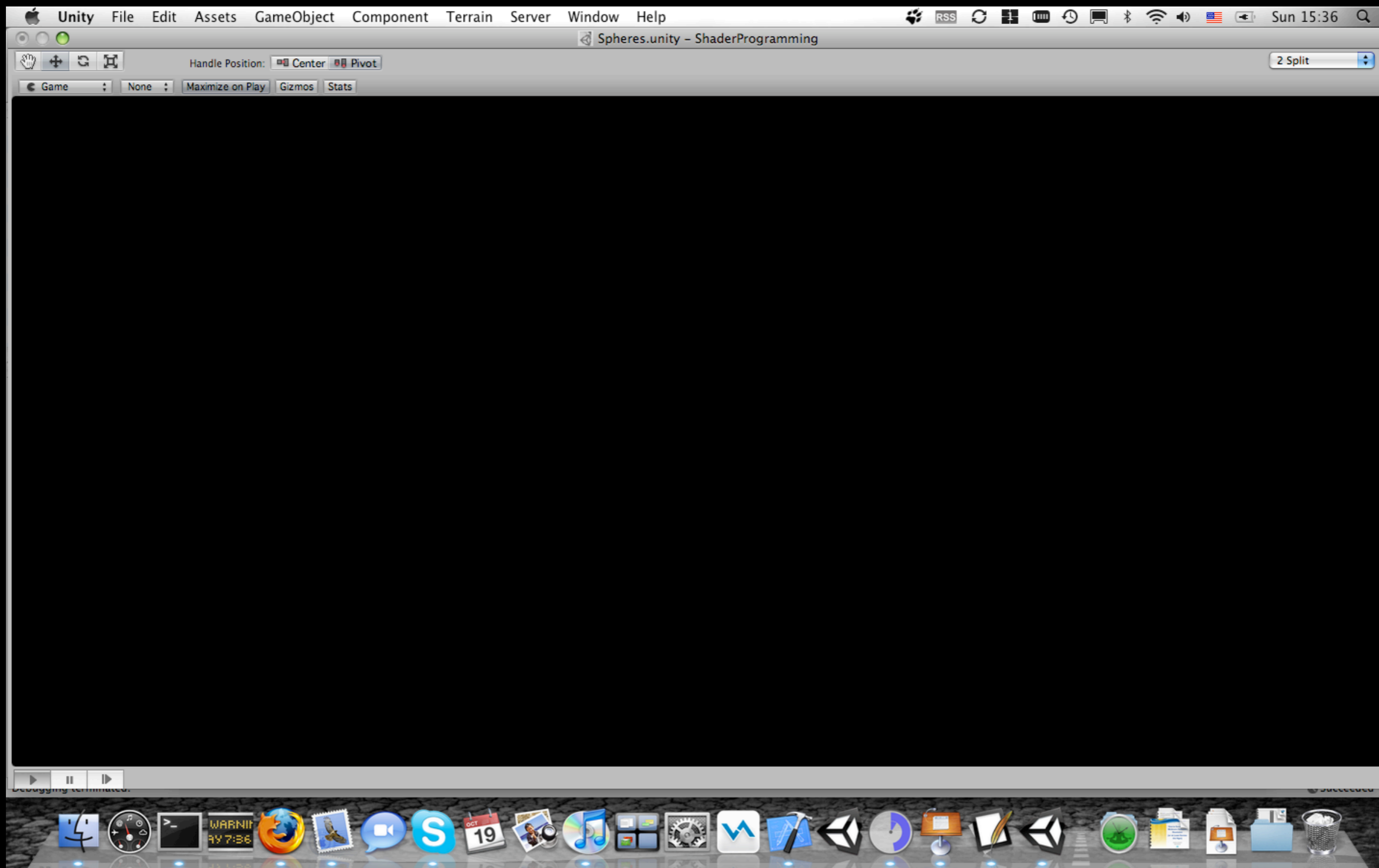
unite'08

Shader Programming

Amir Ebrahimi

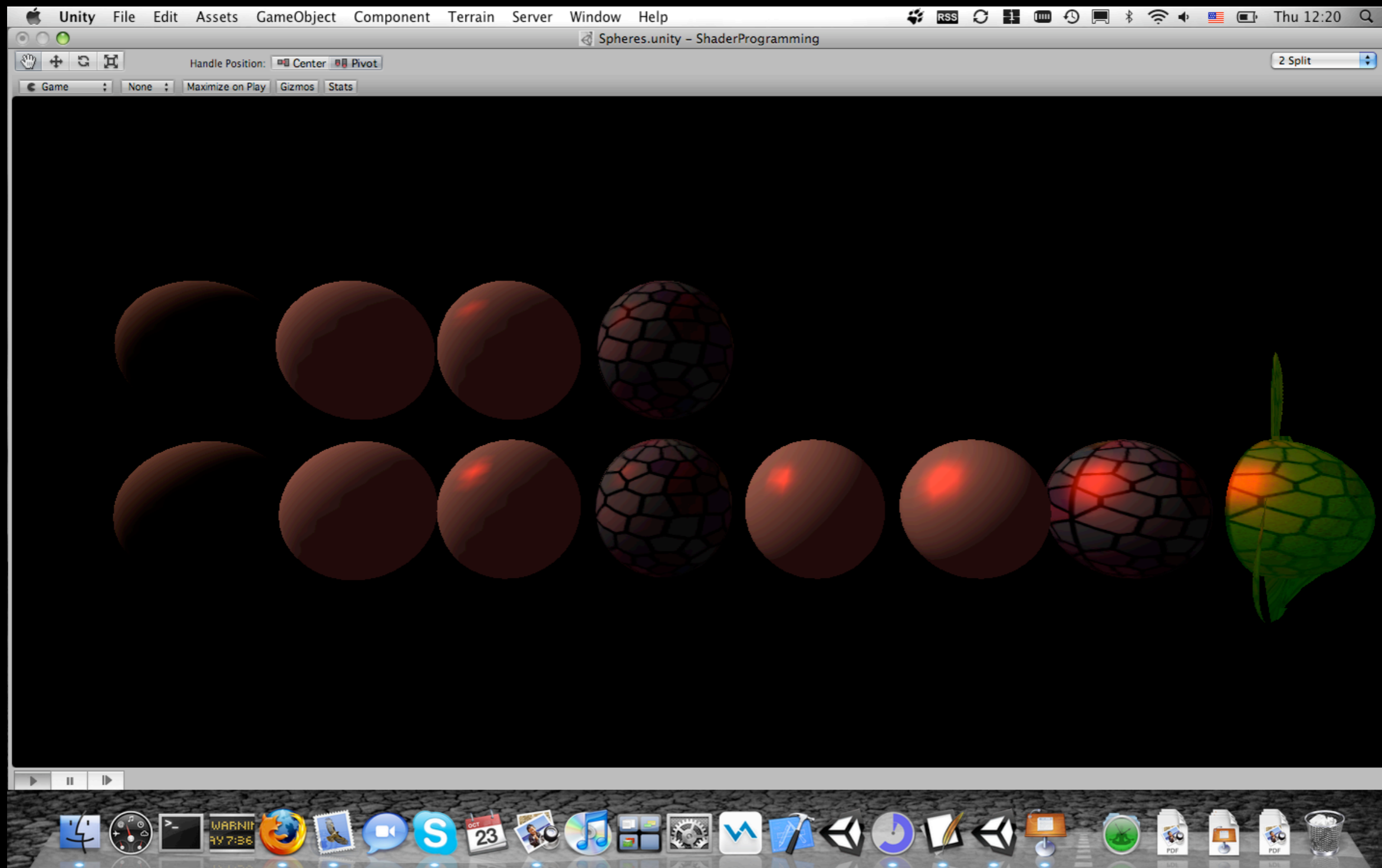
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What does a shader do?



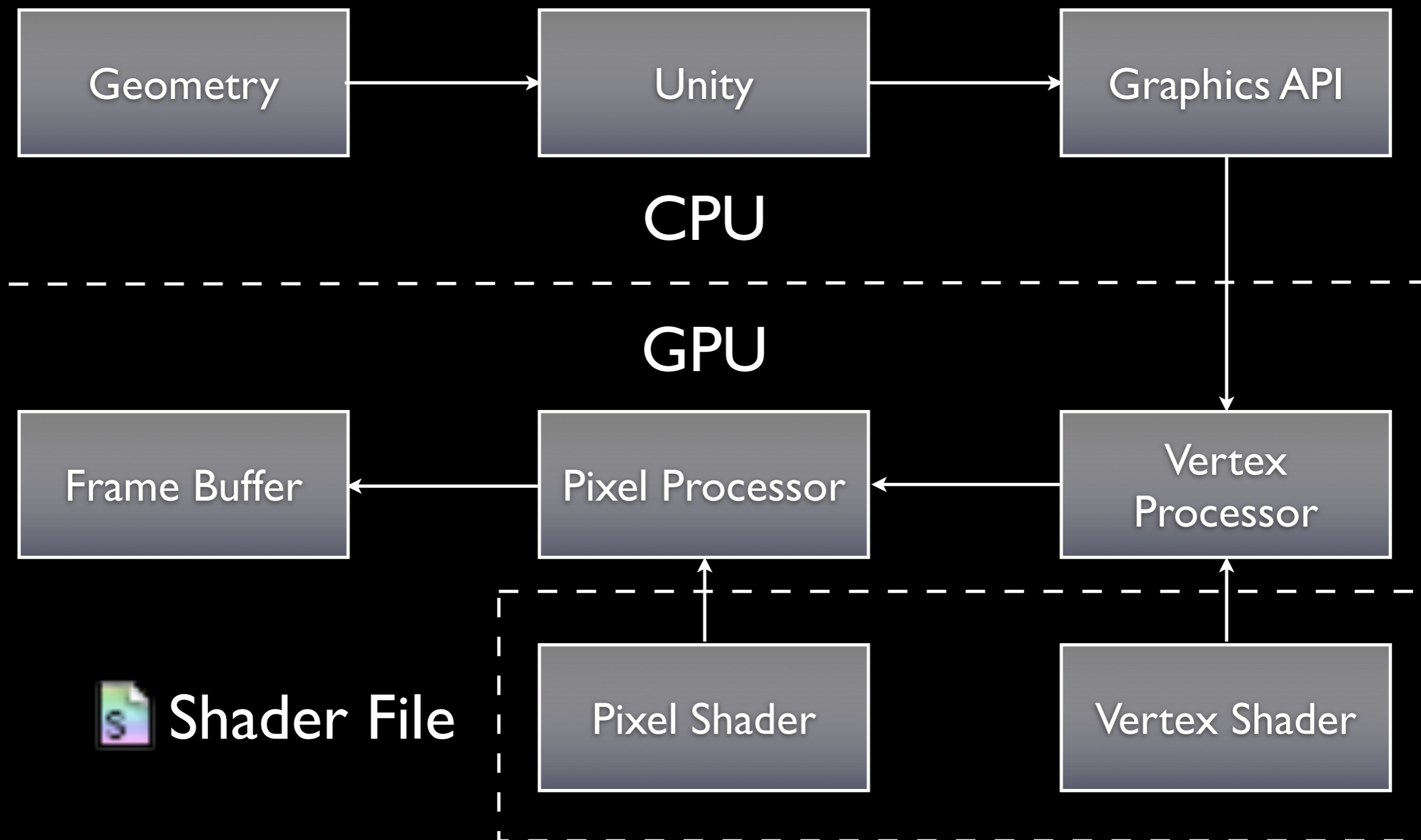
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Gives sight to the blind!



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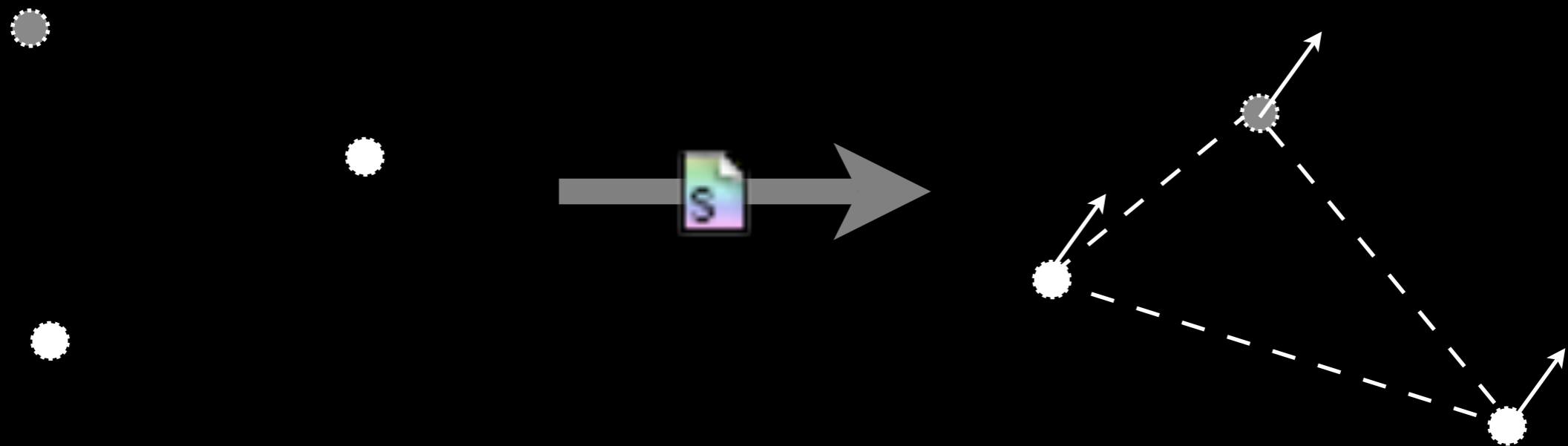
How does a shader work?



Unit 08

Vertex Shaders

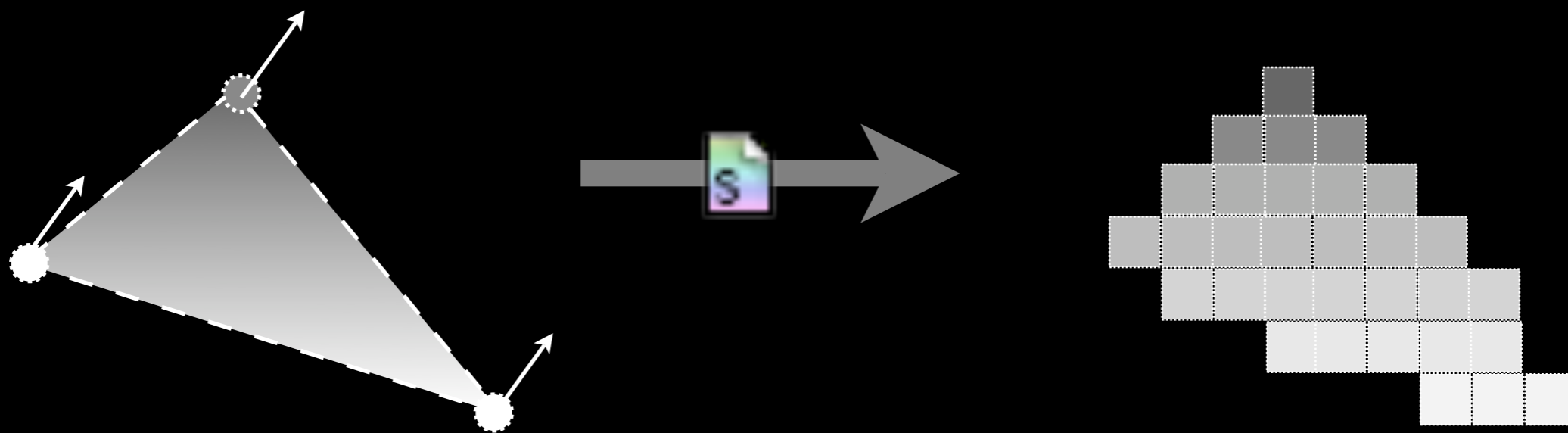
- Transform an object from local space to world space
- Can calculate any per-vertex data to be interpolated
- Pass through other input data



Unit 08

Pixel Shaders

- Can use interpolated data from the vertex shader
- Calculate per-pixel lighting
- Can use source textures to determine the final color



The logo for Unite '08, featuring a stylized bird or wing shape in red and blue, with the text 'unite '08' in white.

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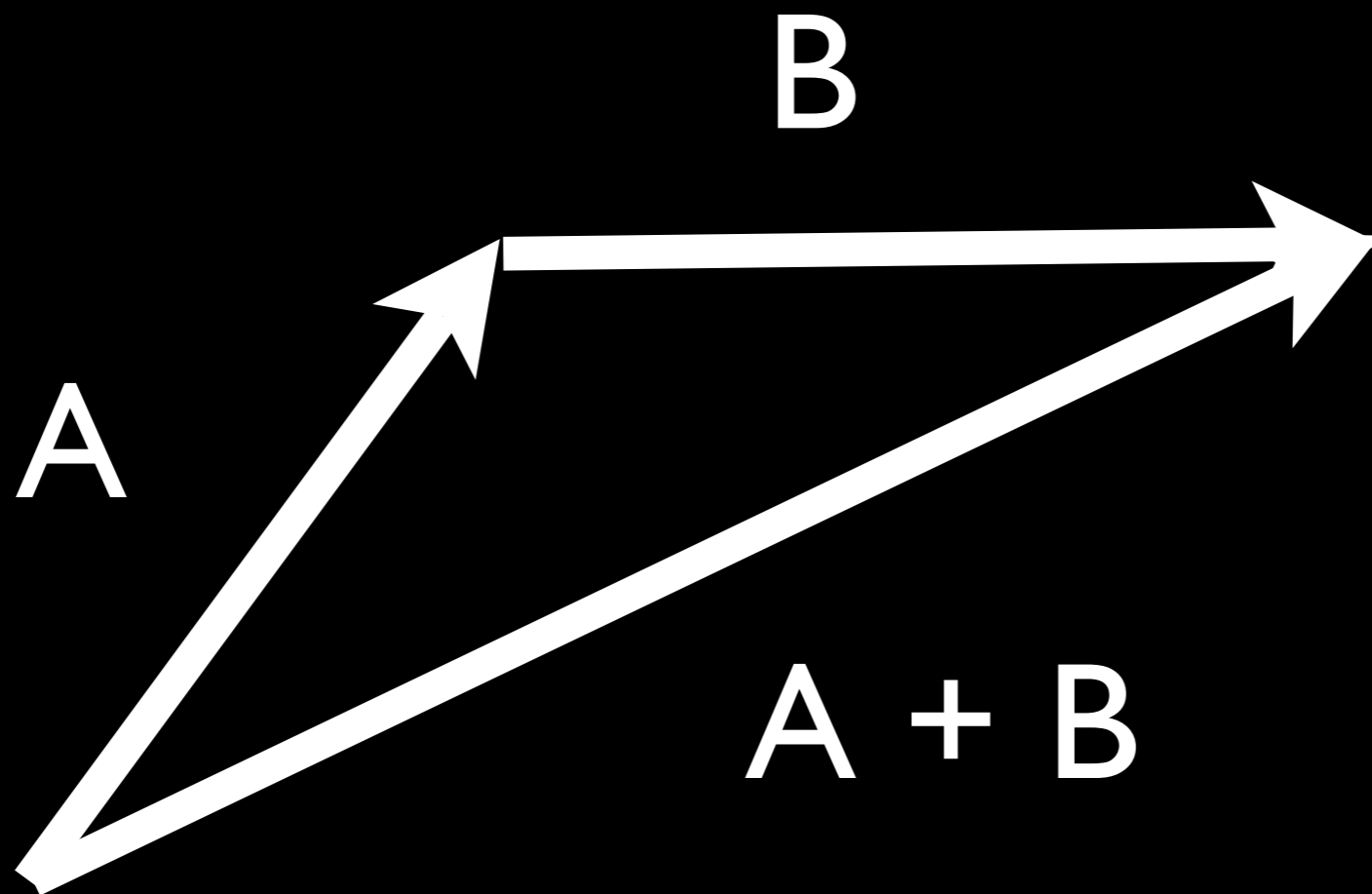
Let's write a shader!

Tutorial #1:

Let's get something drawing on the screen

Unit '08

What's your vector victor?



Unit '08

What's your vector victor?

normalize(



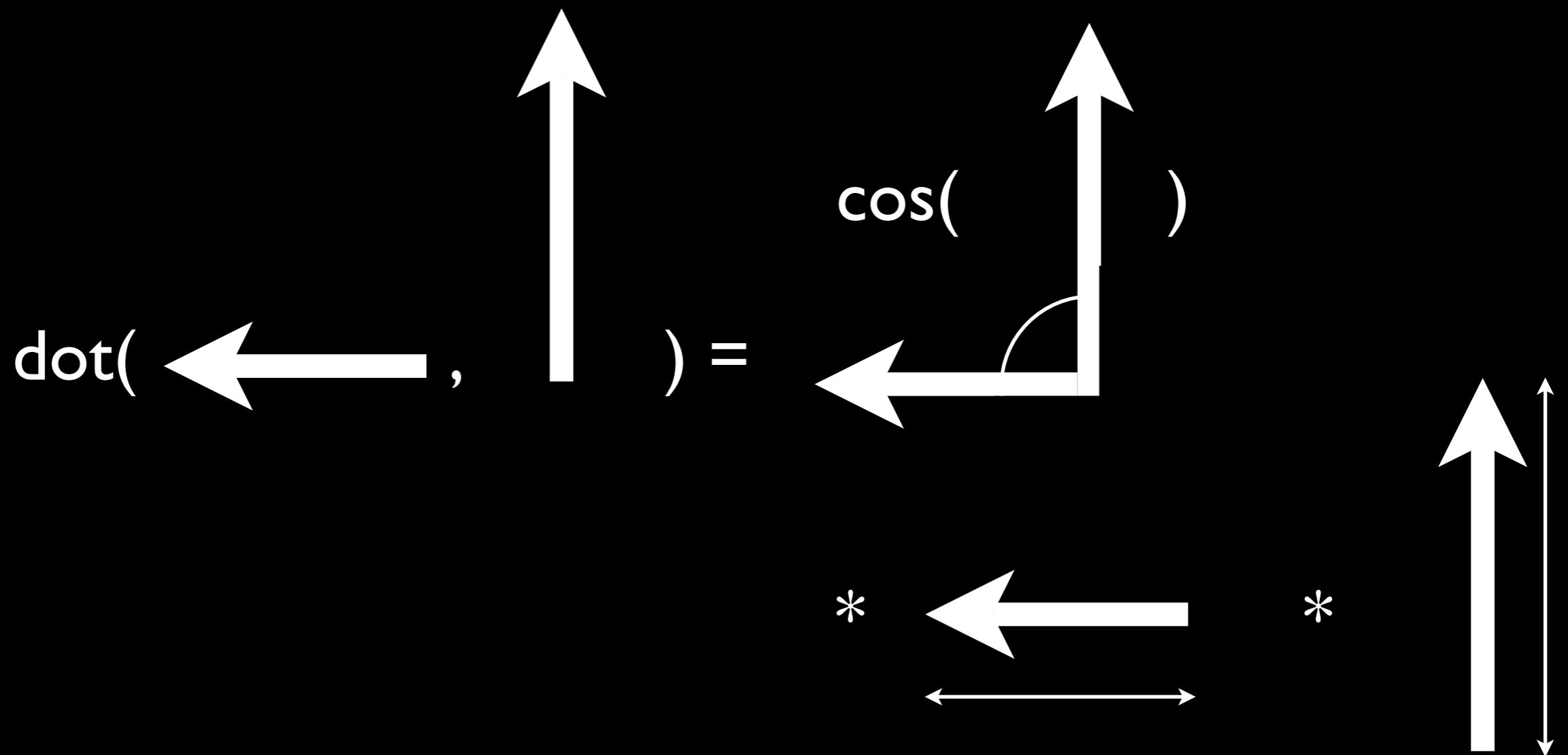
) =



1 unit

Unit '08

What's your vector victor?





Unit '08

Cg Primer

Data types

float

float2

float3

float4

sampler2D

Shader semantics

POSITION

COLOR(N)

TEXCOORD(N)

Functions

dot()

normalize()

saturate()

pow()

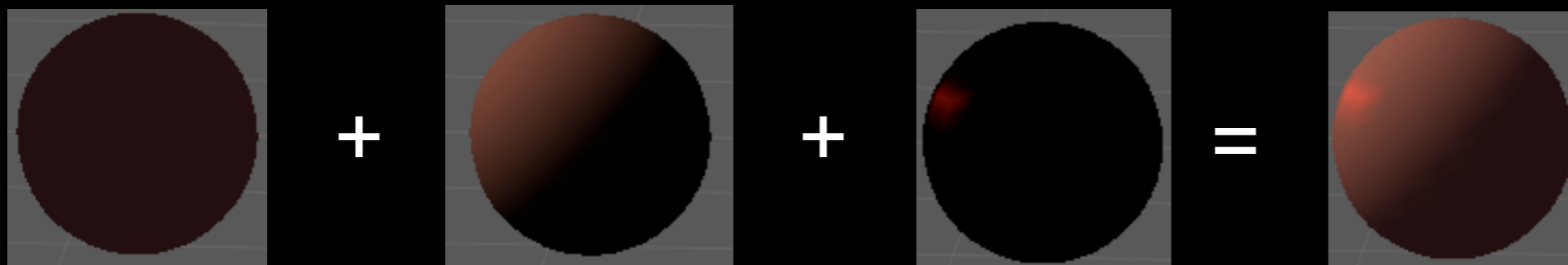
mul()

tex2D()

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Blinn-Phong

Ambient + Diffuse + Specular = Final Color



$I_a * I_o +$

$I_d * I_o * \text{dot}(L_d, N_o) +$

$I_s * I_o(s) * \text{pow}(\text{dot}(N, H), \text{Shininess})$

The logo for Unite '08, featuring a stylized red and blue bird or flame-like shape.

unite '08

Let's write a shader!

Tutorial #2:

Let's implement Blinn-Phong



Unity '08

Unity built-ins

float4 _Time (t/20, t, t*2, t*3)

float4 _SinTime (t/8, t/4, t/2, t)

float4 _CosTime (t/8, t/4, t/2, t)

_ModelLightColor[N] (Material's Main * Light color)

_SpecularLightColor[N] (Material's Specular * Light color)

PositionFog()

ObjSpaceLightDir()

ObjSpaceViewDir()

TRANSFORM_TEX()

DiffuseLight() or SpecularLight()

The logo for Unite '08, featuring a stylized red and blue bird-like shape with wings spread, positioned behind the text.

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Let's write a shader!

Tutorial #3:

Let's do something funky



Q&A

amir@unity3d.com