Individual Assignment 2 - Review

INFR 2350 - Intermediate Computer Graphics 2023

Purpose: In this assignment, you will demonstrate your knowledge in preparation for the final exam.

This assignment is weighted at 10% of your final mark for this course.

This assignment must be done individually and done during class time on March 28, 2023. This activity is open book, but limited to course materials for exam practicing purposes.

Deliverables:

- This PDF document with your self-evaluation completing the assignment's rubric.
- A working repository with evidence supporting the self-evaluated items including screenshots and text description of what was done. Please note that items without descriptions are not awarded any points. Incomplete, or inadequate description and supporting materials will have the point being deducted to half its value.

Tasks:

	Task	Deliverable	Value
Create a repository for this assignment. Suggested time limit: 10 minutes	Make the repository is public	Proof of completing the task with screenshots and descriptions on the repository's readme	0.2/1
	Add unity gitignore		0.2/1
	Create an empty Unity 3D project		0.2/1
	Build the project		0.2/1
	Upload the build as a release to GitHub		0.2/1
Total			1/1

	Task	Deliverable	Value
Explain the difference between forward and deferred rendering using a diagram Suggested time limit: 15 minutes	Define with your own words what deferred and forward rendering are	Proof of completing the task with screenshots and descriptions on the repository's readme	0.25/1
	Create a diagram that shows how each of these work and their differences		0.25/1
	Use the diagram to explain the differences		0.25/1
	Provide an example by describing a scene and how it could be implemented employing pseudocode or a flowchart		0.25/1
Total			0.25/1

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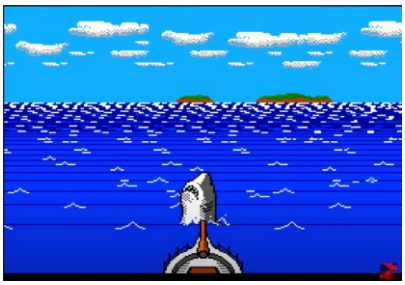
	Task	Deliverable	Value
Create a toon shaded square-shaped wave. Note the water moves. Suggested time limit: 30 minutes	Edit the empty scene on your project. Even student numbers will aim to have a scene similar to this one from Jaws the video game:  While odd student numbers will use this one:  Please keep in mind that you are not being asked to recreate this scene faithfully. You are being asked to create one that is similar. You can explain your decisions on how you decided to tackle this task to ensure the scene resembles the designated one. The scene should present basic movements controlling the ship or the shark.	Proof of completing the task with screenshots and descriptions on the repository's readme	0.75/3
	Explain how the shaders were implemented.		0.75/3
	Explain the modifications done to the shaders and how they differ from the ones given in class and tutorials. If the shader does not present modifications, no points are awarded.		0.75/3
	Create a build for this task and upload it as a release on GitHub		0.75/3
Total			3/3

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	Task	Deliverable	Value

Explain the following code snippet
 	
Suggested time limit: 10 minutes
	`void OnRenderImage(RenderTexture source, RenderTexture destination){`
	
	`int width = source.width / integerRange;`
	`int height = source.height / integerRange;`
	`RenderTextureFormat format = source.format;`
	`RenderTexture[] textures = new RenderTexture[16];`
	
	`RenderTexture currentDestination = textures[0] = RenderTexture.GetTemporary(width, height, 0, format);`
	
	`Graphics.Blit(source, currentDestination);`
	`RenderTexture currentSource = currentDestination;`
	`Graphics.Blit(currentSource, destination);`
	`RenderTexture.ReleaseTemporary(currentSource);`
	`int i = 1;`
	`for (; i < iterations; i++) {`
	`width /= 2;`
	`height /= 2;`
	`currentDestination = textures[i] = RenderTexture.GetTemporary(width, height, 0, format);`
	`if (height < 2) {`
	`break;`
	`}`
	`currentDestination = RenderTexture.GetTemporary(width, height, 0, format);`
	`Graphics.Blit(currentSource, currentDestination);`
	`RenderTexture.ReleaseTemporary(currentSource);`
	`currentSource = currentDestination;`
	`}`
	
	`for (; i < iterations; i++) {`
	`Graphics.Blit(currentSource, currentDestination);`
	`//  RenderTexture.ReleaseTemporary(currentSource);`
	`currentSource = currentDestination;`
	
	`}`
	
	`for (i -= 2; i >= 0; i--) {`
	`currentDestination = textures[i];`
	`textures[i] = null;`
	`Graphics.Blit(currentSource, currentDestination);`
	`RenderTexture.ReleaseTemporary(currentSource);`
	`currentSource = currentDestination;`
	`}`
	
	`Graphics.Blit(currentSource, destination);`
	`}`
		Proof of completing the task with screenshots and descriptions on the repository's readme	

	Highlight text to explain the code		0.1/0.5
	Explain what the code does		0.2/0.5
	Provide an example of where this could be used		0.2/0.5
Total			0.2

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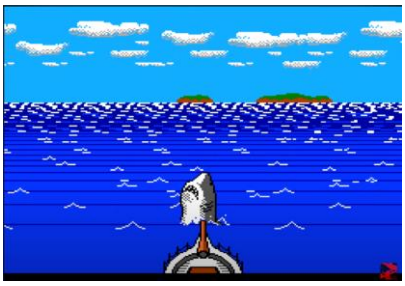
	Task	Deliverable	Value
Add any two of the following: Bloom Shadows Outlining Vertex extrusion Suggested time limit: 50 minutes	Use the previous Jaws scene and build on top of it. Even student numbers will aim to have a scene similar to this one from Jaws the video game:  While odd student numbers will use this one:  Please keep in mind that you are not being asked to recreate this scene faithfully. You are being asked to create one that is similar. You can explain your decisions on how you decided to tackle this task to ensure the scene resembles the designated one.	Proof of completing the task with screenshots and descriptions on the repository's readme	
	Explain how the shaders were implemented.		1/3
	Explain the modifications done to the shaders and how they differ from the ones given in class and tutorials. If the shader does not present modifications, no points are awarded.		1/3
	Create a build for this task and upload it as a release on GitHub		1/3
Total			3/3

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	Task	Deliverable	Value

Explain the following code snippet
 	
Suggested time limit: 10 minutes
	<pre>Shader "ColoredShadow"
	{
	    Properties{
	     _Color("Main Color", Color) = (1,1,1,1)
	     _MainTex("Base (RGB)", 2D) = "white" {}
	    _ShadowColor("Shadow Color", Color) = (1,1,1,1)
	    }
	        SubShader{
	
	            Tags { "RenderType" = "Opaque" }
	            LOD 200
	
	        CGPROGRAM
	        #pragma surface surf CSLambert
	
	        sampler2D _MainTex;
	        fixed4 _Color;
	        fixed4 _ShadowColor;
	
	        struct Input {
	            float2 uv_MainTex;
	        };
	
	        half4 LightingCSLambert(SurfaceOutput s, half3
	lightDir, half atten) {
	
	            fixed diff = max(0, dot(s.Normal, lightDir));
	
	            half4 c;
	            c.rgb = s.Albedo * _LightColor0.rgb * (diff *
	atten * 0.5);
	
	            //shadow color
	            c.rgb += _ShadowColor.xyz * (1.0 - atten);
	            c.a = s.Alpha;
	            return c;
	        }
	
	        void surf(Input IN, inout SurfaceOutput o) {
	            half4 c = tex2D(_MainTex, IN.uv_MainTex) *
	_Color;
	            o.Albedo = c.rgb;
	            o.Alpha = c.a;
	        }
	        ENDCG
	    }
	
	        Fallback "Diffuse"
	}</pre>
		Proof of completing the task with screenshots and descriptions on the repository's readme	

	Highlight text to explain the code		0.1/0.5
	Explain what the code does		0.2/0.5
	Provide an example of where this could be used		0.2/0.5
Total			0.5/0.5

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	Task	Deliverable	Value
Choose any shader seen in the second half of the term that has not been covered in your previous responses Suggested time limit: 15 minutes	Explain how the chosen shader works	Proof of completing the task with screenshots and descriptions on the repository's readme	0.25/1
	Create a diagram that shows how it works		0.25/1
	Explain where this can shader be used		0.5/1
Total			1/1

Once you complete the activities, please input the values on the following table and calculate the total. Do note that this activity allows you practice and identify strengths and weaknesses towards the final. After this is done, compare notes with classmates. Most importantly, make sure you understand the shaders seen in the second half of the term and you can use them beyond what was provided in class, making them suit any given scene. I hope you have enjoyed this activity.

	Task	Value
Add all of the items and calculate the assignment's total	Create repository and Unity project	1 /1
	Explain the difference between forward and deferred rendering using a diagram	0.25 /1
	Create a toon shaded square-shaped wave.	3 /3
	Explain the code snippet	0.2 /0.5
	Add to shaders to the designated scene	3 /3
	Explain the code snippet	0.5 /0.5
	Explain any shader of your choosing	1 /1
Total		8.95 /10