Developer Support Engineer Interview test

1. Please solve the following problems. You can use the Unity Documentation, Scripting Reference, Stack Overflow, Google, etc:

    1.1. Extend the following vertex and fragment shader to use Light Probe illumination from the scene, affecting the object being rendered.

```
Shader "MyShader/Diffuse With LightProbes" {
        Properties { [NoScaleOffset] _MainTex ("Texture", 2D) = "white" {} }
        SubShader {
        Pass {
            Tags {
                   "LightMode"="ForwardBase"
            }
            CGPROGRAM
                #pragma vertex v
                #pragma fragment f
                #include "UnityCG.cginc"
                sampler2D _MainTex;
                struct v2f {
                        float2 uv : TEXCOORD0;
                        float4 vertex : SV_POSITION;
                };
                v2f v (appdata_base vertex_data) {
                        v2f o;
                        o.vertex = UnityObjectToClipPos(vertex_data.vertex);
                        o.uv = vertex_data.texcoord;
                        return o;
                }
                fixed4 f (v2f input_fragment) : SV_Target {
                        fixed4 col = tex2D(_MainTex, input_fragment.uv);
                        return col;
                }
             ENDCG
            }
        }
}
```

    1.2. Create a native plugin with a function written in C/C++, which is called from Unity in a C# script and receives the following struct from C#:

```
struct TwoStrings {
        string string1;
        string string2;
        string concatenated;
}
```

    After calling the native function from C#, passing as argument an object of type TwoStrings, the variable “concatenated” of the object will store the two strings in

"string1" and "string2" concatenated.

1.3. Create a Unity project using Unity's C# Job System to calculate the sum of the R channel, for each texture element of a texture. To do this, split the texture into four regions of equal size, the operation should be processed by jobs **running in parallel**.

1.4. Use VFX Graph to create a particle system that moves along a Bezier curve.

1.5. Create two prefabs using cubes with a shared material, packing each prefab into a separate asset bundle. Use a script to load the prefabs and instantiate them in the scene. Do not use Addressables.

2. Please, try to answer the following questions in your own words:

2.1. Describe what each of these technologies are and what they can be used for:
- 2.1.1. Scriptable Build Pipeline
- 2.1.2. Scriptable Render Pipeline
- 2.1.3. Addressables
- 2.1.4. IL2CPP
- 2.1.5. Nested Prefabs

2.2. Mention at least two problems of Unity's non-incremental Garbage Collector.

2.3. Explain which of these is better and why? Unity LTS, TECH release, Beta or Alpha?

2.4. What is your preferred version control system and why do you prefer it over others?

2.5. What is your favorite IDE and why?

2.6. What issues or limitations have you recently experienced using Unity?

2.7. What strategies or best practices can be used to optimize the CPU and GPU usage in an application made with Unity?

2.8. How do you catch and investigate crashes happening in a released game?

2.9. Compare the following function and macro definitions. In what cases will they produce different results and/or side effects?

```
int square(int val) { return val*val; }
#define square(val)  (val*val)
```

2.10. What is the package manager in Unity and what is the alternative way of adding a package than via the package manager UI?

2.11. Examine the following function. What does it accomplish?

```
int someFunction(int i) {
      int n = 0;
      while (i)   {
            i &= i-1;
            n++;
      }
      return n;
}
```