

# Computer Graphics II

## - Instancing (Questions)

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# Possible Questions

What is the idea of instancing?

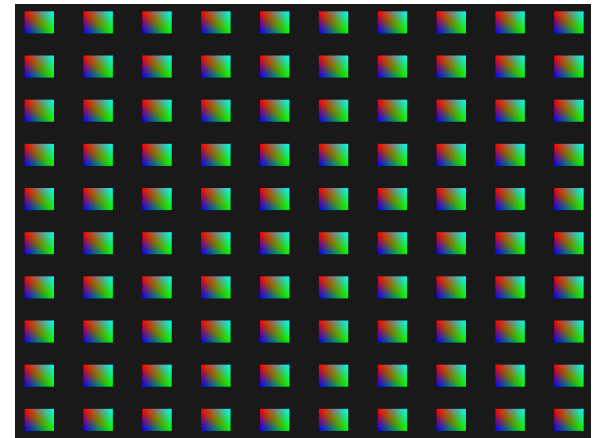
# Possible Questions

What is the idea of instancing?

- Send data over to the GPU once and then tell OpenGL to draw multiple objects with a single drawing call using this data → instancing
- Instancing can draw many objects at once with a single render call → saving the CPU -> GPU communications

# Possible Questions

Complete the code (output right).



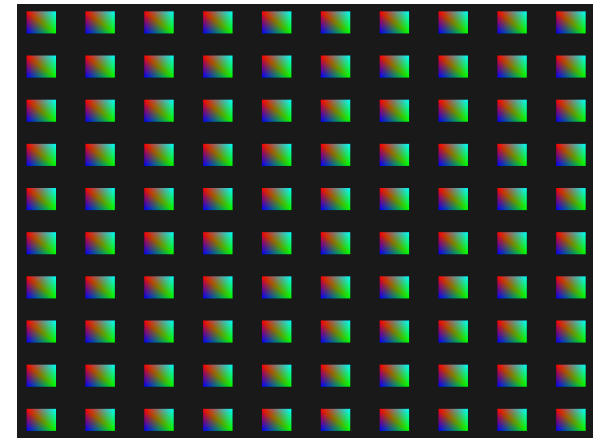
```
#version 330 core
layout (location = 0) in vec2 aPos;
layout (location = 1) in vec3 aColor;

out vec3 fColor;
uniform vec2 offsets[100];

void main()
{
    vec2 offset          ;
    fColor = aColor;
    gl_Position = vec4(aPos + aOffset, 0.0, 1.0);
}
```

# Possible Questions

Complete the code (output right).



```
#version 330 core
layout (location = 0) in vec2 aPos;
layout (location = 1) in vec3 aColor;

out vec3 fColor;
uniform vec2 offsets[100];

void main()
{
    vec2 offset = offsets[gl_InstanceID];
    fColor = aColor;
    gl_Position = vec4(aPos + aOffset, 0.0, 1.0);
}
```

# Possible Questions

What does this mean?

```
glVertexAttribDivisor(2, 1);
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glVertexAttribDivisor(2, 1);
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- 1<sup>st</sup> parameter - vertex attribute; 2<sup>nd</sup> the attribute divisor
- Vertex attribute at attribute location 2 is an instanced array changed for every instance