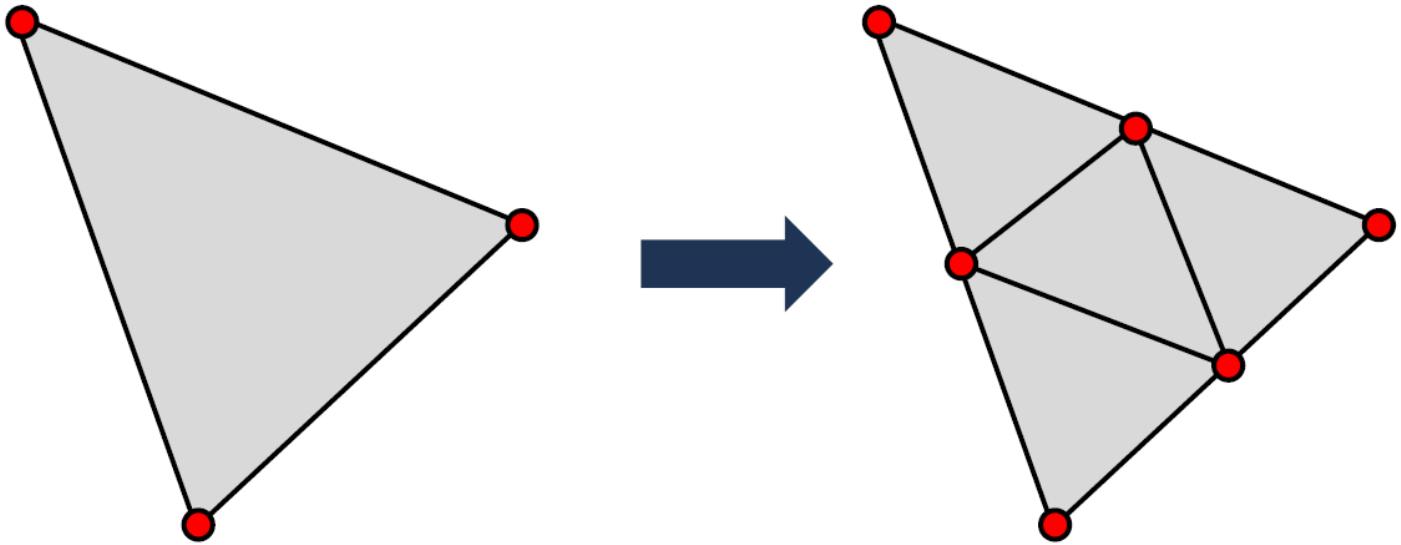
Advanced Computer Graphics Practical Session

Programming Assignment 1

1. Change the scene description to triangles (and triangular patches).



- Patches are `Triangle`-instances

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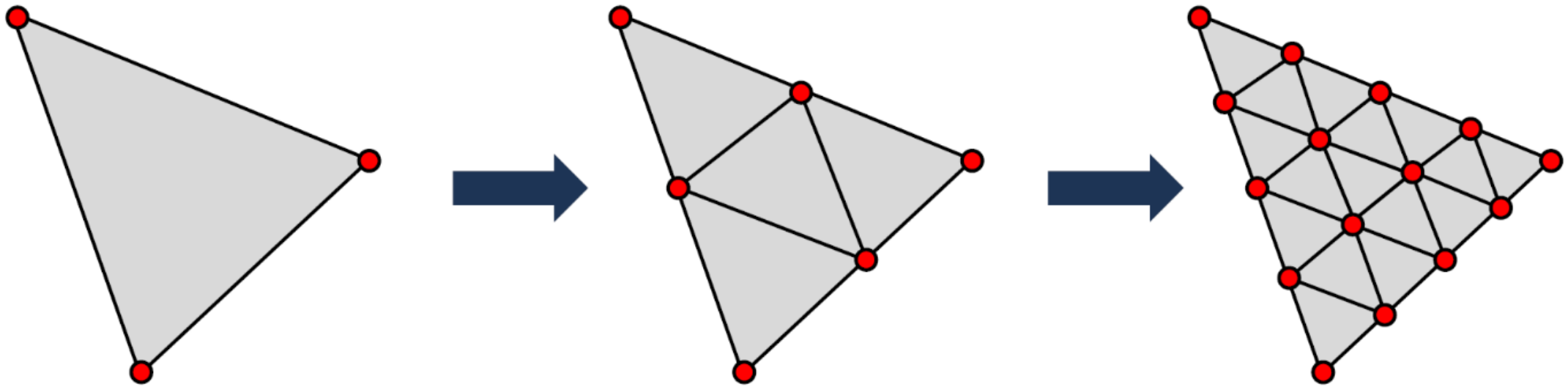

Depth 0

Depth 1

Depth 2

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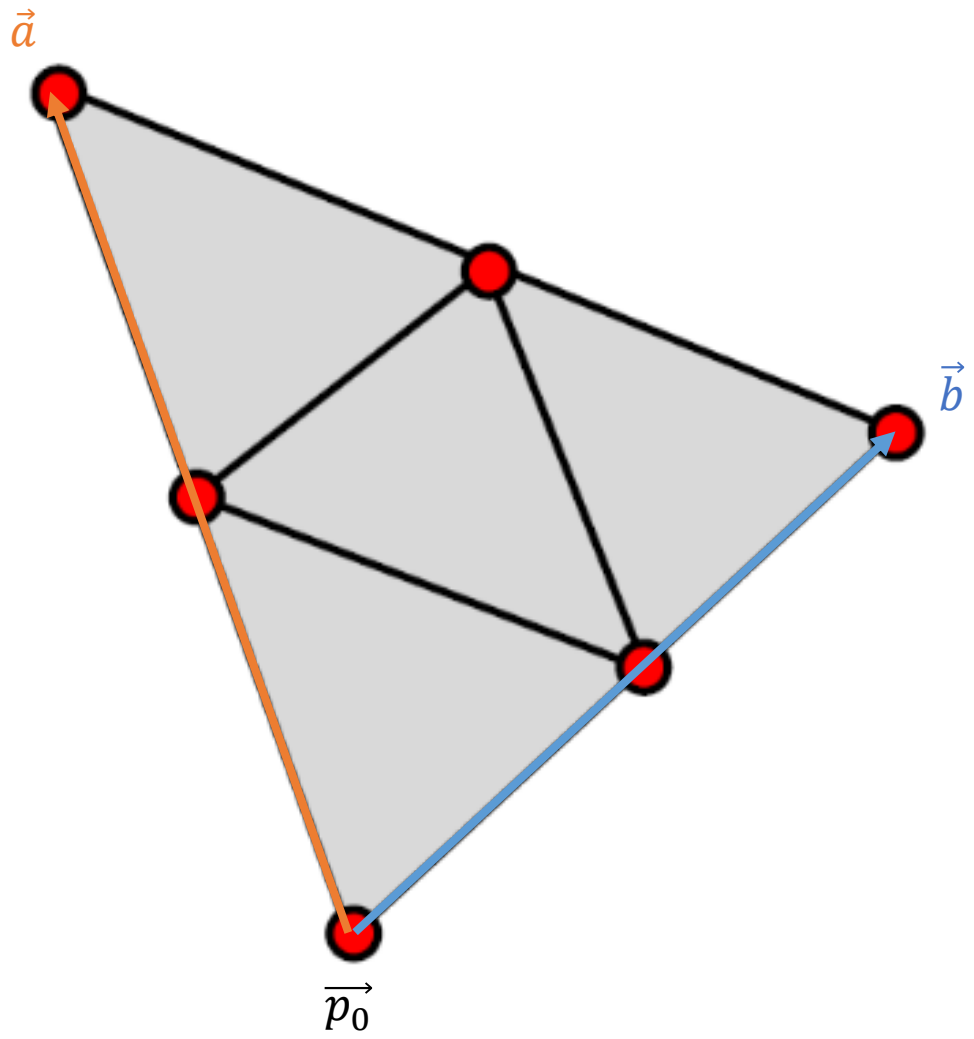

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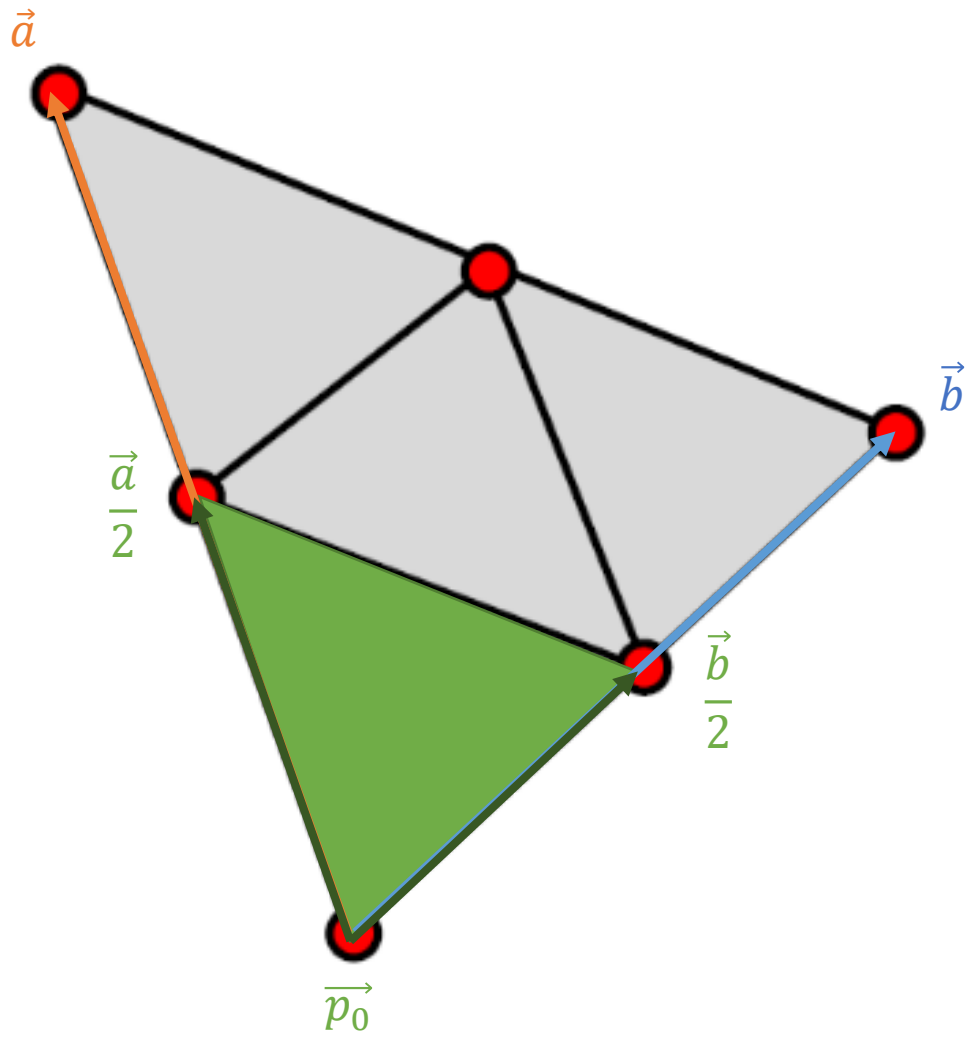

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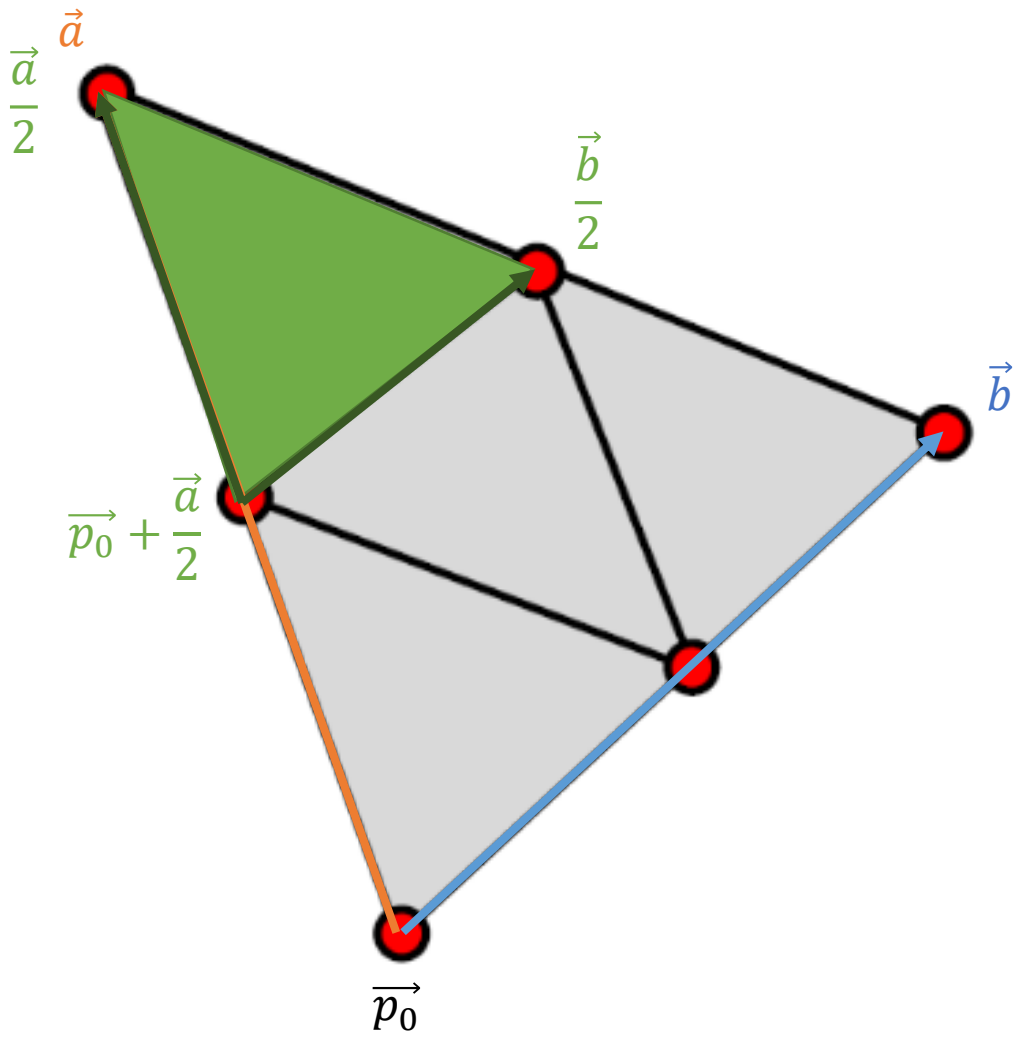

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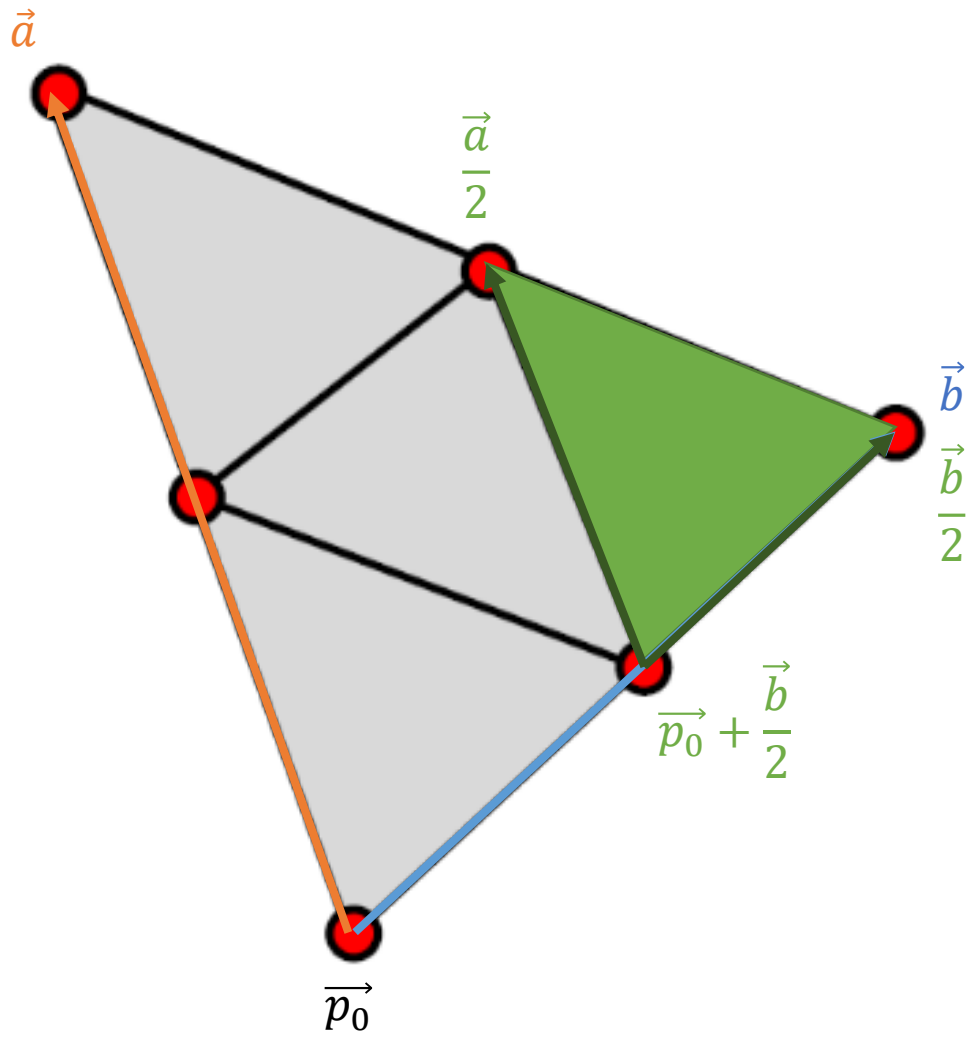

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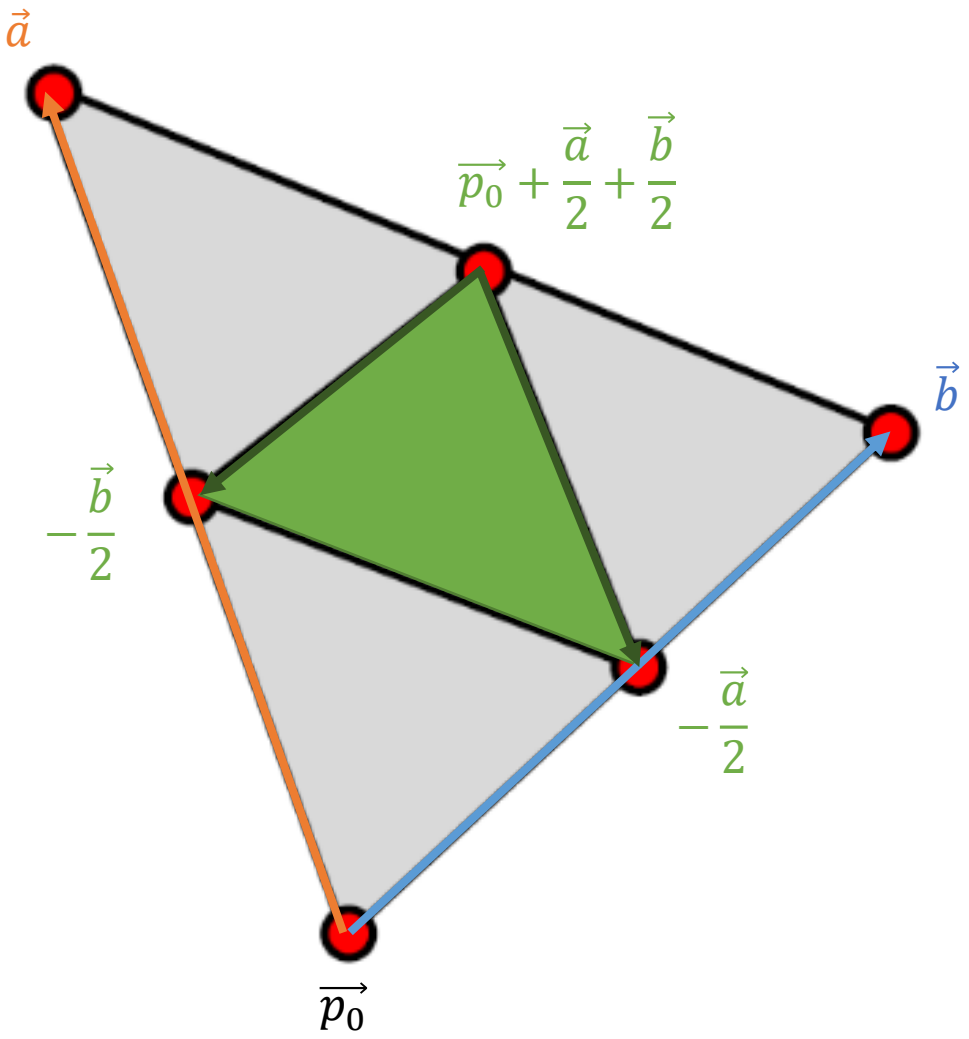
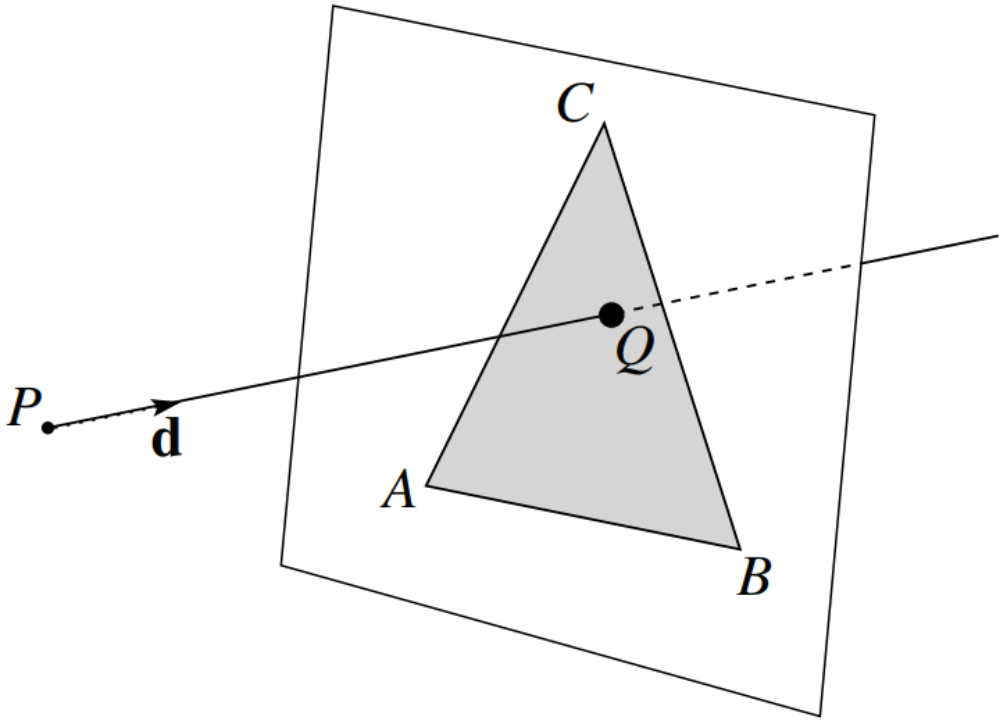
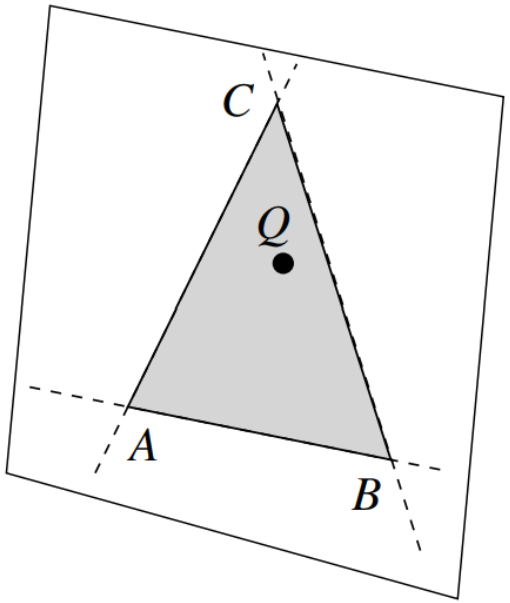


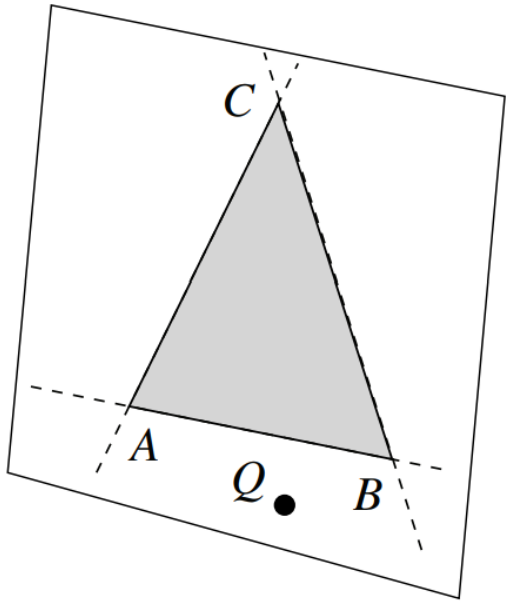
2. Implement a ray-triangle intersection test.



- Ray-Plane intersection testing

2. Implement a ray-triangle intersection test.

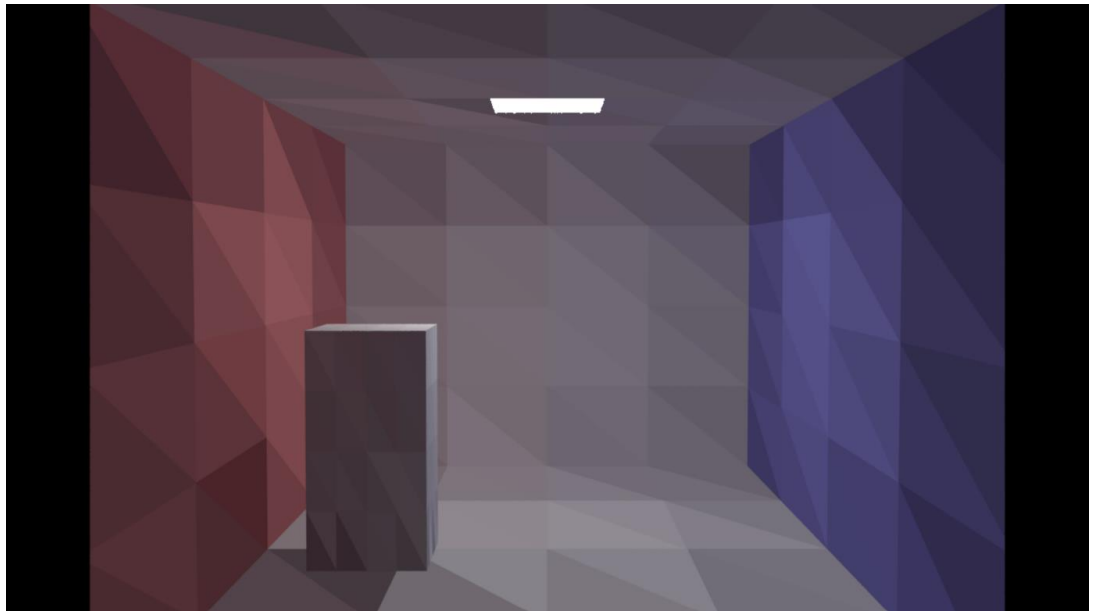




- Triangle inside-outside testing

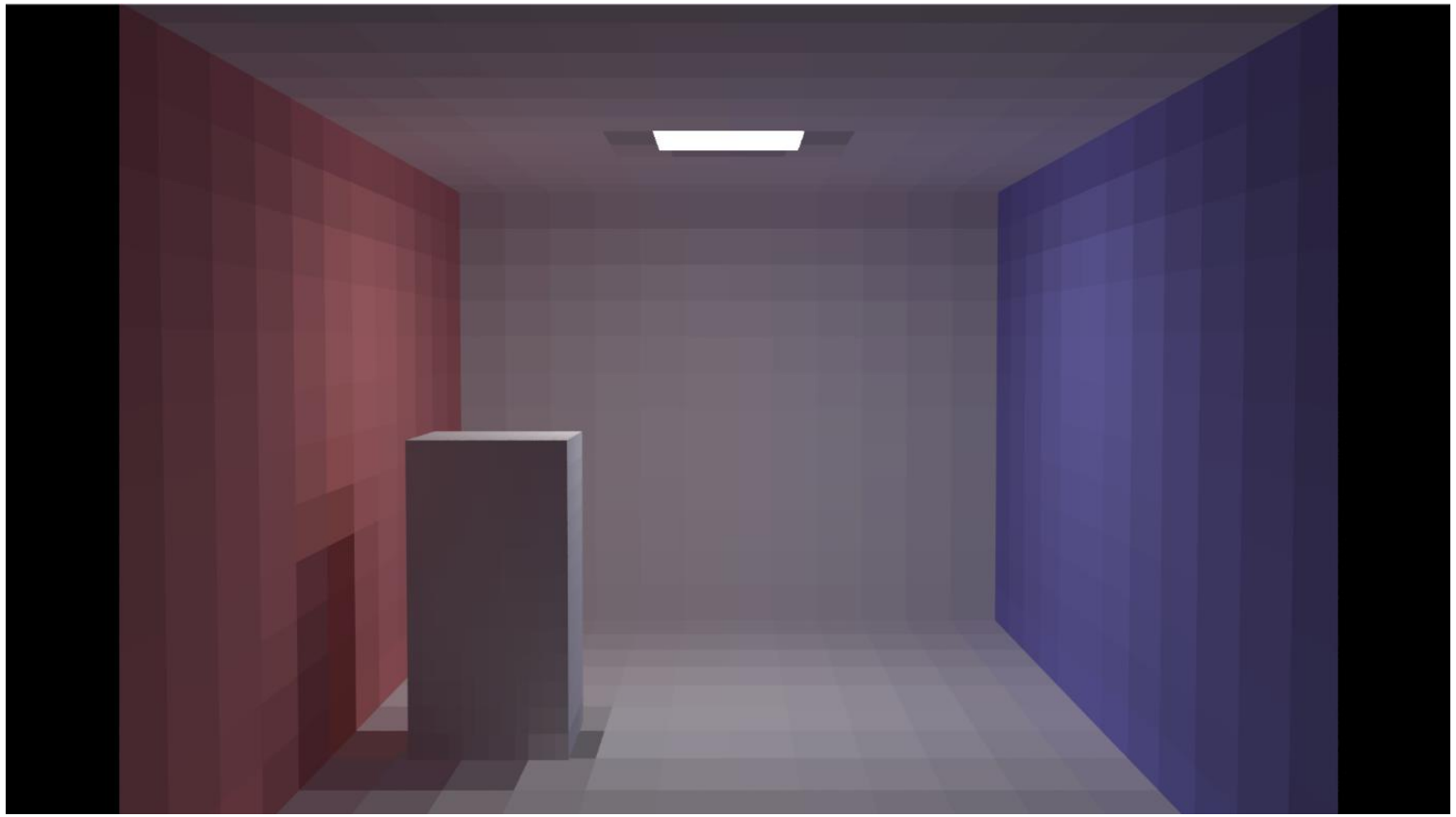
$$[(B-A)\times(Q-A)]\cdot\mathbf{n}\geq 0$$
$$[(C-B)\times(Q-B)]\cdot\mathbf{n}\geq 0$$
$$[(A-C)\times(Q-C)]\cdot\mathbf{n}\geq 0$$

3. Change the Monte-Carlo integration to triangles, thus requiring a uniform sampling method in the triangle area.



- Done as described in the practical sessions
- However, contains small mistake: colors are not fully coherent

4. Compare the resulting renderings with those obtained with the original code.



- Given Code

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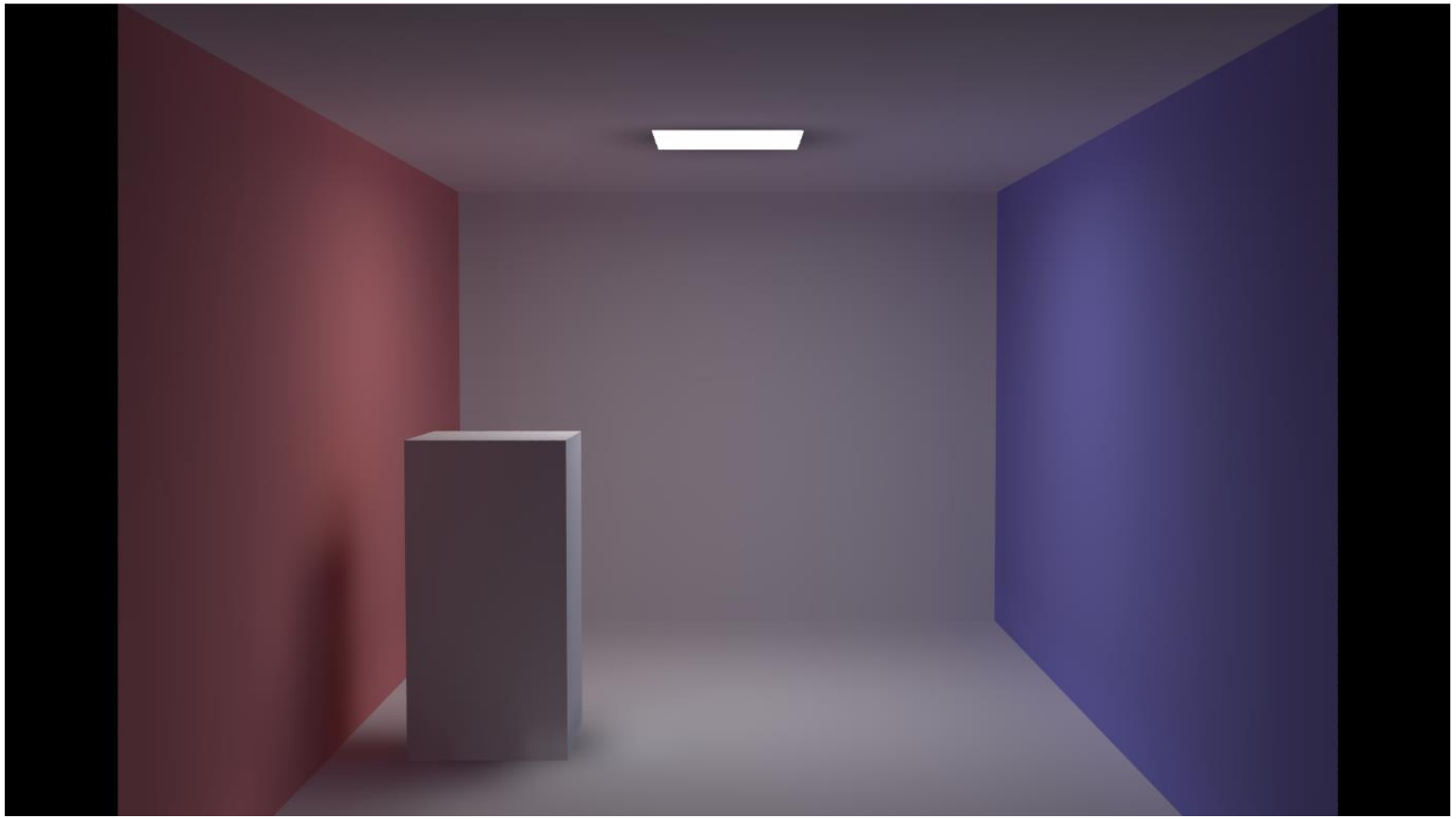

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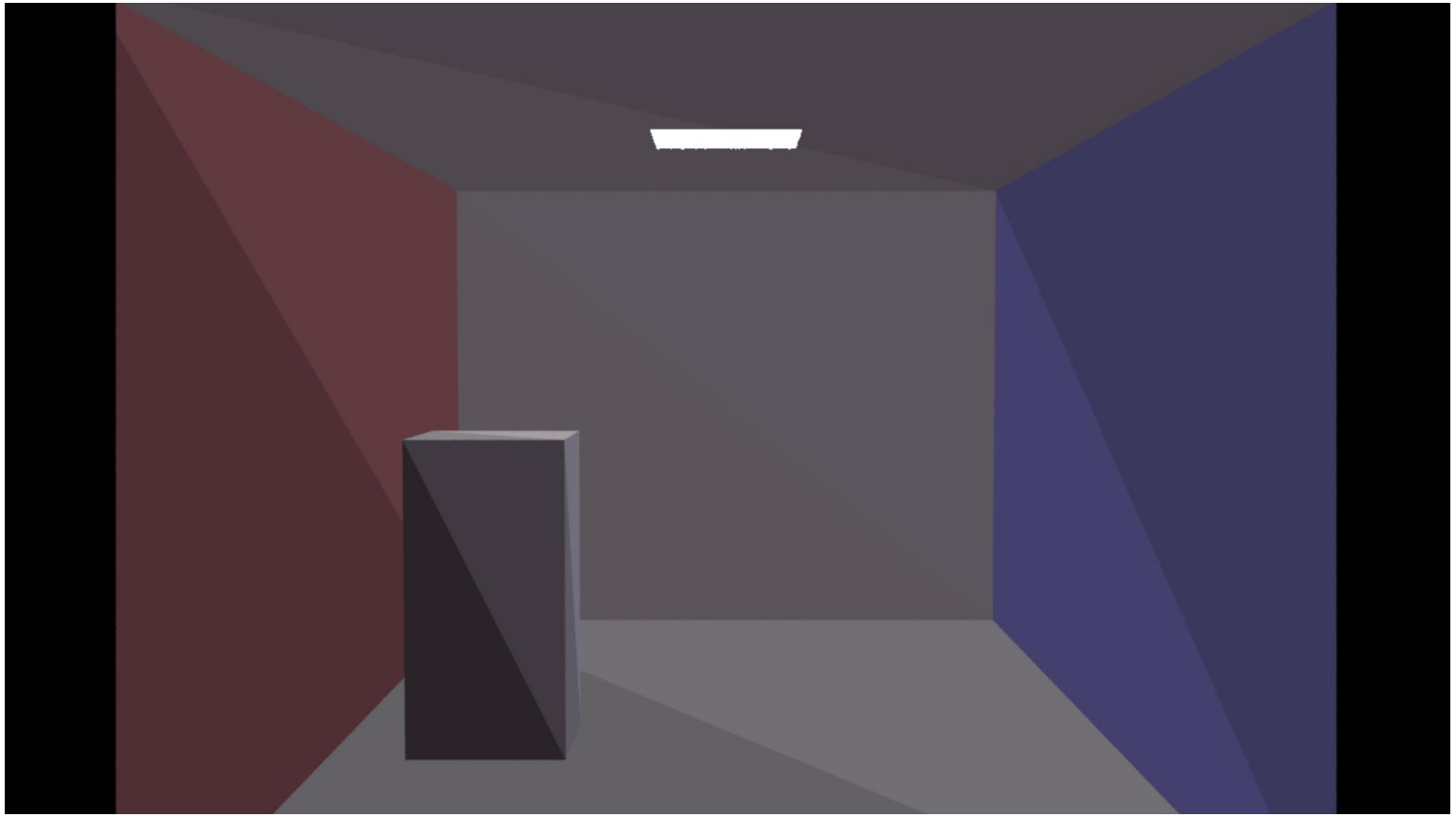
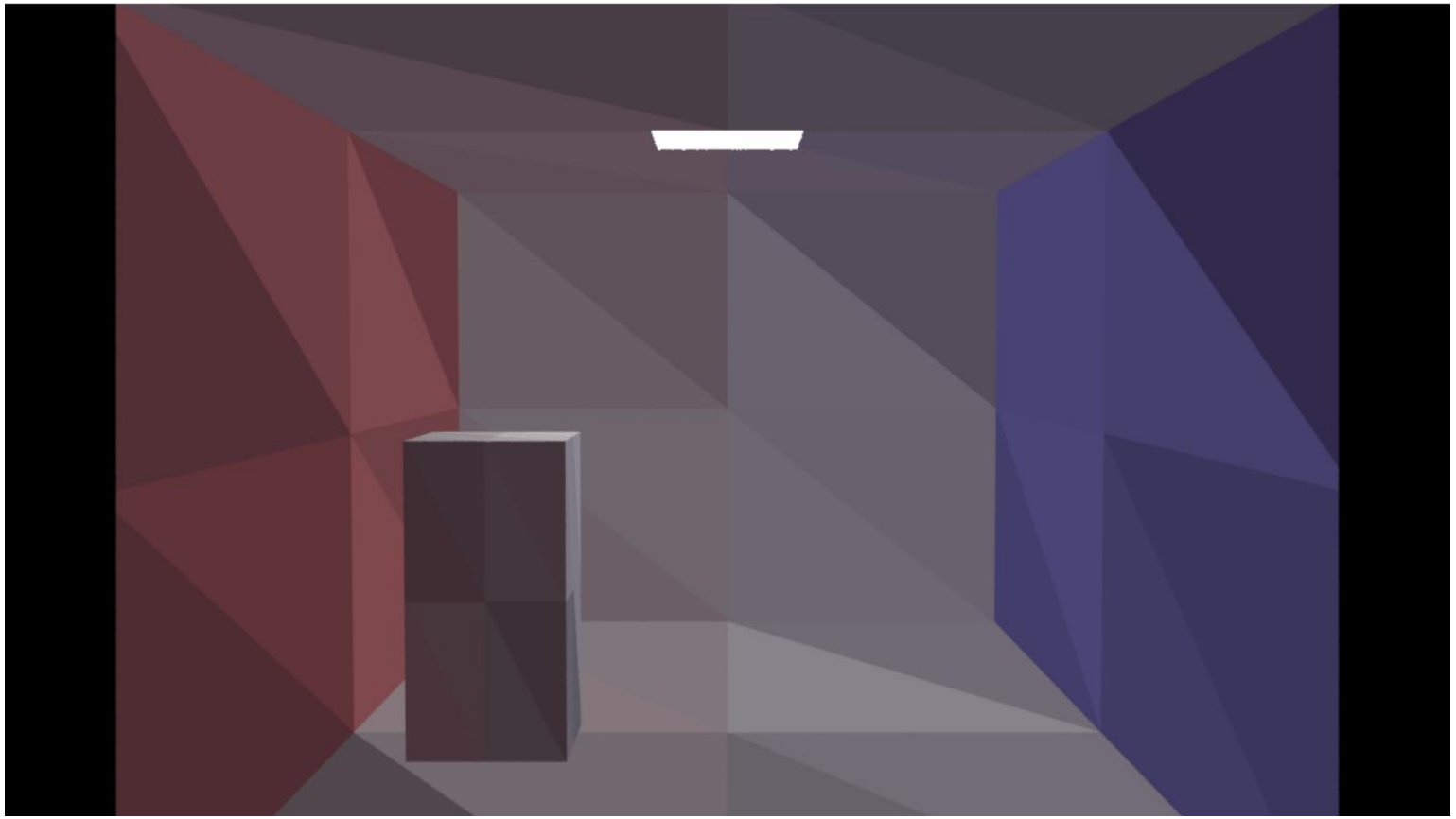


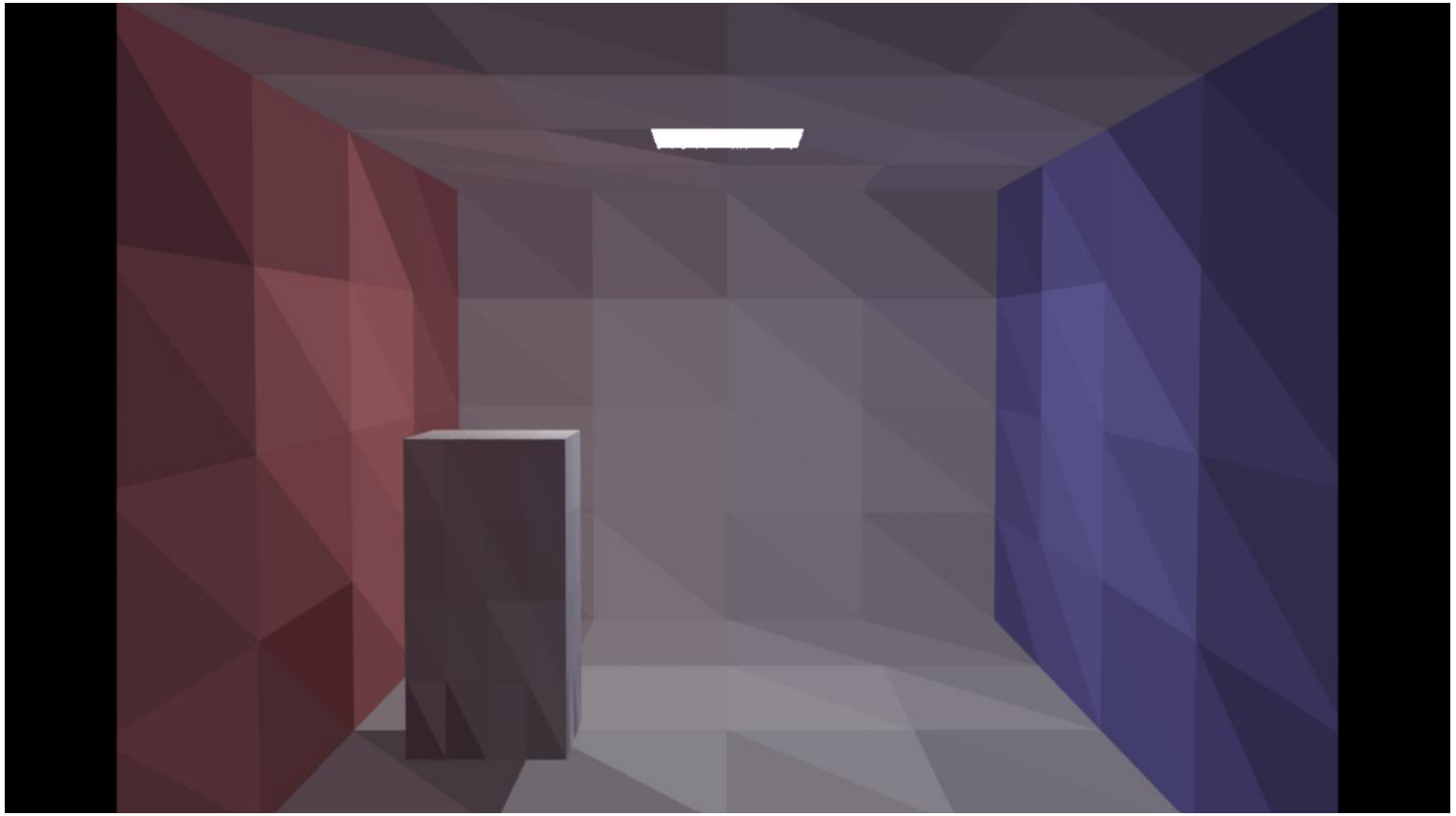
- Our Solution: Depth 0

4. Compare the resulting renderings with those obtained with the original code.

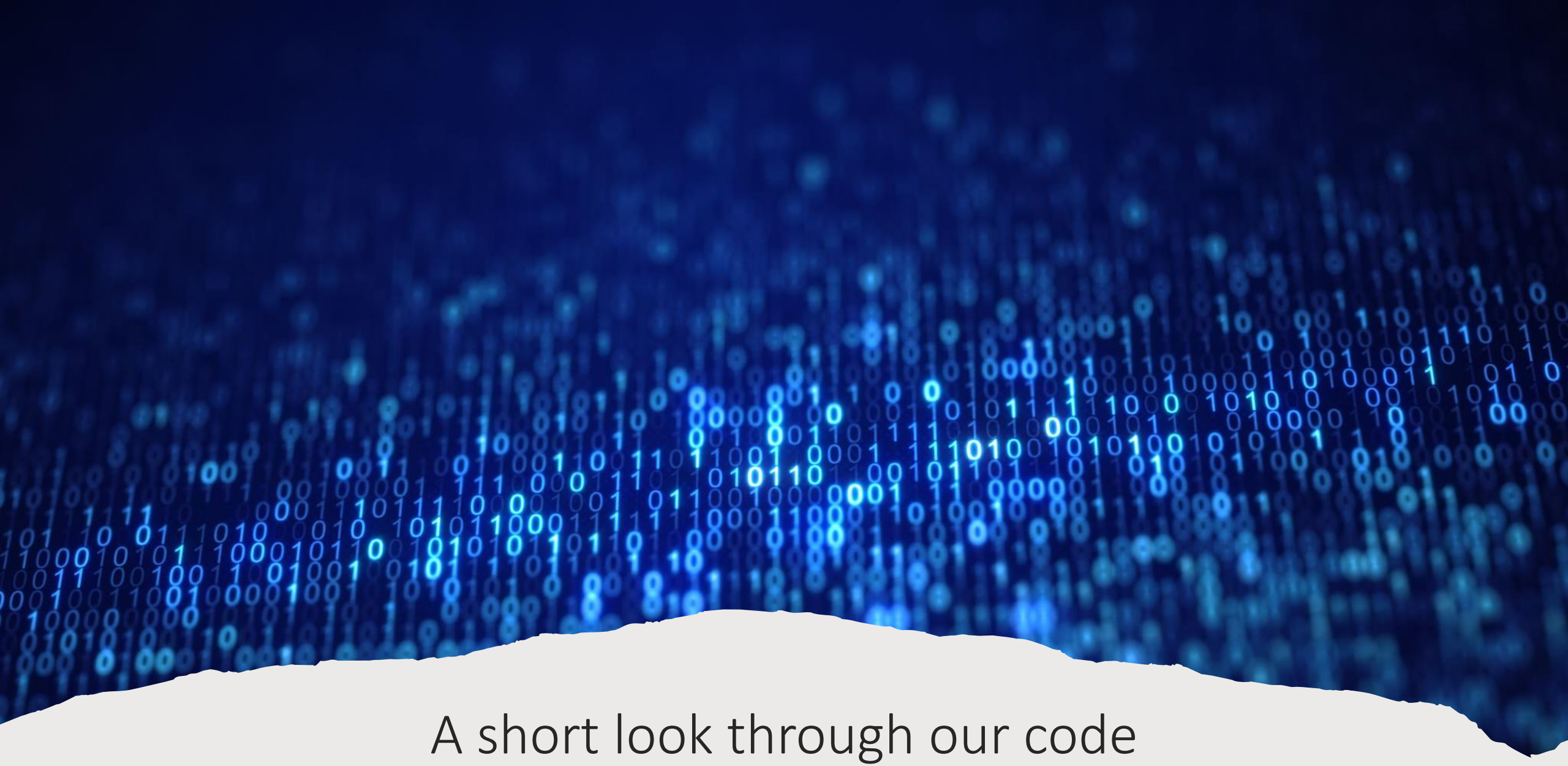


- Our Solution: Depth 1

4. Compare the resulting renderings with those obtained with the original code.



- Our Solution: Depth 2
- Code quite slow
- Colors not as coherent as in original code



A short look through our code