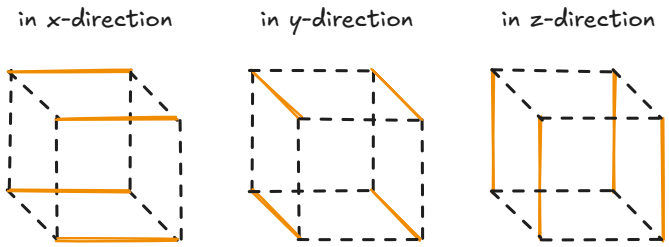
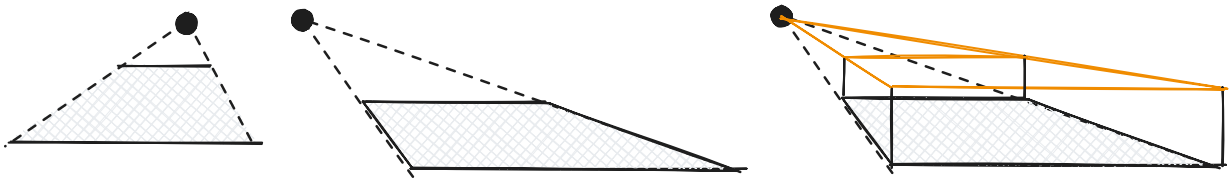
# Lesson 4 — Drawing in perspective

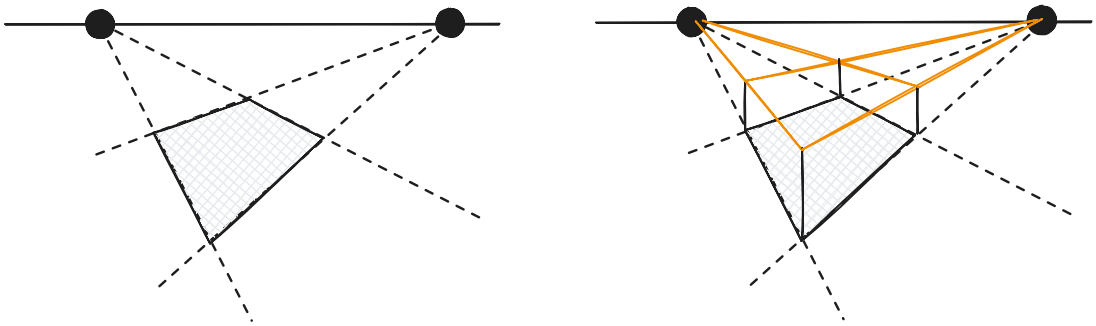
What is $n$-point perspective? A cube or block has three sets of parallel edges:



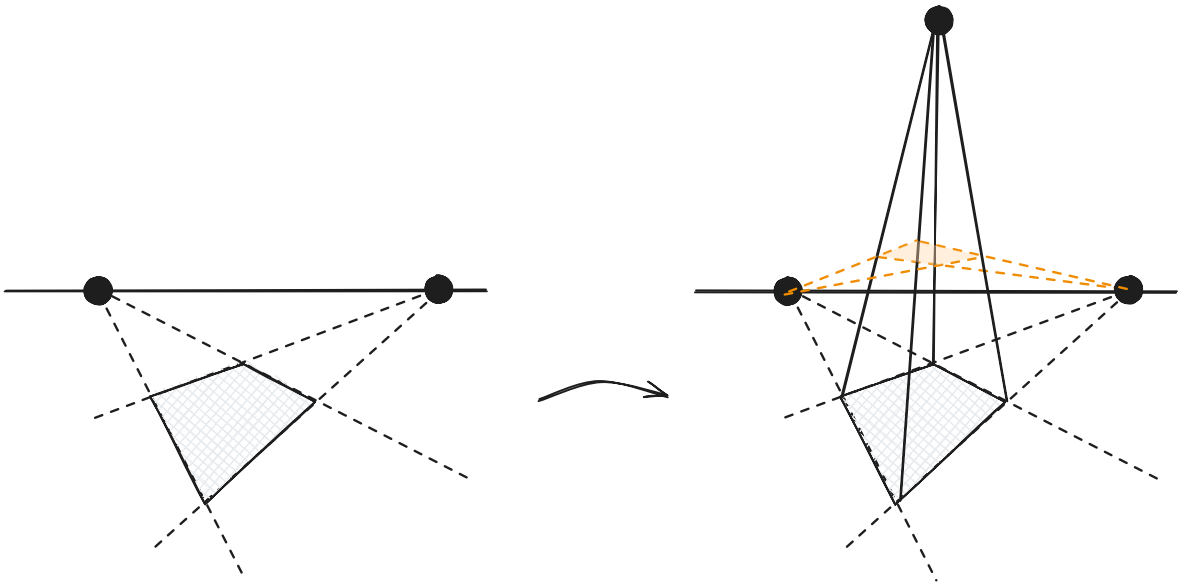

**One-point perspective** (1PP) uses one vanishing point from one set of parallel edges of a rectangle, leaving the other edges parallel to the picture plane. Extending vertically gives a block.



**Two-point perspective** (2PP) uses both vanishing points from the two sets of parallel edges of a rectangle. The two vanishing points determine the horizon of the plane containing the rectangle. Extending vertically gives a block.



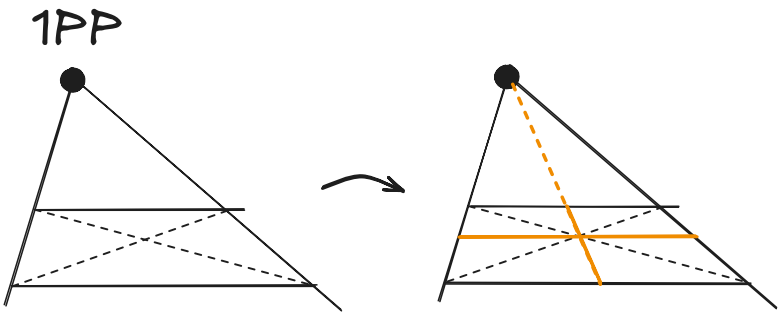
In **three-point perspective**, the three sets of parallel edges of a block all have vanishing points.

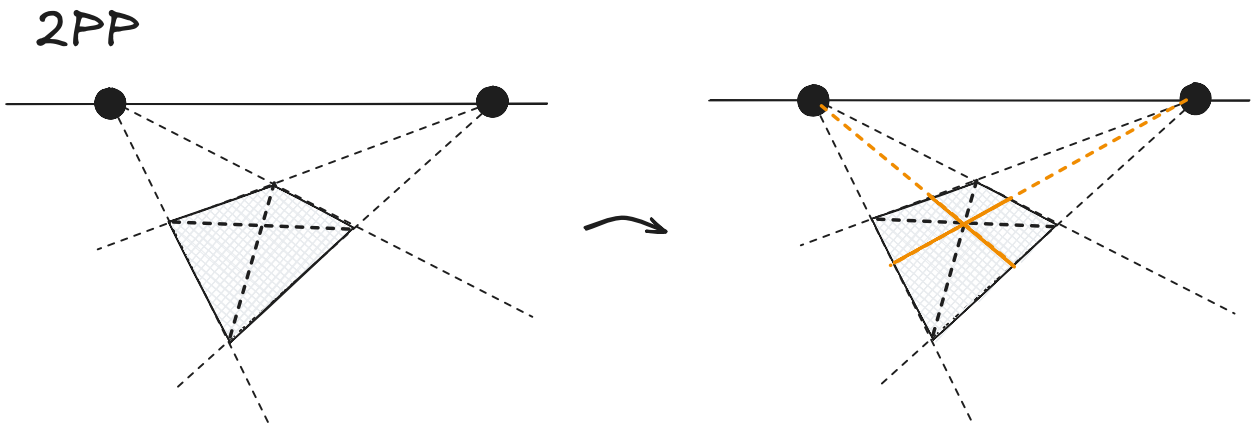


## Subdividing a grid

In the plane, we can refine a rectangle into sub-rectangles since the diagonals of a rectangle intersect in the center. Then sliding the horizontal and vertical edges of the rectangle over give the lines that halves the rectangle horizontally and vertically.

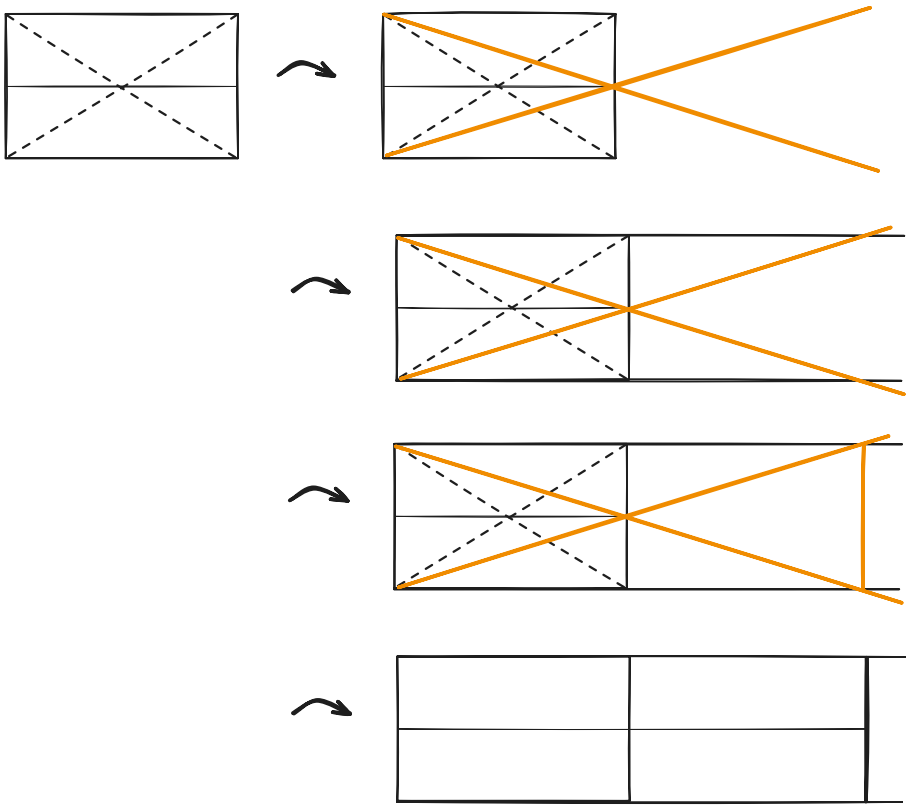
Linear perspective preserves incidence relations (where lines intersect), so the same procedure subdivides a perspective rectangle:




## Extending a grid

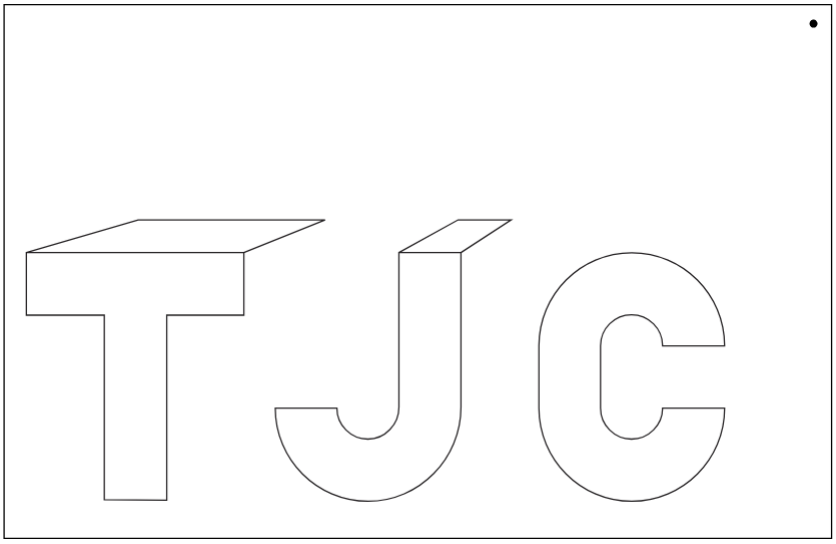
In the plane, we can also extend a rectangle by reversing the subdivision/midpoint construction.



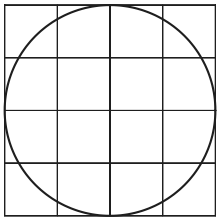
Again the same procedure works in 1PP and 2PP.

## Exercises

1. Finish the letters "TJC" **drawn in 1-point perspective**, with vanishing point being the dot shown in the top right corner of the scene below. Assume that the 3D letters shown all have the same depth or thickness. After completing the drawing in 1PP, explain how you deduced the correct depths for the vertical stroke of the letter T and for the top rectangles in the lower tips of the letters J and C.



2. Transfer the following circle to a square in 1-point perspective and also in 2-point perspective:



3. (Hard.) Transfer a tricolor flag (think Canada, Ireland, Italy, Mexico) which has three equal sections to the flag shown below in 2-point perspective. Explain why your method of dividing a line into three equal parts is correct.