1. How many vertices, edges and triangles are there in a tetrahedron after:

a One subdivision step (Loop or Butterfly)

b Two subdivision steps

c Three subdivision steps

d N subdivision steps, any N

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2. The size (i.e. number of nodes) of a BSP tree of a collection of line segments in the plane typically depends on the order in which we select the segments when building the tree: for certain selection orders we may need to split more than for others.

For any n, show examples of collections of $2n$ line segments, no two of which intersect, such that:

a. No matter what the order is, no splits are necessary

b. For some selection order, at least n^2 splits are necessary