

To the left is the well-known *House of Santa Claus*. You can draw it without lifting your pencil off the paper and never draw the same edge twice.

See for yourself! Try the sequence of vertices, for example:

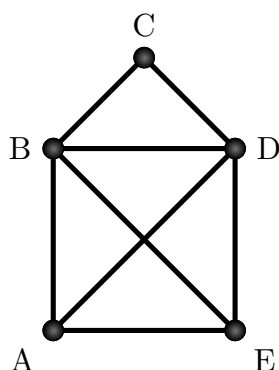
$A - B - C - D - E - B - D - A - E$ .

Such a sequence of vertices containing each edge of the graph exactly once is called an EULER PATH.

Leonard Euler was a really important mathematician, both the Euler characteristic and the Euler path are named after him.

### Exercises

1. Try to draw the House of Santa Claus by starting at different vertices. From which starting vertices can the house be drawn? Which vertex will you reach last?
2. What is special about these vertices?  
Hint: Count how many edges go out from each vertex.
3. Find a connected graph for which there is no Euler path. Why can the graph not have an Euler path?
4. Does the graph of your polyhedron have an Euler path? If no, why not? If yes, draw it on the graph of your polyhedron.



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