

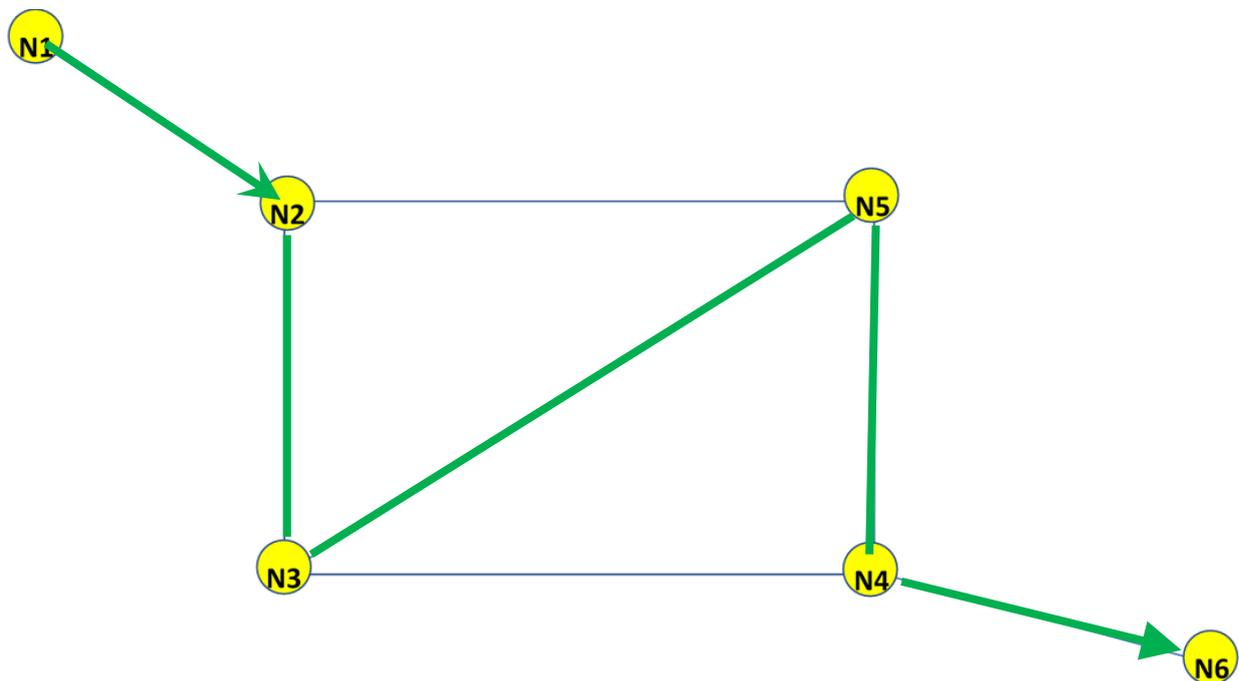
The 2 paths that visit all nodes once are : [1,2,3,5,4,6] and [1,2,5,3,4,6]

### **Solution**

Solutions to this problem will rely heavily upon logical thinking combined with trial and error (or really trial and improvement).

You will find yourself saying "If I go this way and continue to the next node, I will have to re-visit a node..." and so forth.

Even though this is a relatively simple network, it is always a good idea to draw the diagram and draw your possible paths over the graph.



### **Note**

*Networks of this kind are called Graphs. Each Node is also called a Vertex. (As in the 3 vertices of a triangle, or the 4 vertices of a square in Maths)*

*The line joining two vertices is called an edge.*

*If you can travel both ways it is called an undirected graph.*

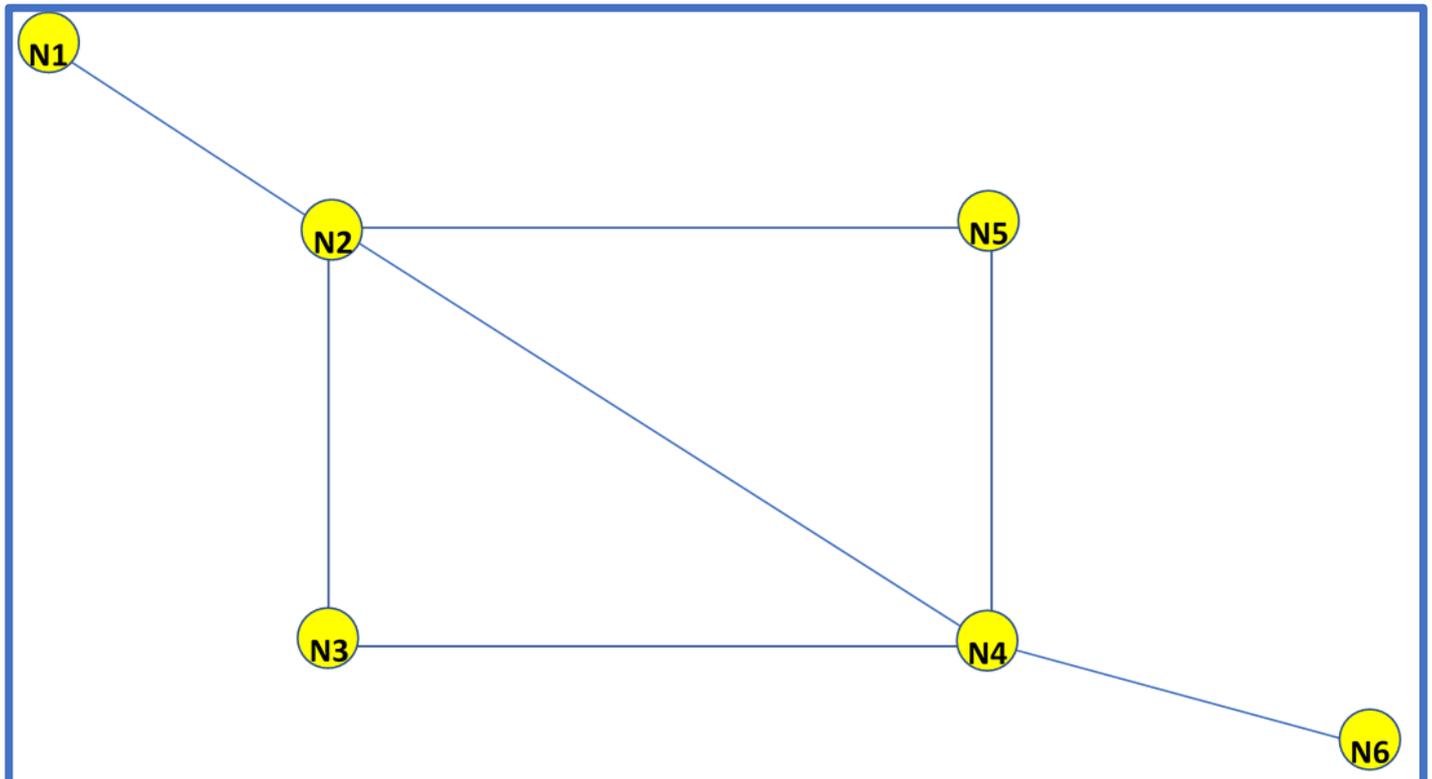
*A path that visits all the nodes is called a Hamiltonian Path.*

(see <https://www.khanacademy.org/computing/computer-science/algorithms/graph-representation/a/describing-graphs> or just google khan academy graph representation)



## Try the one below...

When you write a program to solve the problem, you should be able to add the network (graph) below into your program and hopefully your program will solve the problem.



## Try some more

When you write a program to solve the problem, you should be able to add a network of higher complexity.

Create your own solvable Hamiltonians or non-solvable. Use names instead of numbers.

Check out:

<http://mathworld.wolfram.com/HamiltonianPath.html>

The following video is 2 minutes and sets a cool puzzle at the end that your program could solve.

<https://www.youtube.com/watch?v=IRH0tax5dFA>