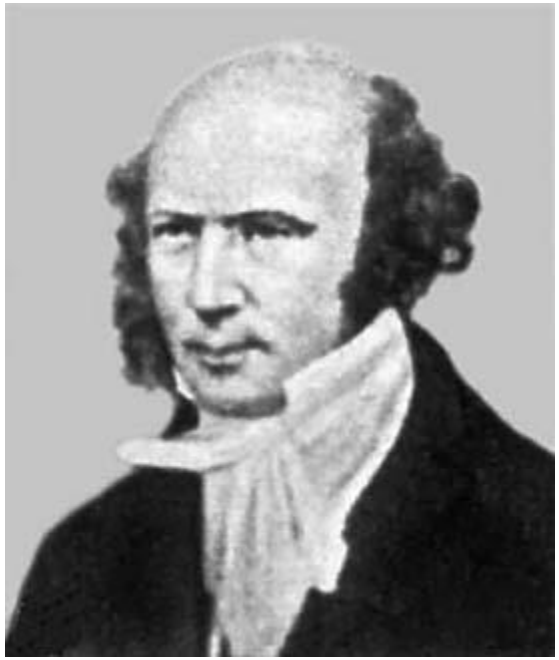
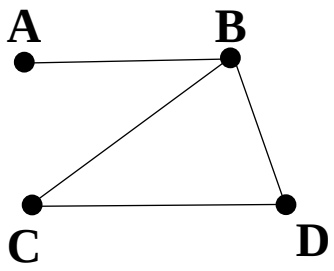
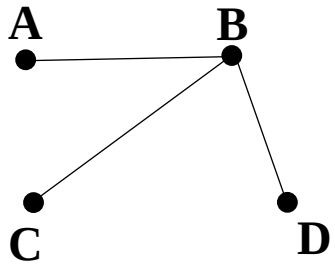
Hamilton Path:

It's a path that visits every vertex of a graph exactly once. It doesn't have to use all the edges.

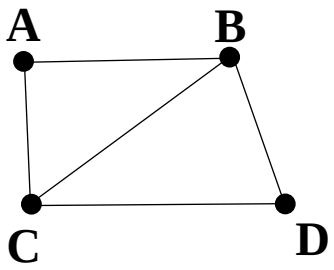


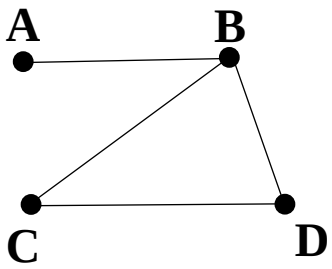




Hamilton Circuit:

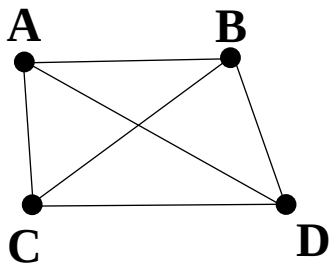
It's a Hamilton path that begins and ends at the same vertex. The starting/ending vertex is the only vertex visited more than once.

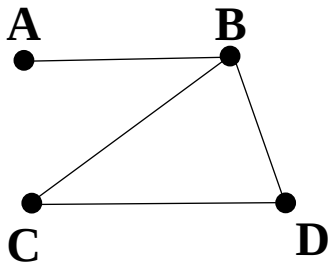




Complete Graph:

It's a graph in which each pair of vertices is connected by an edge.

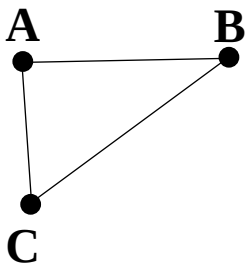




The theory of Hamilton paths and circuits is not as detailed as with Euler paths and circuits. Here's the main result:

Every complete graph with three or more vertices has a Hamilton circuit.

Example:



Hamilton circuits:

A,B,C,A	**B,C,A,B**	**C,A,B,C**
A,C,B,A	**B,A,C,B**	**C,B,A,C**

But really there are just 2 different Hamilton circuits:

A,B,C,A and A,C,B,A

The textbook will always describe them as starting and stopping at A.

We could have counted them without listing them.

1			**1**
1st vertex	**2nd vertex**	**3rd vertex**	**4th vertex**

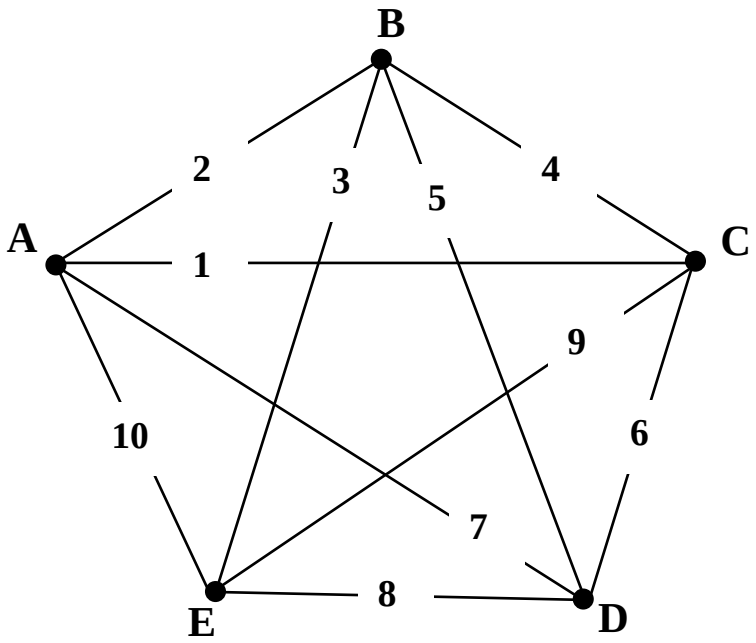
In general, a complete graph with *n* vertices has $(n-1)!$ Hamilton circuits.

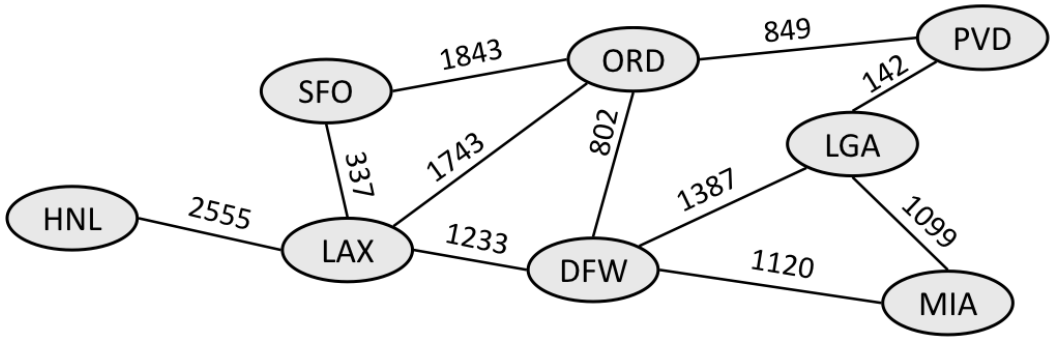
1			…	**1**
1st vertex	**2nd vertex**	**3rd vertex**	…	**$(n+1)^{st}$ vertex**

How many Hamilton circuits are in a complete graph with 6 vertices?

Weighted Graph:

It's a graph with numbers(weights) attached to its edges. The weights might represent distances, costs, profits,….





Weight of a Path:

It's the sum of the weights of the edges used in the path.

Examples:

Find the weights of the following paths.

A,B,C,D

B,E,D,C,E

B,E,D,C,A,B