

Section 1.3 Hamiltonian Circuits and Paths

Hamiltonian Path - A path that visits _____ exactly once.

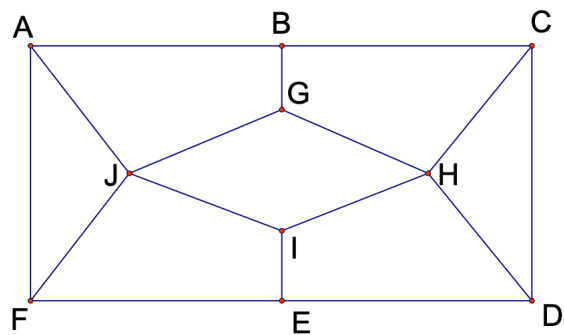
Hamiltonian circuit - A circuit in a graph is a path that starts and ends at the _____ vertex and passes through all other _____ exactly once.

Question: What is the difference between a Hamilton Path and an Euler Path?

Notes:

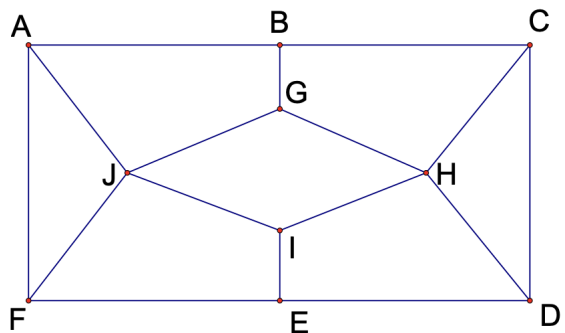
1. A graph can't have both an Euler circuit and an Euler path.
2. A graph that has a Hamilton Circuit has a Hamilton Path.

Example 1. Consider the following graph.

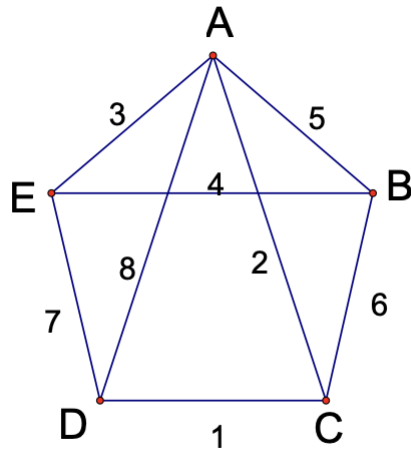


1. Find two different Hamilton Circuits.

2. Find a Hamilton Path that starts at A and ends at B.



Example 2. Consider the following weighted graph.



- a) What is the weight of AD?
- b) What is the weight of the Hamilton Circuit ABCDEA?
- c) What is the weight of the Hamilton Circuit ACDEBA?

Note:

Complete graph A graph in which every pair of distinct vertices is joined by an _____. If you have N vertices, K_N denotes the complete graph.

Factorial:

! Formula for the number of edges in a complete graph with N vertices:

Table with info about complete graphs

Table 1: Complete Graphs Facts

No vertices	Notation	Visualization of Complete graph	Number of HCs

! Formula for the number of Hamilton Circuits in the complete graph K_N :

Example 3. For a complete graph with 10 vertices, how many Hamilton Circuits are there?

Example 4. If K_N has 40,320 Hamilton Circuits, what is N ?