

HAMILTON PATHS

Ex 10 F

↳ passes through every VERTEX only ONCE

* Edges not important here *

HAMILTON CIRCUIT

is a Hamilton path that

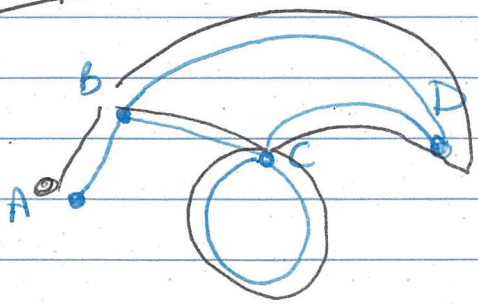
↳ start and finish at same vertex

* NO SIMPLE RULE TO DETERMINE IF THESE EXIST *

TRIAL AND ERROR ONLY

Sorry :)

Example:



Euler path possible?

A - degree 1
 B - degree 3
 C - degree 4
 D - degree 2

2 odd
 ∴ yes
 it is possible

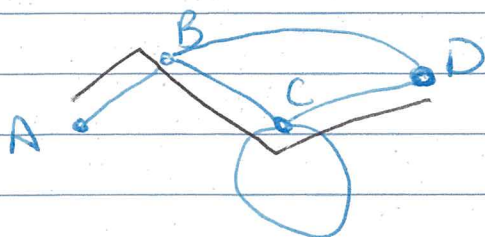
Euler path

A-B-C-C-D-B

or A-B-D-C-C-B

but circuit is NOT

(2)



Is a Hamilton path possible?

Let's try !!

yes A - B - C - D

Is a Hamilton circuit possible?

Let's try !!

A - B - D - C - B - A X

or A - B - C - D - B - A X

* No it is not as these pass through vertex B twice

OK ?

Try Ex 10 E and 10 F questions

Ex 10.9

3

Now, how do we actually use all this in real life?

A really useful tool for things like planning

the shortest path

on a driving holiday or trip around city sights etc ...

Basically, to find the shortest path you add distances to your network graph along the appropriate edge

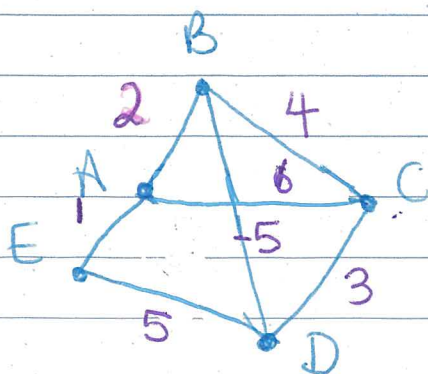
This is called a "WEIGHTED GRAPH"

To visit each vertex once, the shortest path will be the

shortest HAMILTON CIRCUIT

Example: Find the shortest path that passes through each vertex once for this network.

① You need to identify the Hamilton circuits first



② How long is each path?

$A-B-C-D-E-A$	$A-E-D-B-C-A$
$\downarrow 2+4+3+5+1$	$\downarrow 1+5+5+6$
$= 15$	$= 17$

$\therefore A-B-C-D-E-A$ is shorter