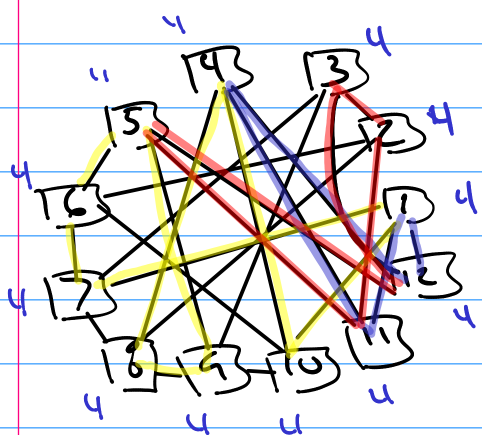
Math 322

Q's 7.1 #6

Euler → circuit: all even deg

path ($\neg$circuit): all even except 2 odds



deg = blue #

all even so Euler Circuit.

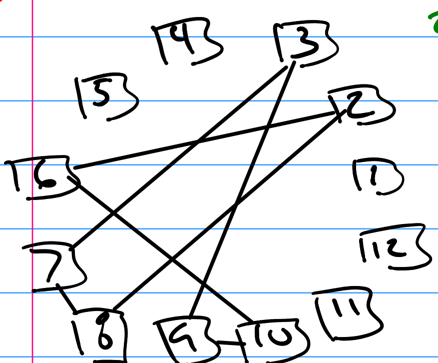
Find an Euler Circuit (connect loops circles)

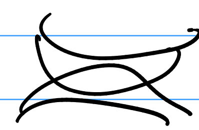
1, 7, 6, 5, 9, 8, 4, 10, 1

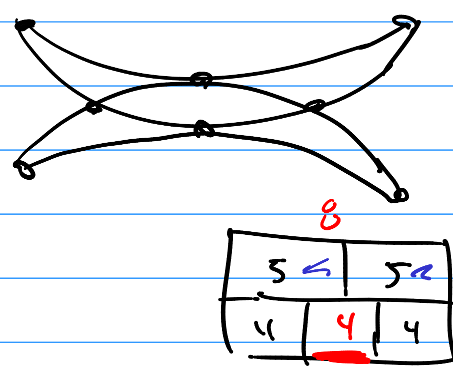
5, 11, 2, 3, 12, 5   4, 11, 1, 12, 4

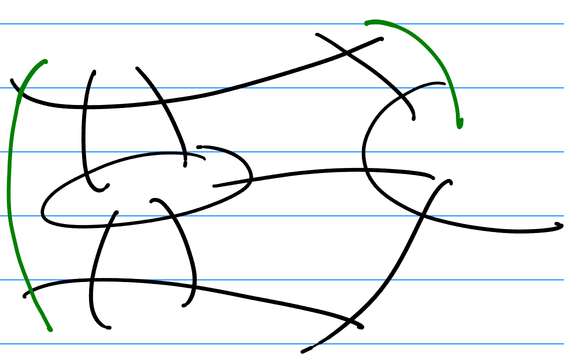
2, 6, 10, 9, 3, 7, 8, 2

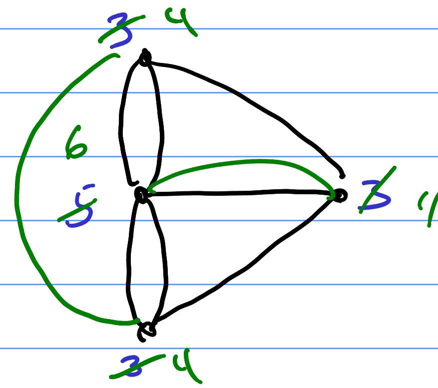
G' ⊂ G











- Dijkstra's Algorithm
  - find all minimal paths from a specific vertex to all the other vertices.

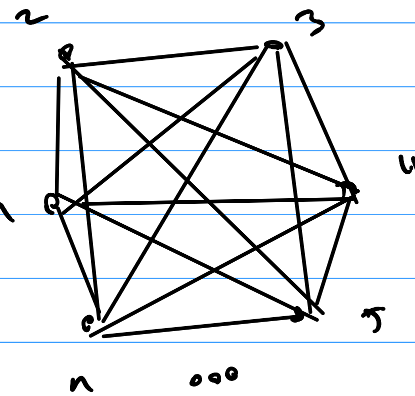
- find a minimal Hamilton circuit in K_n

(traveling salesman)

<u>thm</u> if $\deg(v) \geq |V|/2$ for every $v \in V$

<u>then</u> we have a Hamilton circuit.

K_n



$\deg(v) = n-1$ is $\geq n/2$

so K_n has hamilton circuits

but because it $\boxed{is}$ K_n we could find all possible hamilton circuits...

Make our Hamilton circuit.

start @ v_1 $\xrightarrow[\text{to}]{\text{go}}$? (any one!) $\xrightarrow{\text{go to}}$ $(n-2)$ $\xrightarrow{\text{go to}}$ $(n-3)$ $\rightarrow$ $\boxed{1}$

$(n-1)$

last back to start

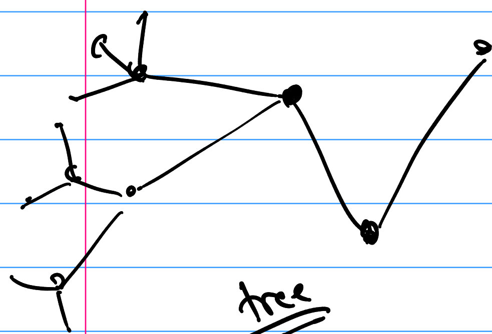
$|\text{hamilton circuits}| = (n-1)!$

Find the minimal hamilton circuit?

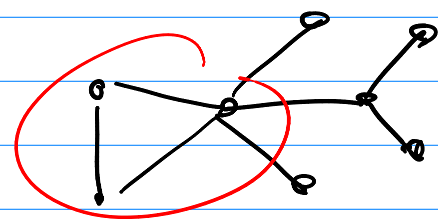
1. make $\boxed{\text{all}}$ $(n-1)!$ of them
2. find all of their lengths
3. min = min.

Ch 10 **Trees**

Def: Undirected graph with no simple circuits is a tree.



tree



Not a tree

Th the following are logically equivalent

1. G is a tree (no simple circuits)
2. between every distinct pair of vertices there exists a unique simple path.
3. G is connected and for every $e \in E$ if you remove e to get $G' = (V, E - \{e\})$ it is disconnected, G is a tree
4. G contains no cycles but adding one edge creates a cycle, G is a tree
5. $|E| = |V| - 1$, G is connected, G is a tree