

# Finding Euler paths & circuits

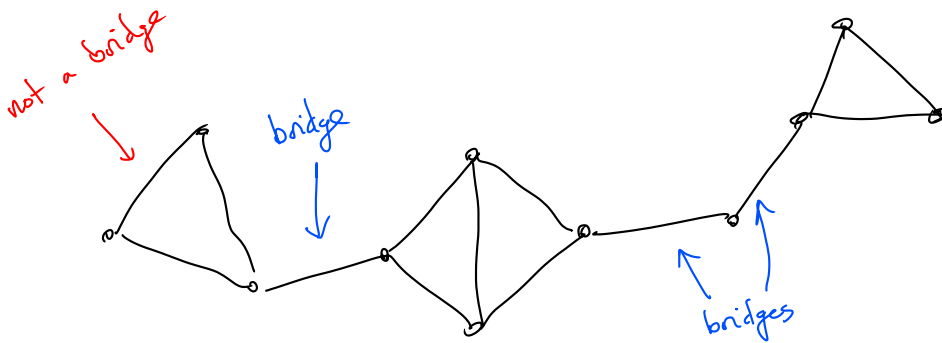
An algorithm for building Euler circuits & paths

↑  
formal procedure

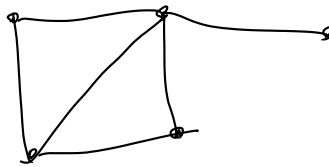
Al Kwarizmi

$$\begin{array}{r} 27 \\ + 35 \\ \hline 62 \end{array}$$

Basic concept: Avoid bridges among the unused edges.

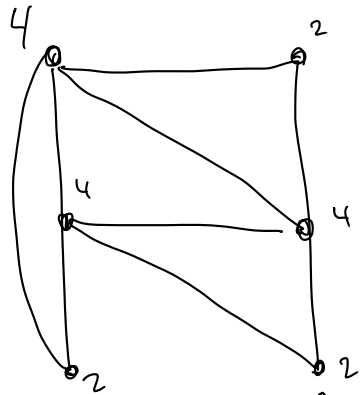


A bridge is an edge whose removal makes it disconnected



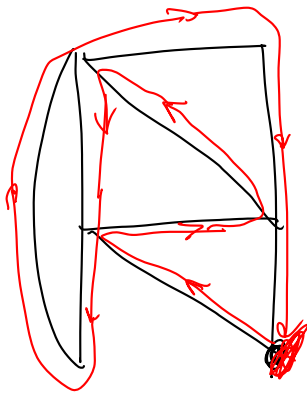
no bridges here.

Fleury's Algorithm Choose any edges, but don't finish early, and never use an edge which is a bridge among the unused edges.



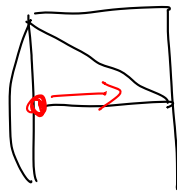
All evens, so an Euler circ. exists

↑ start & end here.



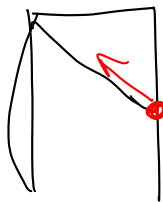
No bridges, so we can go either ↑  
or ↖

remaining edges:



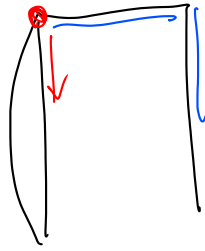
still no brige, choose whatever

Remaining edges:



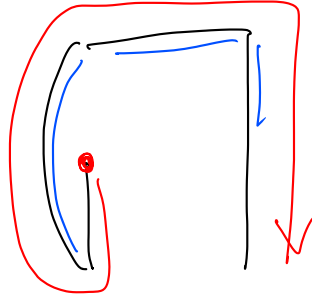
No bridges

Remaining:

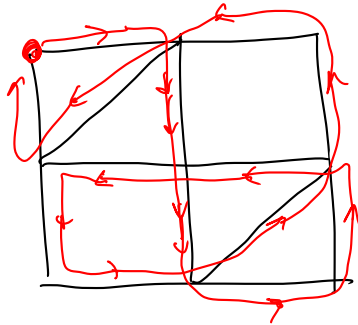
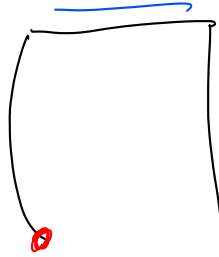


don't use the bridges

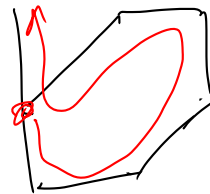
Remaining



Now we finish.

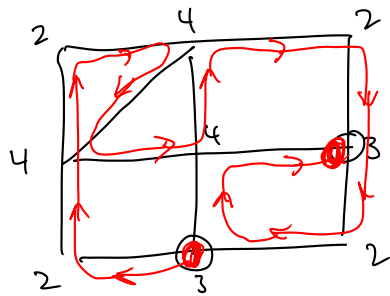


Draw an E. circ.

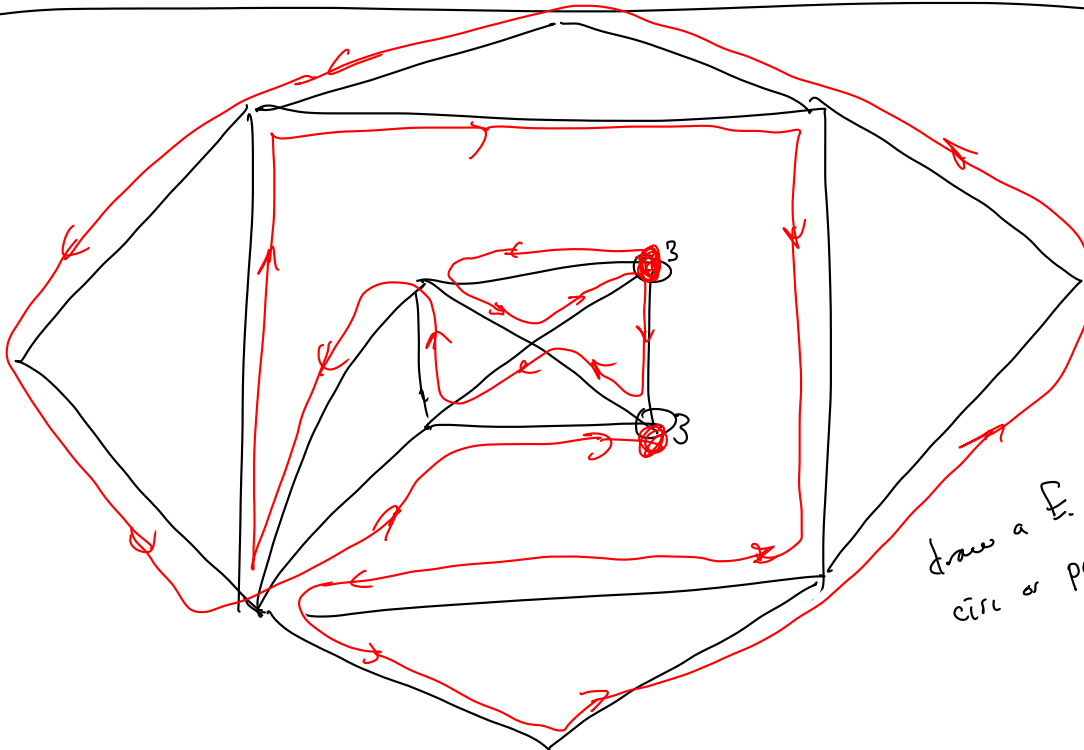
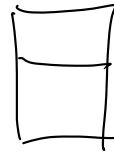


Find a Euler path:

Same, but must start at an odd degree & end at the other odd

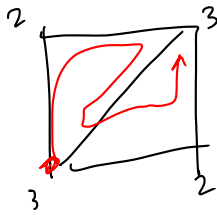


Find an Euler path.



draw a E. circ or path

$$IQ = \frac{4\pi A}{p^2}$$

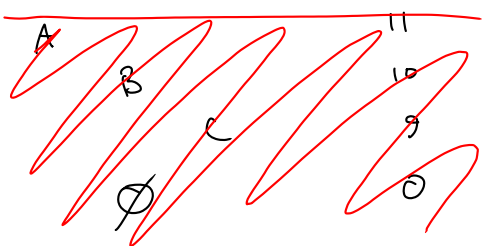


Banzhaf for  $[18: 11, 10, 9]$

critical?

Combos			total weight	A	B	C
A	B	C	30			
A	B		21	✓	✓	
A		C	20	✓		✓
	B	C	19		✓	✓

← nobody is critical



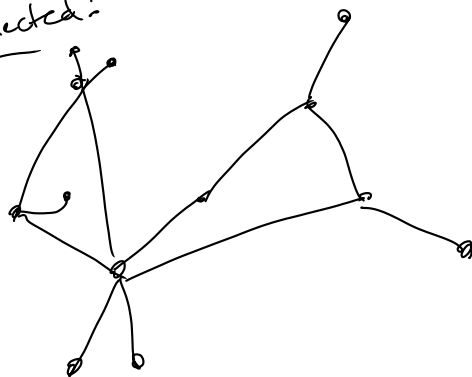
Banzhaf is:  
 A: 2/6  
 B: 2/6  
 C: 2/6

EG: Find the EG.

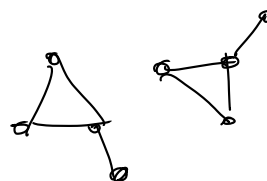
dist	D	R	tot	thresh	Dwasted	Rwasted
1	12	(15)	27	14	12	1
2	(10)	7	17	9	1	7
3	(20)	3	23	12	8	3
4	(15)	14	29	15	0	14
			96		21	25

$$\frac{25-21}{96} = \frac{4}{96} \text{ in favor of D.}$$

Connected:



Not connected



A graph where each vert is a person  
in this class, 2 verts have an edge  
when their ages are within 2 years.

Typical degree is a bit less than 30,

Graph is not connected (because of the  
elderly prof.)

