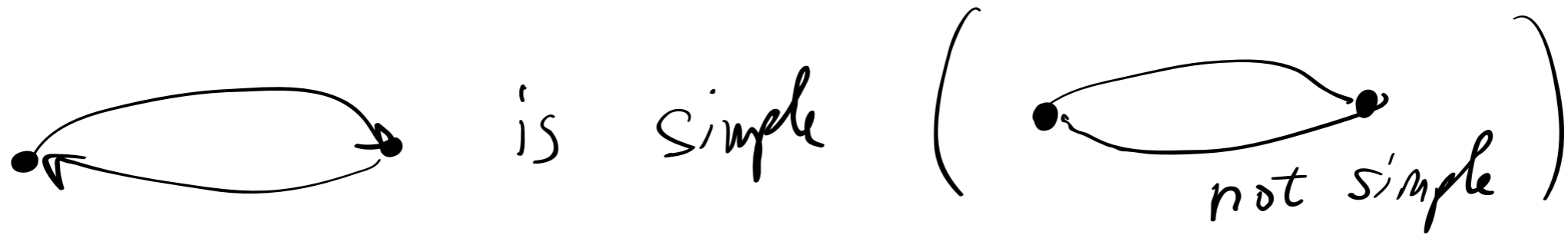


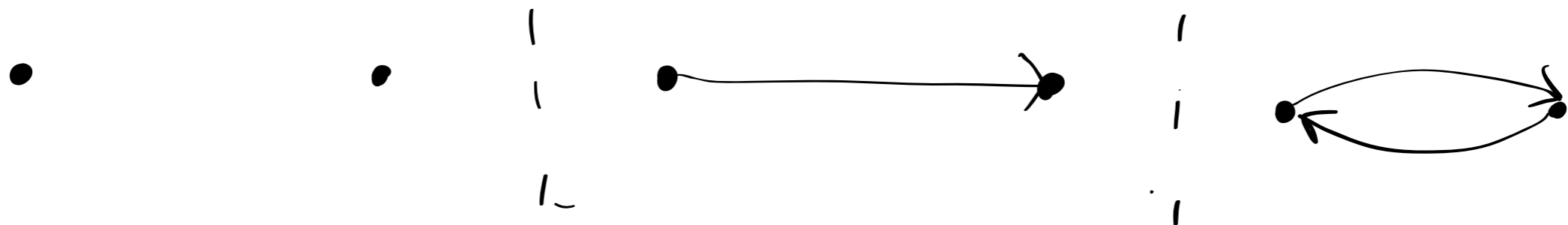
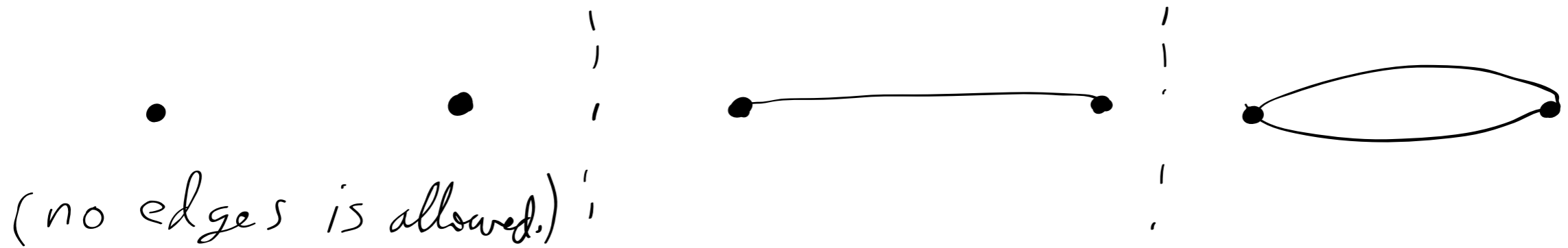
# Lecture 25

Find all simple digraphs on  $\mathbb{Z}^2$  vertices.



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possible underlying graphs:



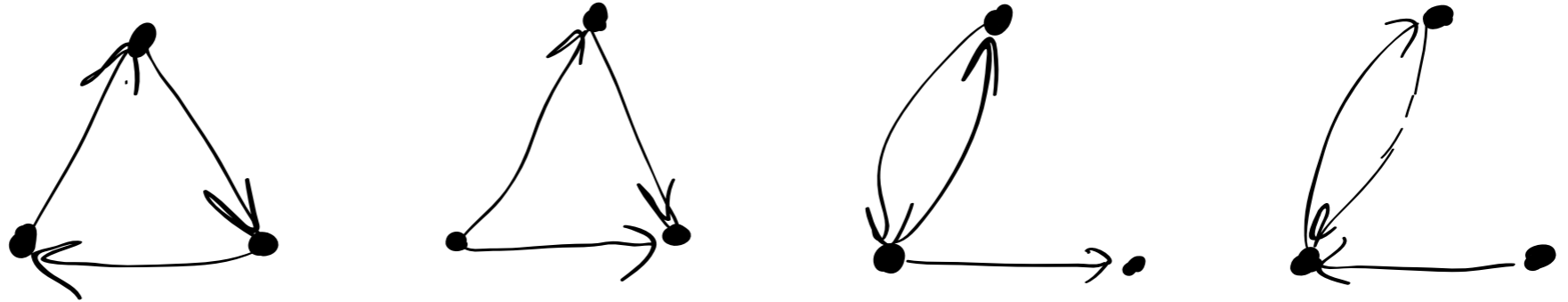
Find all 3-vertex, simple digraphs,

0 edges.

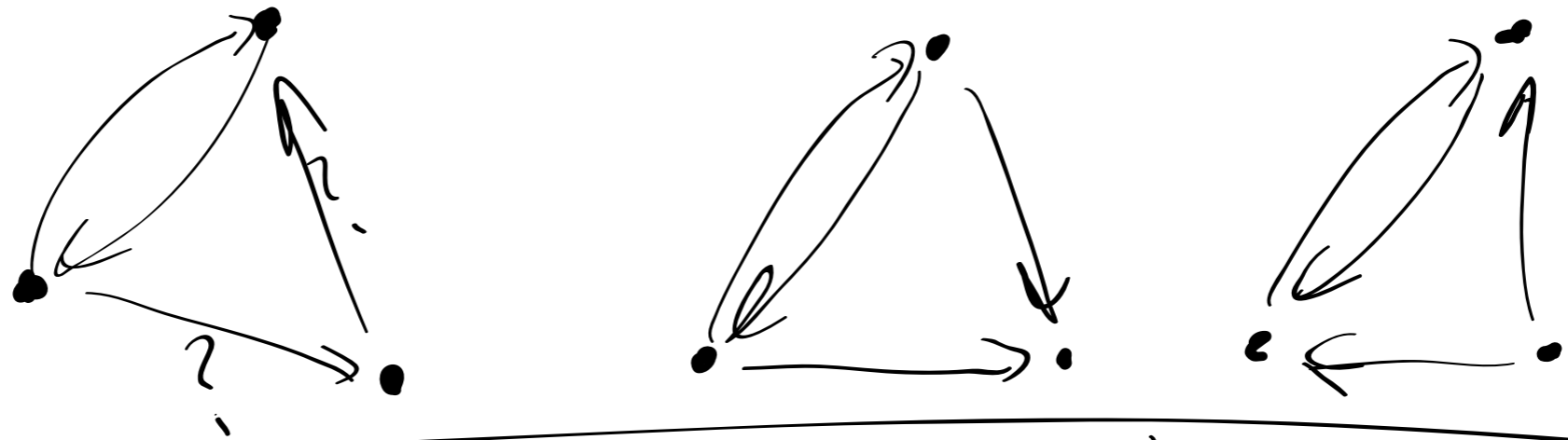


This tree, just sort by number of edges. Will skip most cases - see HWKey.

3 edges



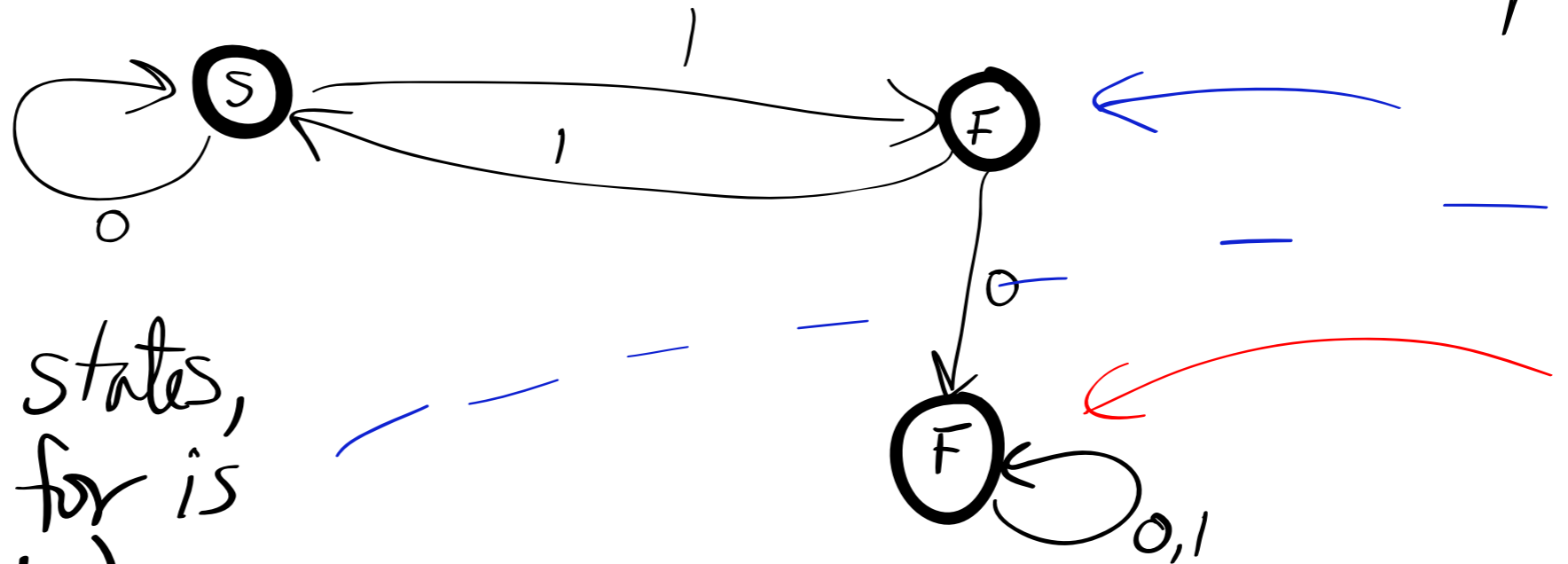
4 edges



If  $D_1$  and  $D_2$  are isomorphic, they have isomorphic underlying graphs?

FSA: What language  $L$  (allowed strings) does this accept?

$\{0, 1\}$ .



$\odot$  F: in these states, string read so far is accepted. (in  $L$ )

Evidence:

1, 111, 11111, ...

0111, 0011011110001, ...  
01101

111010111, ...

Complete answer:  
Allowed are  
w0q  
where w has  
even # of  
1s.

$\underbrace{11\dots1}_{\text{odd \#}}$  or  $\underbrace{11\dots1}_{\text{odd \#}} 0$  etc

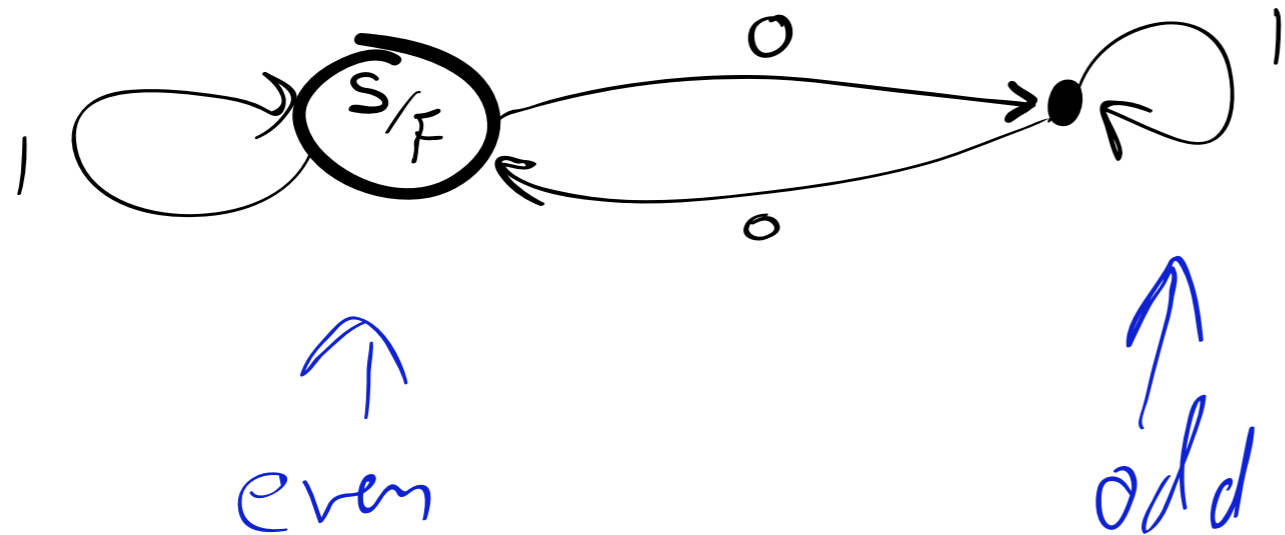
anything,  
even empty string.

more...

Find a FSA that accepts, from words in  $\{0,1\}$ , any word with an even number of zeros.

$\epsilon$  accepted.

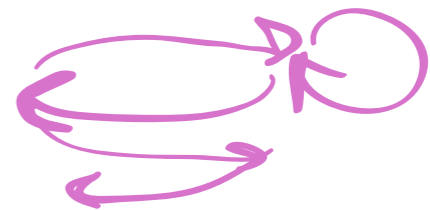
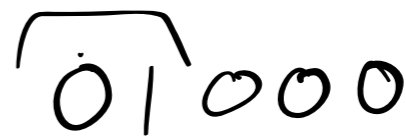
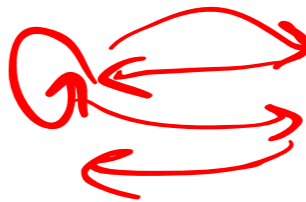
Start State = a final State

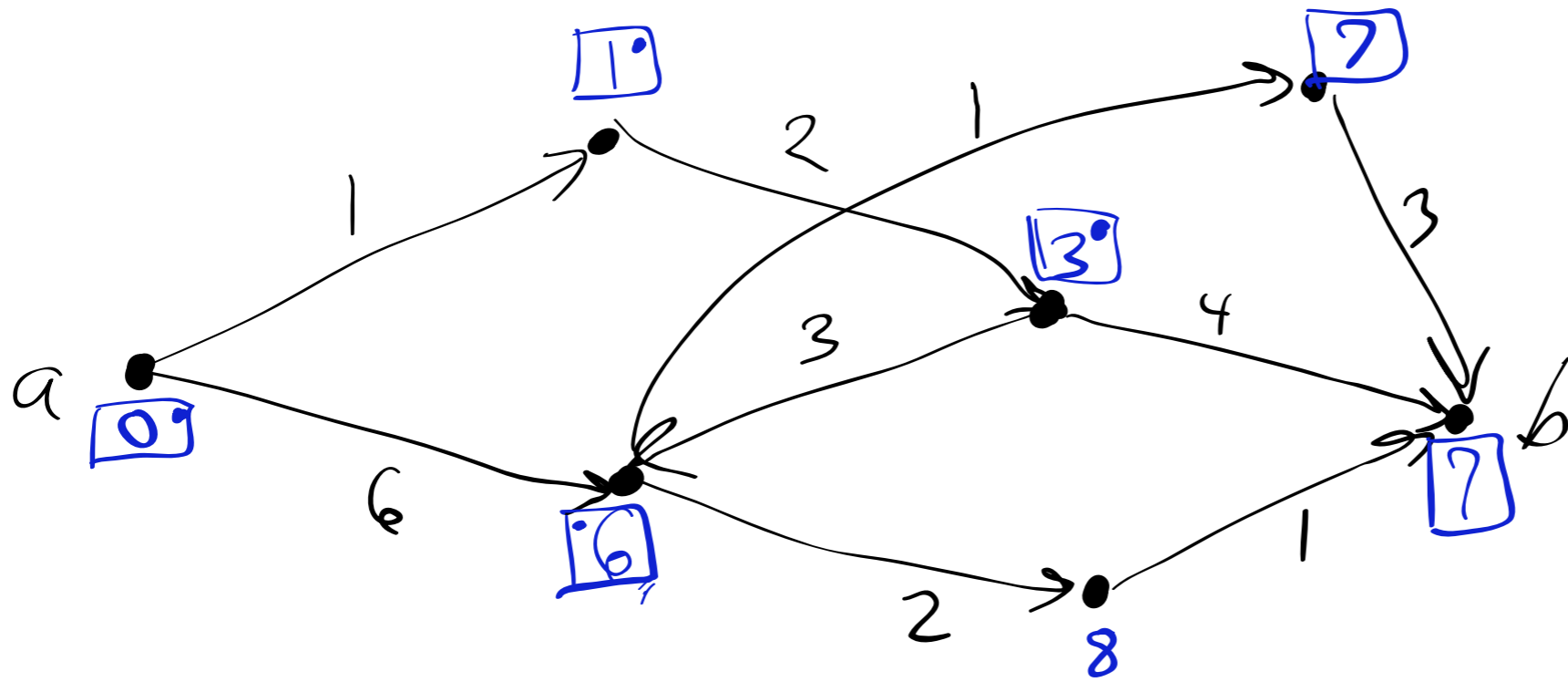


↑  
even

↑  
odd

$d_1 d_2 d_3 \dots$

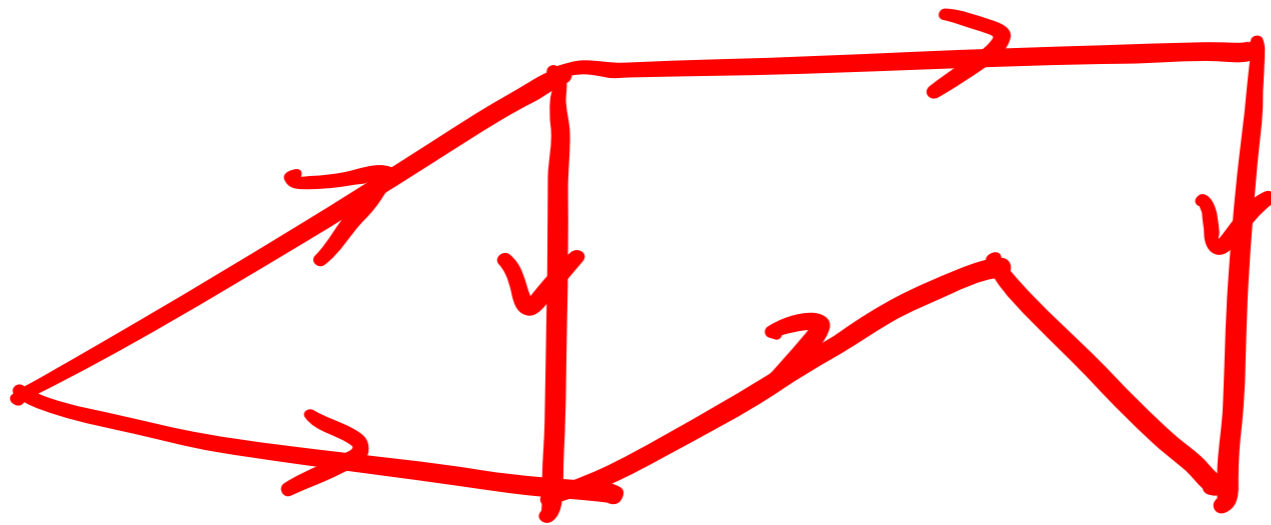
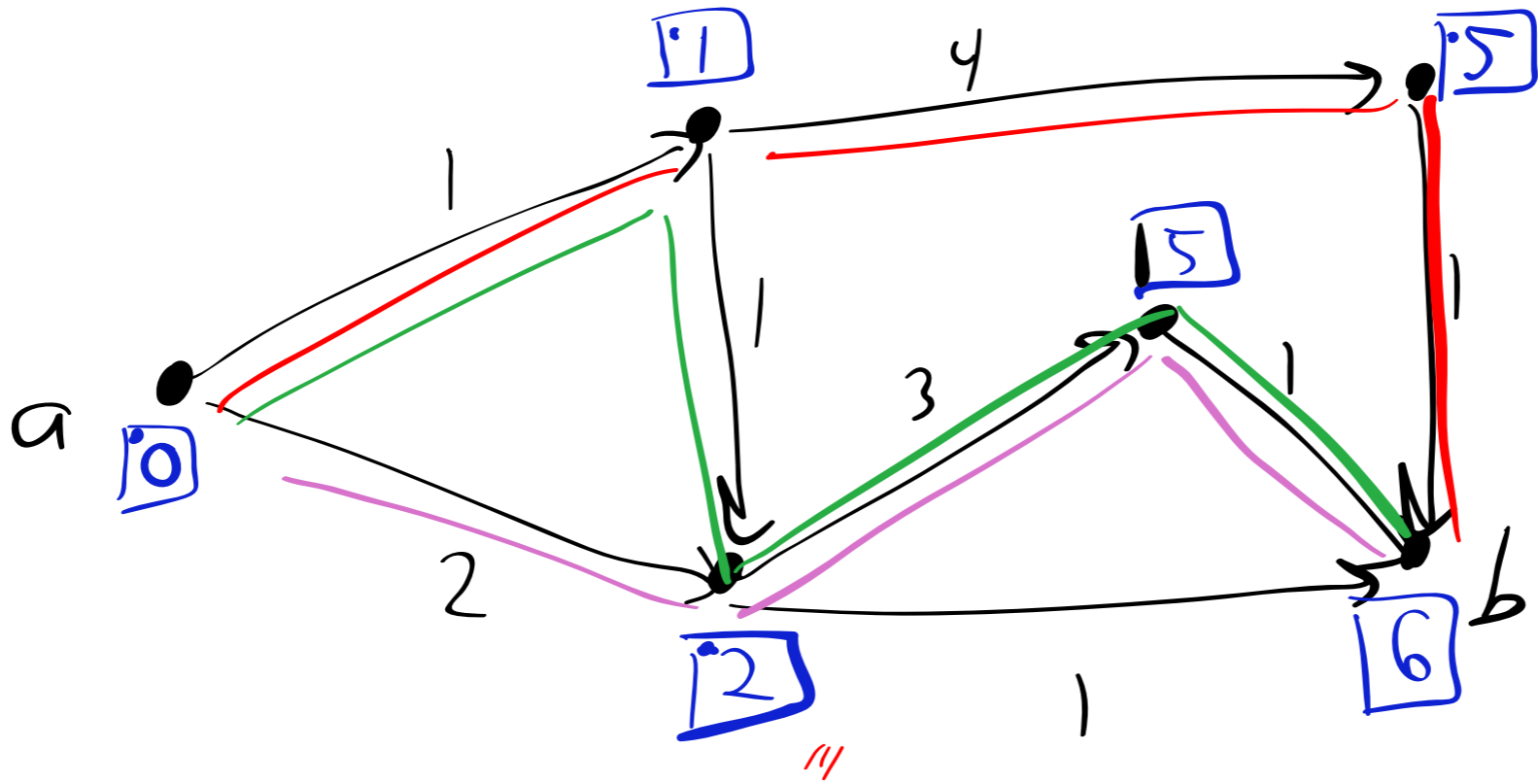




Min. Are we done? Depends on question

→ Q: What is the weight of a min-weight path: 7. done.

Q: Find a min weight path? - can finish -



In this case, there are three max-weight paths