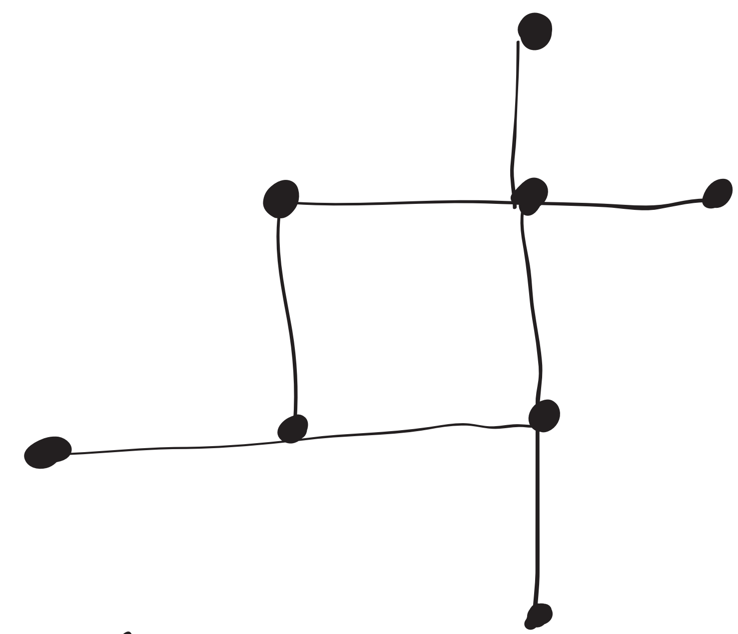
#1 Consider G:

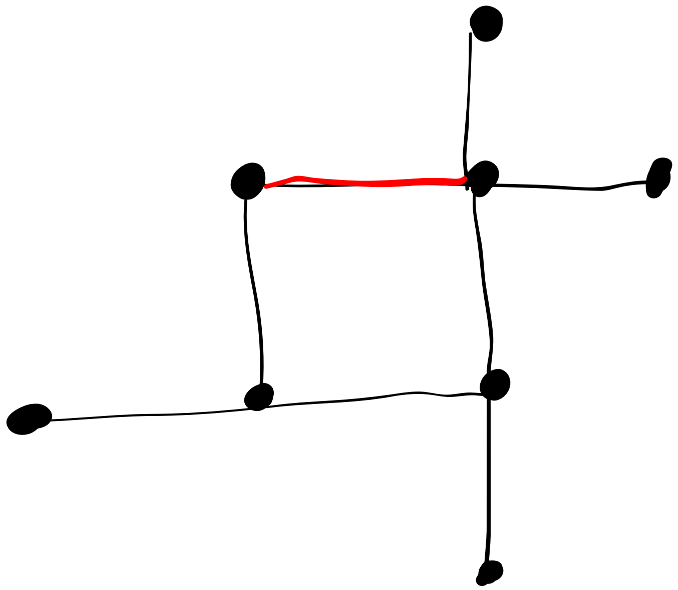
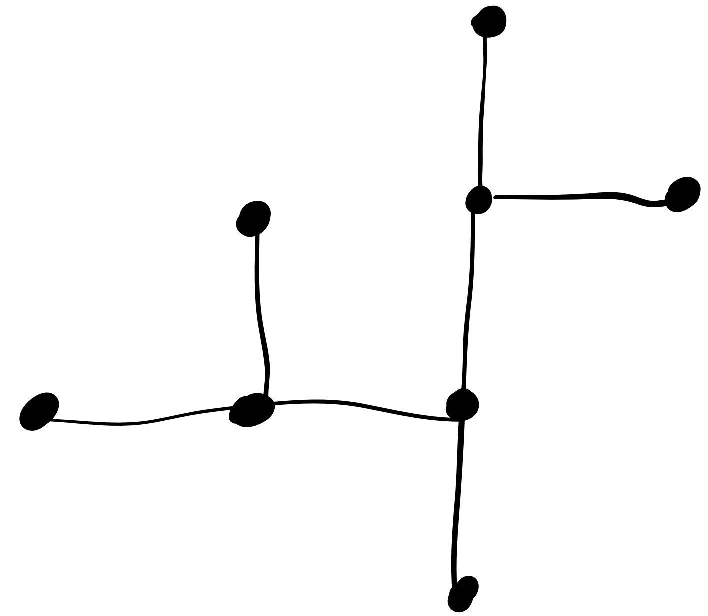
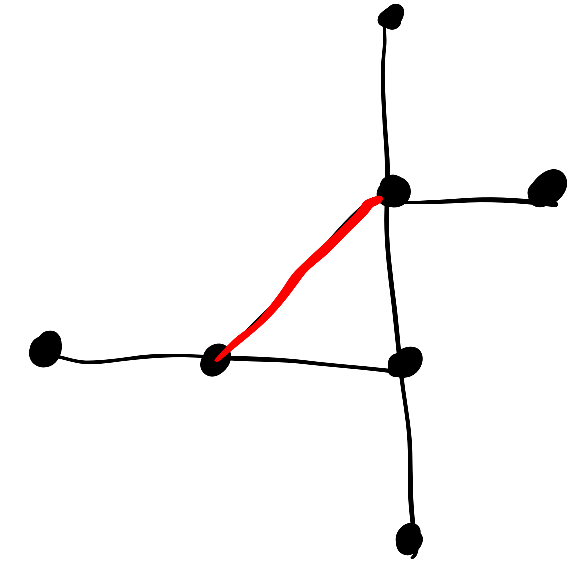


Lecture 39

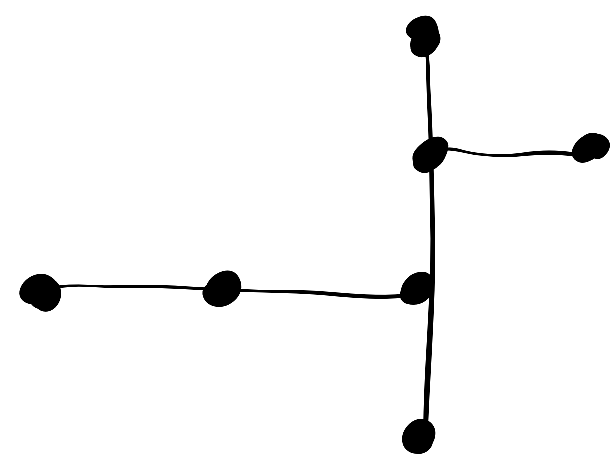
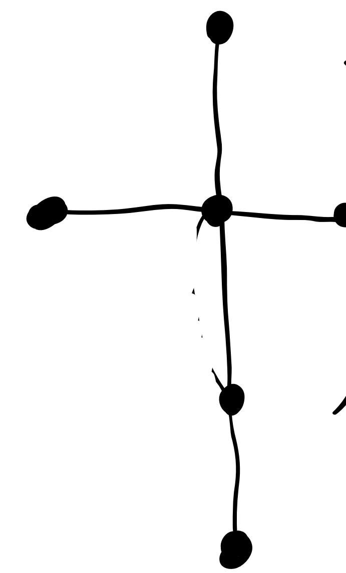
(a) What is the chromatic number of G?

(b) How many ways can G be colored with k-colors, when k is the chromatic number of G?

One solution for both (a) and (b) comes from computing $P_G(n)$. Using the deletion–contraction formula:

 $=$  $-$ 

(a tree with 8 vertices)

$= n(n-1)^7 - \Big($  $-$  $\Big)$

(trees, again)

$$= n(n-1)^7 - \left(n(n-1)^6 - n(n-1)^5\right)$$

So $P_G(n) = n(n-1)^5\left[(n-1)^2 - (n-1) + 1\right] = n(n-1)^5(n^2-3n+3)$.

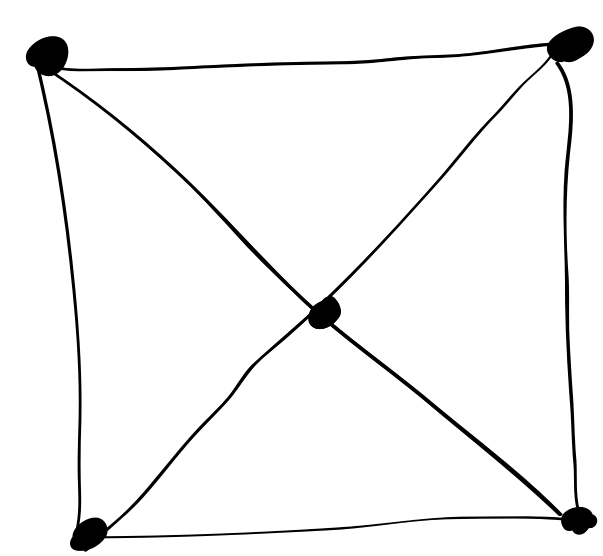
$P_G(n) = n(n-1)^5(n^2-3n+3)$,

So $P_G(1)=0$, $P_G(2)=2\cdot1\cdot(4-6+3)=2$.

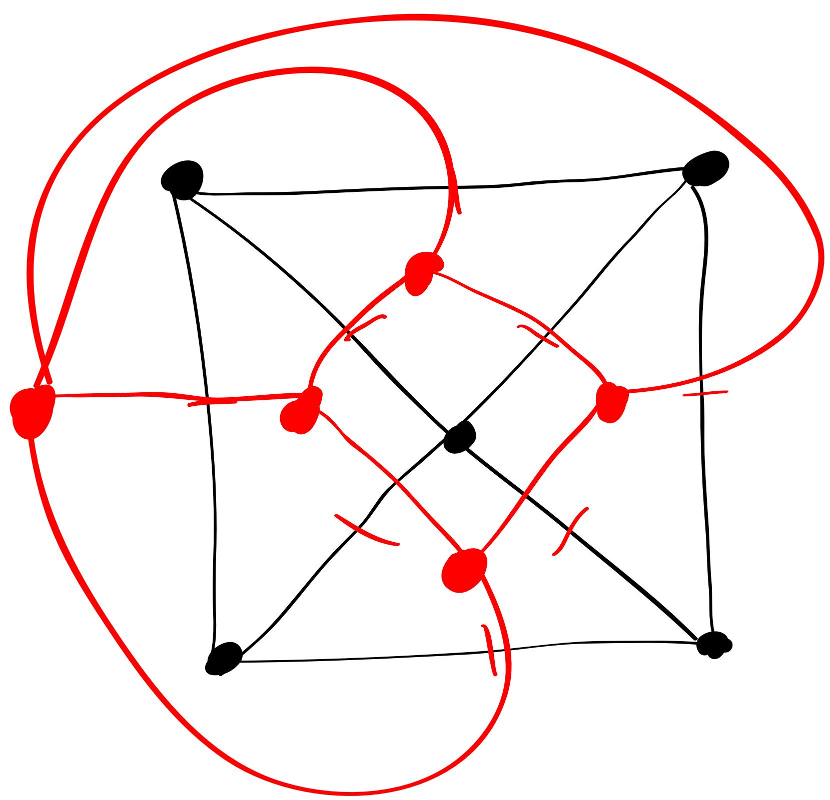
(a) $\chi(G) = 2$.

(b) G can be colored in two ways using 2 colors.

#2. Let H be



Is the dual of H edge-traceable?



$\overline{G}$.

$\overline{G}$ has 4 vertices of odd degree. $\therefore$ $\overline{G}$ is <u>not</u> edge-traceable.