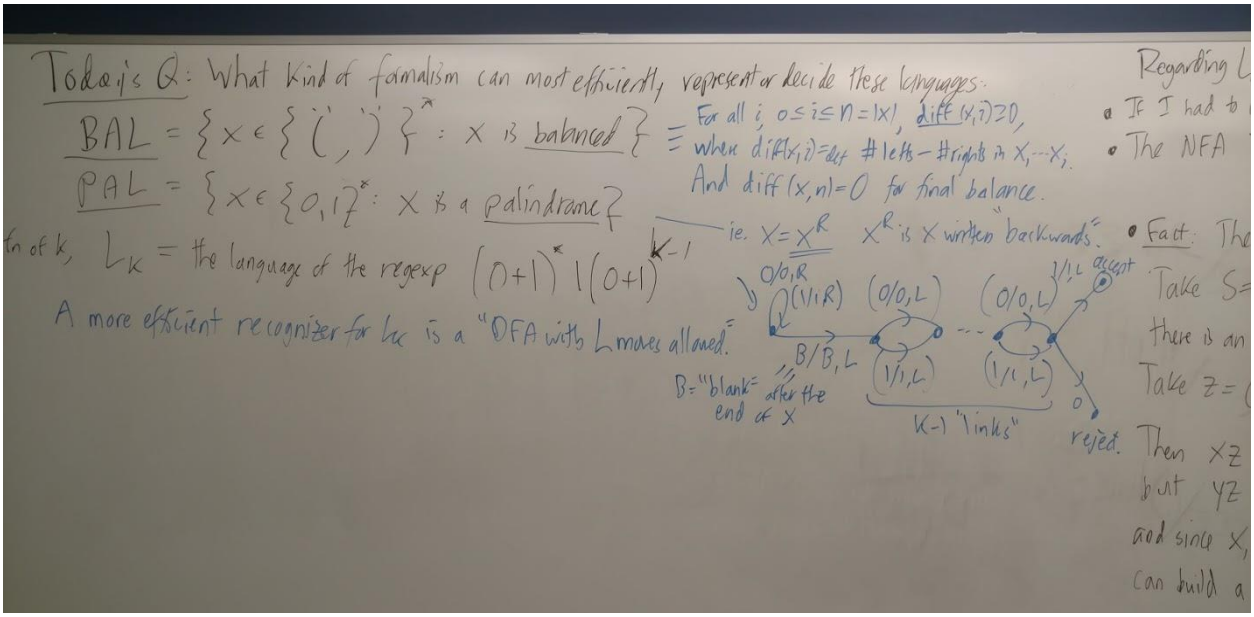
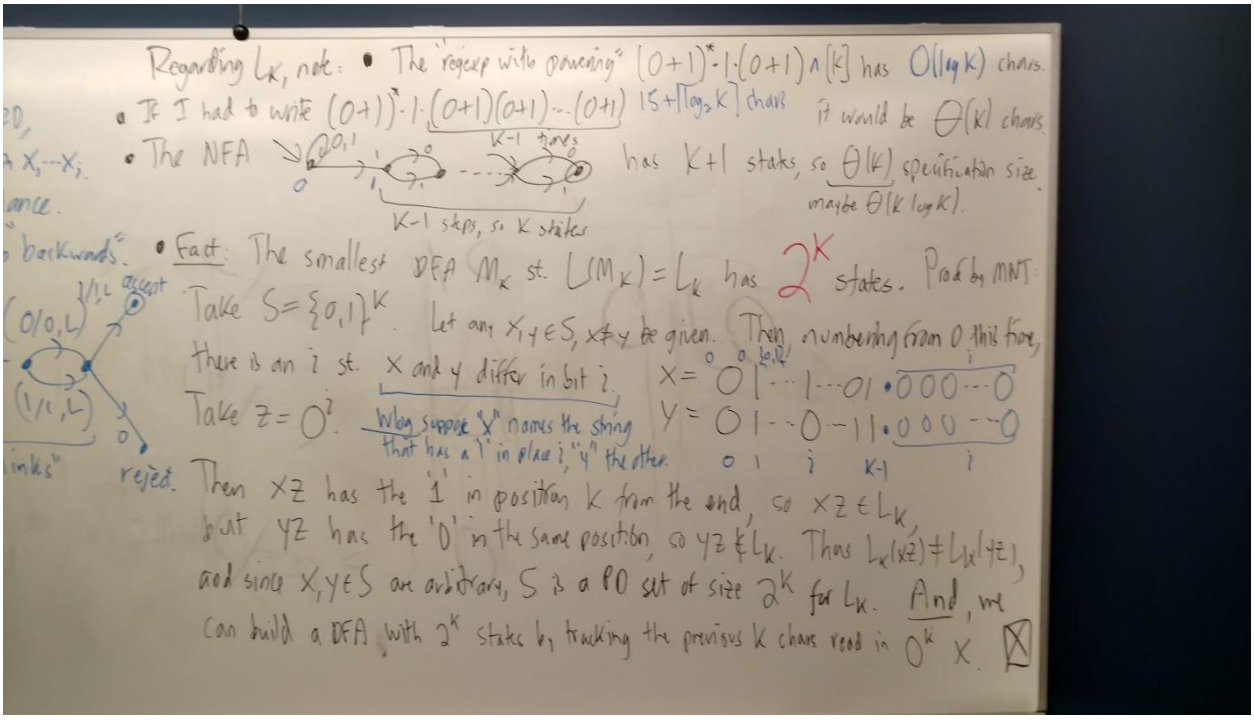
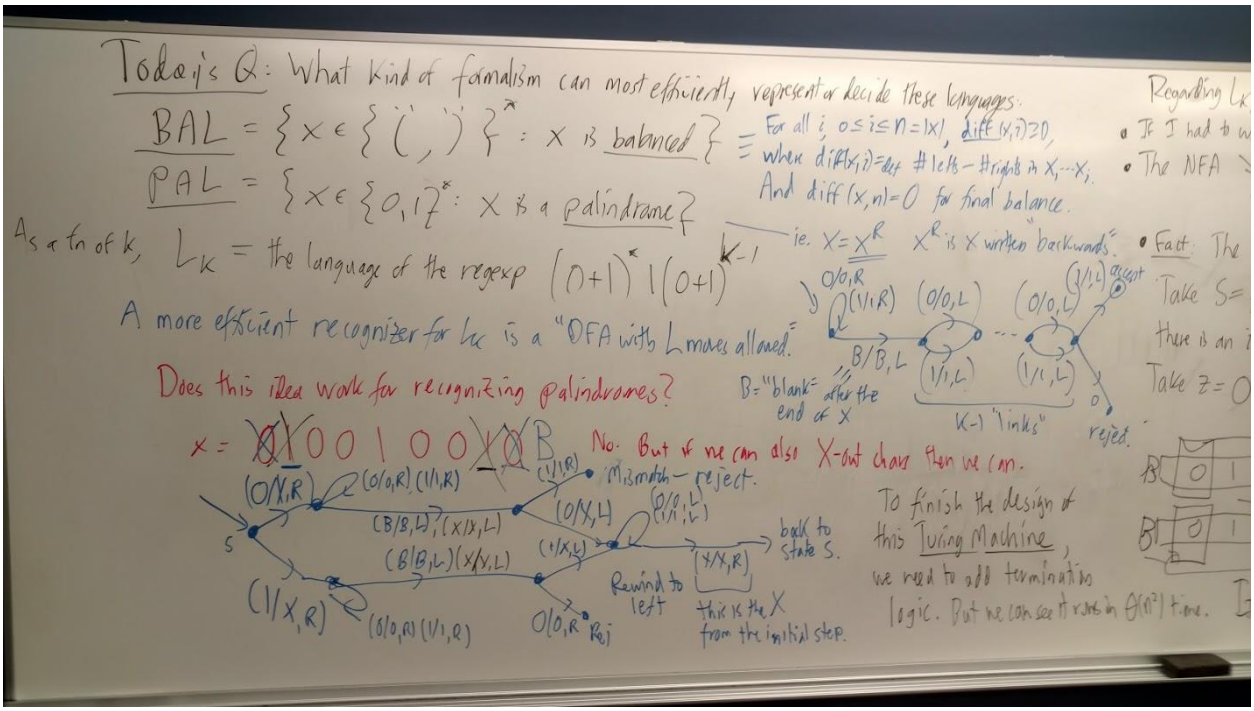
CSE596 Lecture Monday Sept. 16, 2019:



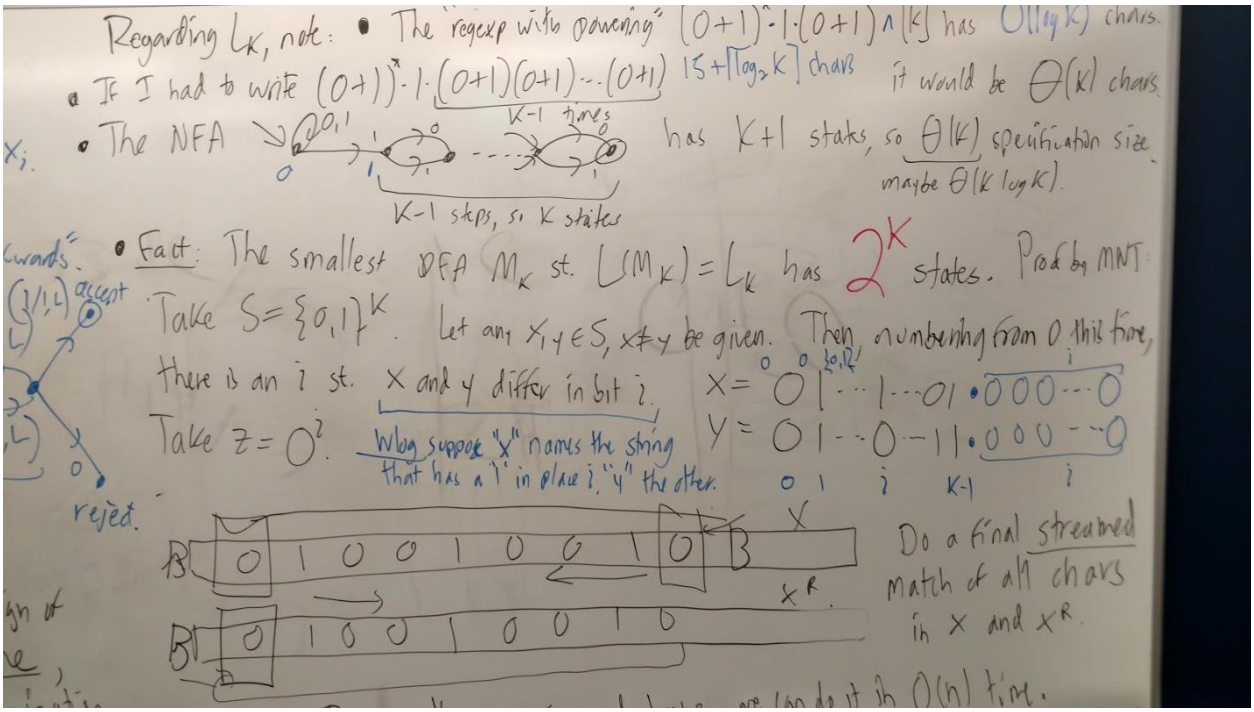
I forgot to take a photo before erasing the lower half. What was originally there was a proof that PAL is non-regular using the Myhill-Nerode script. Here it is: Take S = 0*1. Clearly S is infinite. Let any x,y in S, x != y, be given. Then there are different natural numbers m and n such that x = 0^m 1 and y = 0^n 1. Take z = 0^m. Then xz = 0^m 1 0^m which is a palindrome, but yz = 0^n 1 0^m is not because n != m and the 1 in the middle leaves no way of making it one. Thus PAL(xz) != PAL(yz), so S is PD for PAL, and since S is infinite, PAL is non-regular by MNT.

I also had a side note that while you can also say “wlog. m < n” this proof does not need it.





This is after sketching (most of!) a Turing Machine for PAL on the rest of the left-hand board. On the right-hand board I only added a sketch of a more-efficient two-tape TM on the bottom:



The missing bottom line says that with a second tape one can do it (that is, recognize the language PAL) in O(n) time. Wednesday's lecture will define Turing machines formally and also the idea of running time.