MA/CSSE 474 Day 16 Summary

1. $L = \{a^n : n \text{ is prime}\}$. For a given k, let w =
   a. If w = xyz, then y =
   b. It L is regular, then $\forall q \geq 0$ (a must be in L).
   c. Choose q = Then
   d. $|x| + |z| + q \cdot |y| =$
   e. How do we know that this is composite (non-prime)?

2. $L = \{a^i b^j : i, j \geq 0 \text{ and } i \neq j\}$ See slides for difficulty with using the pumping theorem for L.

   Don't try to copy what's there. Use this space for notes and questions.

3. $L = \{ a^i b^j c^k : i, j, k \geq 0 \text{ and } (\text{if } i=1 \text{ then } j=k) \}$. This is example 8.16 in the textbook. Be sure to look at it.

4. Also see example 8.20, 8.22, 8.23 in the textbook.
   Is the set of regular languages closed chop?
   What do we need to do
   a. If the answer is yes?
   b. If the answer is no?

Let *chop*(L) =
$\{w : \exists x \in L$
$(x = x_1 c x_2,$
$x_1 \in \Sigma_L^*,$
$x_2 \in \Sigma_L^*,$
$c \in \Sigma_L,$
$|x_1| = |x_2|,$ and
$w = x_1 x_2)\}$

Is the set of regular languages closed under *chop*?

L	*chop*(L)
∅	
a*b*	
a*db*	

5. What is a decision procedure? (we'll do as many examples as we have time for today. All are in the textbook.

6. Given a DFSM M=(K,Σ, δ, s, A) and a string w ∈ Σ*, is w ∈ L(M)?
    a. boolean decideFSM(FSMdescription <M>, string w) { // is w in L(M)?

        }
    b. decideregex(regex α, string w){

        }
7. Given an FSM *M*, is *L*(*M*) empty?
    a. Graph analysis approach:

    b. Simulation approach:

    c. Minimal DFSM approach

8. Totality: Given an FSM *M*, is *L*(*M*) = Σ_M*?

9. Given an FSM *M*, is *L*(*M*) finite?
    a. Graph analysis approach:

    b. Simulation approach:

10. Equivalence: Given FSMs M1 and M2, is L(M1) = L(M2)?

11. Minimality: Given a DFSM M, is it minimal?