Homework #7 *due to be announced*

Questions

(1)

(a) Show that the languages $L_1, L_2 \subseteq \{a,b,c,d\}^*$ given below are context-free languages (*CFL*) :
$L_1 = \{a^n b^n c^m d^m;\ n,m \geq 0\}$; $L_2 = \{a^n b^m c^m d^n;\ n,m \geq 0\}$
(b) Is the language $L = (\omega \in \{a,b,c,d\}^* \mid$ in ω : $\#a$'s $= \#b$'s and $\#c$'s $= \#d$'s $)$ a *CFL* **?** If so find a *CFG* that generates L or a *PDA* that accepts L; if not prove your claim using the *pumping lemma* for CFGs.

(2) A *CFG* is called *right linear* if ***all*** productions are of the form $A \rightarrow a\,B$ or $A \rightarrow e$ and called *left linear* if ***all*** productions are of the form $A \rightarrow B\,a$ or $A \rightarrow e$ where $A, B \in V$ and $a \in T$ and e is the empty string. Show that both *right linear* and *left linear* grammars generate *regular languages*. Specify finite state machines corresponding respectively to right and left linear grammars.

Main Text: Exercise 7.1.4, 7.4.3(b), (c)