Exam 2 Review

Prove that the following language is or is not regular:

L = {w | w contains more As than Bs }

M = { w | w contains an even number of As and an odd number of Bs }

N = { w | w contains an unequal number of As and Bs }

How are language M and N related?

Describe, using a few English sentences, the main concept that allows the pumping lemma to work (or, why is pumping involved at all?)

Describe, using a few English sentences, the main concept that allows the 2nd pumping lemma to work (or, why is pumping involved at all?) and how it's different from the 1st pumping lemma.

Why is a the following string, *s*, useless in applying the pumping lemma for the following language, L:
L = $\{a^n b^{n^n} | n > 0\}$ s = ab

Prove that the following language is or is not context free:

L = {w | w contains more As than Bs }

M = { w | w contains an even number of As and an odd number of Bs }

N = { w | w contains an unequal number of As and Bs, and twice as many Cs as Ds }

Build a PDA that recognizes this language:
L= $\{a^{2*n} b^n | n \geq 0\}$

Build a CFG that recognizes the above language.

Using your grammar above, build the parse tree for: aaaabb

Build a PDA and CFG that recognizes the following language.
Build the parse tree for aaaaaabbb
L= $\{a^{2*n} b^n | n > 0 \ AND \ n \ \% \ 2 = 1\}$

Build a PDA and CFG for the following language or show that you can't.

L= $\{a^{2*n} b^n a^q b^{q*2} | n>0, q>0\}$

For each grammar you wrote above, put it in CNF.

For each grammar you wrote above, calculate FIRST and FOLLOW for each nonterminal. Which grammars are LL(1) and which are not? For those that are LL(1), build LL(1) parse tables. For those that are not LL(1), how many lookahead characters do you need to produce an unambiguous parse table?

Use shift reduce parsing to parse the following string using the given grammar, or show that you can't.
S = (x + x) + x * (x)

(1) E -> E + E
(2) E -> E * E
(3) E -> (E)
(4) E -> x