Worksheet #5
Context-Free Grammars

1. Consider the following CFG:

S → AxB
A → yy | yyy | AA
B → ε | Bz

Lower-case letters are terminals and upper-case letters are variables. S is the start variable. Write down five strings in the language described by this grammar. For one of your five strings, show the full parse tree.

2. Given the language described by the grammar in Question #1, determine which of the following strings are in the language:

ε
x
yyx
yyyyyyyxz
xz
yyxxzz
yxz
zzyy
yyyyyx
yzyz
yzzzz
yx
yzxyz
xxzz

3. Which CFGs can be converted into Chomsky Normal Form? Why is CNF useful?

4. Given a binary alphabet, suppose you have a regular language, L = {w : w begins with the prefix 110}. First build a DFA that accepts L. Then using your DFA as a guide, construct a CFG with language, L.