Quiz 1 was given in class on Friday, January 25, 2013.

1. This problem concerns the grammar given below.

\[
S \rightarrow Ay \\
A \rightarrow Ax \\
A \rightarrow \varepsilon
\]

1a. Based on the above grammar, write a derivation for the string “xxy”.

We begin with the start symbol (S), apply one rule at a time, and finish with the required string.

\[
S \\
Ay \\
Axy \\
Axxxy \\
xxxy
\]

*Note: The final rule applied was “A \rightarrow \varepsilon”. Remember that “\varepsilon” is not a character in our alphabet; it represents the empty string.*

1b. Describe the language generated by this grammar.

The language is the set of all strings consisting of zero or more xs followed by a single y. In other words, y, xy, xxy, xxxy, xxxxxy, ....

*Note: We could represent this language using the regular expression x*y.*