1. Here is just a portion of the grammar for our programming language

   varDcl ::= var nameDcl
   nameDcl ::= id : type
   type ::= id | ^ type

Draw a parse tree for the input
   var x : ^ int

2. Draw the DFA that would be constructed by the LR parsing algorithm. Number your states.

3. Show the sequence of shift and reduce steps that would occur when processing the input described in question 1.

4. Imagine that a is an array of real numbers that begins at offset -80 in the activation record, i is an integer at offset -8. Draw the two ASTs that would be created for the statement
   \[ a[i] = 3.2 \times i \]
Indicate the type associated with each node in the AST.

5. Explain why a lexical analyzer is most easily built on top of a push back buffer.

6. (580 only) What is a call by name parameter? Explain how call by name is implemented.