CMSC 430 MIDTERM
November 2, 1995

1 [50]. Consider the following grammar G1. For each class listed below, determine if G is of that class. Give a complete reason why. Your answer can be a simple sentence or may have to be the complete transition table for the parsing algorithm.

G1: $S \rightarrow T \perp$
$T \rightarrow (U) \mid [U) \mid (V) \mid [V)$
$U \rightarrow a \mid T$
$V \rightarrow a \mid T$

[a] LL(0)
[b] LL(1)
[c] SLR(0)
[d] SLR(1)
[e] LR(1)
[f] LALR(1)
[g] General precedence

2 [20]. Consider grammar G2:

G2: $T \rightarrow (U] \mid [U) \mid (V) \mid [V]$
$U \rightarrow a$
$V \rightarrow a$

(a) Show that G2 is a regular language by giving a regular grammar for it.
(b) Give a finite state automaton that accepts G2.
(c) Give a minimal state finite state automaton for G2.
(d) Give a finite state automaton over the same alphabet for all strings NOT in G2.

3 [10]. Give the regular expression, finite state automaton, and regular grammar for all binary strings representing integers divisible by 4.

4 [10]. [a] Give the postfix for:
[1] A*B+C*D+E*(F-G)
[2] A+B-(C-D)

[b] Give the prefix for each.

5 [10] Show that a grammar which is ambiguous cannot be a precedence grammar.