CMSC 430 Midterm March 16, 1999

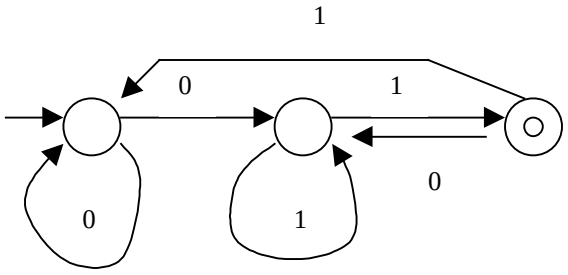
1. [54] Consider the following grammar G:

$S \rightarrow 1AS \mid B$
$A \rightarrow 2A \mid 2$
$B \rightarrow 3B \mid 3$

If G is a grammar of the following classification, give the appropriate parsing table; if not, precisely prove why it is not of that classification. (9 points for each- 1 point for correct answer and 8 points for proof or parsing table)

(a) LL(0)
(b) LL(1)
(c) LR(0)
(d) LR(1)
(e) SLR(1)
(f) LALR(1)

2. [21] Consider the following state diagram:



(a) Give the DFSA for this state diagram
(b) Give the minimized DFSA for this state diagram
(c) Give a regular grammar that accepts the same set as this state diagram

3. [7] Prove that a grammar which is left recursive cannot be LL(1).

4. [10] Prove that the set $\{a^n b^{n*n}\}$ (i.e., n *a*'s followed by n^2 *b*'s) cannot be recognized by a push down automaton.

5. [8] Show that the set of integers divisible by 7 is a regular set.