

CS 310T-31 - TPCS: Theory of Computation

Midterm 2

June 5, 2004

1. Construct a PDA that accepts the language $\{0^n 1^n \mid n \geq 0\}$
(Extra Credit) Show that 001 and $011 \notin L(M)$ but 0011 and $01 \in L(M)$

2. Draw a parse tree for the following grammar and example:

$G = (W, \Sigma, R, S)$, where

$W = \{S, (,)\}$,

$\Sigma = \{(,)\}$,

$R = \{S \rightarrow e, S \rightarrow SS, S \rightarrow (S)\}$

Example: $((()())(())())$

3. Give a Turing machine that scans a word to the right and accepts when it finds three consecutive a 's and rejects when it finds three consecutive b 's

4. Give a state diagram of a turing machine that decide the following language: $\{a^i b^j c^k \mid i, j, k \geq 0, j = 2i \text{ and } k = 3i\}$

(Extra Credit) Give the sequence of configurations that this machine enters when started on the following input strings

i. $abbcc$

ii. $aaabbc$