CSE 303: INTRODUCTION TO THE THEORY OF COMPUTATION
Assignment 3. Due on 22 April, by 5PM

Solutions are to be scanned or photographed and submitted by email by 5:00PM of the due date. Diagrams should be drawn neatly.

Email to **amos.omondi@sunykorea.ac.kr**

1. Give context-free grammars for the following languages.

   (a) $\{w \mid w \in (0+1)^* \text{ and } w \text{ contains at least three 0s}\}$

   (b) $\{w \mid w \in (0+1)^* \text{ and length of } w \text{ is odd}\}$

2. Give pushdown automata for the following languages.

   (a) $\{0^n 1^m 0^{n+m} \mid n, m \geq 0\}$

   (b) $\{w \mid w \in (0+1)^* \text{ and } w \text{ contains more 0s than 1s}\}$

   Use the tabular representation format used in class for PDAs; i.e. as a table with State-Input-TOS-Action-Comment columns. **Do <u>not</u> use any other format.**