CS 383
HW 5

Due in class on Friday, November 1

1. Design a PDA to accept the strings in $(0+1)^*$ such that no prefix has more 1's than 0's. 01001011001 is a string in this language. Say whether your PDA accepts by final state or empty stack.

2. Design a PDA to accept $\{a^i b^j c^k \mid i=j \text{ or } j=k\}$. Say whether this accepts by final state or empty stack.

3. Design a PDA to accept $\{0^n 1^m \mid n <= m <= 2n\}$

4. Convert the following grammar into a PDA that accepts by empty stack.
   $S => 0S1 \mid A$
   $A => 1A0 \mid S \mid \varepsilon$

5. Here is a PDA that accepts strings in $(0+1)^*$ with the same number of 0's and 1's. This PDA accepts by empty stack. Chomsky's algorithm gives a grammar equivalent to this PDA, with grammar symbols of the form [pXq]. Give a derivation in this grammar for the string 0101.

$1,1 \mid 11$
$1,0 \mid \varepsilon$
$1,Z_0 \mid 1Z_0$
$0,0 \mid 00$
$0,1 \mid \varepsilon$
$0,Z_0 \mid 0Z_0$