CS 361 – Homework 6

Total possible points: 60

1. (15 points) Use a **set notation** to **define** the language generated by the following grammar

$$R \rightarrow TT \mid U$$

$$T \rightarrow 0T \mid T0 \mid \#$$

$$U \rightarrow 0U00 \mid \#$$

   Consider the following strings. If they are in L(G), derive them.
   a) 00#0000
   b) ϵ

2. (15 points) Let A = $\{0^n1^m0^n1^m \mid m, n > 0 \text{ and } m \neq n\}$. If A is a context free language, then build the corresponding PDA or CFG. If not, prove that B is not a context-free language using the pumping lemma.

3. (15 points) Let B = {*a*#*b*#*c* | *a*, *b*, *c* are sequences of 1's; |c|=|a|+|b|; $|a| \geq 0$; and |b| >0 }. If B is a context free language, then build the corresponding CFG. If not, use the pumping lemma to show that B is not a context-free language.

4. (15 points) Let C = $\{a^n b^m c^{2n} \mid m, n > 0\}$. If C is a context free language, then build the corresponding PDA. If not, use the pumping lemma to show that C is not a context-free language.

Note that for full credit you need to provide a complete proof, *considering all the possibilities*, as discussed in class.