Formal Languages and Automata Theory, SS 2018. Homework 10 (due Week 12)

1. Write context-free grammars for the following languages:

   (a) $L = \{w|w$ is a binary palindrome$\}$

   (b) $L = \{$ the language of balanced paranthesis $\}$
   Examples: ()((((())))((())), (((()))()()); *Counterexamples:* (((((())))((())), (((()))()())

   (c) $L = \{0^m 1^n | m \geq n\}$

   (d) $L = \{0^n 1^n | n \geq 1\}$ *Examples:* 01, 00001111

   (e) $L = \{0^n 1^n | n \geq 0\}$ *Examples:* λ, 01, 00001111

   (f) $L = \{$ The set of all strings with an equal number of a's and b's$\}$
   Examples: λ, aabb, bbaa, abbababa,bbababaa. (Bonus: 0.25 points)

   (g) $L = \{$ Binary words with even length$\}$

   (h) $L = \{0^i 1^j 2^k | i = j$ or $j = k,$ where $i, j, k \geq 0\}$ (Bonus: 0.25 points)

   (i) $L = \{a^i b^j c^k | i + j = k, i, j, k \geq 0\}$ (Bonus: 0.25 points).