CSCI 338: Exercise 05

I will give non-regular exercises for you to try (remember, you must work on these besides following my lectures or read book sections!). These will not be graded. Solutions will be posted on D2L a bit later.

Problem 1

Let $\Sigma = \{a, b\}$. Construct a CFG for the following language:

(1.1) $A = \{w|\ the\ length\ of\ w\ is\ odd\}$.

n is odd iff $n = 2x+1$.

$$\begin{cases} S \to aT \mid bT \mid a \mid b \\ T \to aTa \mid bTb \mid aTb \mid bTa \mid \varepsilon \end{cases}$$

(1.2) $B = \{w|\ w\ has\ at\ least\ three\ a's\}$.

$$\begin{cases} S \to BaBaBaB \\ B \to aB \mid bB \mid \varepsilon \end{cases}$$

(1.3) $C = \{w|\ w\ is\ a\ palindrome\}$.

$S \to aSa \mid bSb \mid a \mid b \mid \varepsilon$

palindrome:
wow
eye
racecar