

Team Assignment 4: Chapter 3. Context-Free Grammars

Due Tuesday, February 9

Names: _____ Section: __ Score: ____/50 pts

1. [10 pts] Construct a CFG over $\{a, b\}$ whose language contains precisely the strings with the same number of a 's and b 's. (Problem 3.12 on Page 99)

2. [10 pts] Construct a CFG over $\{a, b\}$ whose language contains precisely the strings of *odd* length that have the same symbol in the *first* and *middle* positions. (Problem 3.13 on Page 99)

3. [10 pts] Give a *regular grammar* that generates the set of strings over $\{a, b\}$ in which every a is *immediately preceded* or *immediately followed* by b , e.g., $baab$, aba , and b . (Problem 3.20 on Page 99)

4. [10 pts] Give a *regular grammar* that generates the set of strings over $\{a, b, c\}$ with an *odd* number of occurrences of the substring ab . (Problem 3.24 on Page 99)

5. [10 pts] Let G_1 and G_2 be the following grammars (Problem 3.39(b) on Page 101):

$$G_1: S \rightarrow aABb$$

$$A \rightarrow aA \mid a$$

$$B \rightarrow bB \mid b$$

$$G_2: S \rightarrow AABB$$

$$A \rightarrow AA \mid a$$

$$B \rightarrow BB \mid b$$

Show that $L(G_1) = L(G_2)$