NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CS 420/520 Theory of Computation, Spring 2019 at Indiana State University, taught by Jeff Kinne

Quiz 10 - context free languages

Points - each part is graded as 1 point, half credit is possible.

1) Give a CFG or PDA.

L = complement of the language {a^n b^n | n >= 0}

In the language: aab, abb, aaa, abab, babaaa, abba

Not in the language: ab, aabb, empty string, aaabbb

2) Give a CFG or PDA.

L = {w such that every prefix of w contains at least

as many a's as b's}

In the language: aaba, ab, aababb

Not in the language: b, abb, ba, bbaa

3) Prove the language it is not CF using the pumping lemma for CF's.

L = {strings of a's, b's, c's with the same number of each letter}

In the language: abc, abaccb, aaabcbcbc

Not in the language: ab, c, abcab, aabbccc

4) Give a PDA or CFG.

L = strings of ( and ) that follow the rules –

same number of ) as (,

for each prefix of the string there are not more ) than (

In the language: (), (()), (()())

Not in the language: (, ), )(, (()))()