CSCI338 HW3

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1 Context-Free Grammers

1.1 $\{\ a^n b^m \mid n \neq 2m\ \}$

S → aaSb | A | B
A → aA | a
B → bB | b

1.2 $\{\ a^i\ b^j\ c^k \mid i,\ j,\ k \geq 0\ j = k\ or\ j = i\ \}$

S → S_1 | S_2
S_1 → abS_1 | A | ϵ
A → cA | c | ϵ
S_2 → a S_2 | B | ϵ
B → Bbc | bc | ϵ

1.3 $\{\ a^n\ b^m \mid n = 3m\ \}$

S → aaaSb | ϵ

1.4 $\{\ a^n\ b^m \mid n \leq m + 3\ \}$

S → aSb | A
A → a | aa | aaa | B
B → bB | ϵ

2   Ambiguous Grammer

Can I construct an identical string using two different paths?
Lets construct the string aab
S → aaB → b → aab

S → AB:
A → aA → aa
B → b
→ aab
This language is ambiguous

3   CFG to PDA

4   Pumping Lemma

4.1

This langauge accepts some amount(≥ 0) of 0's followed by atleast 1, but no more than 2 #, following by some amount (≥ 0) of 0's

4.2

If G is a context free then there is a number P (Pumping length) such that S $\in$ and $|S| \geq P$ then S can be decomposed into S = UVXYZ S.T.:
1. $uv^i xy^i z$
2. $|vy| > 0$
3. $|vxy| \leq P$