Jonny Hughes
Automata
3/17/20

Homework 13

Use the pumping lemma to prove that these languages are **not** context-free.

- L1 = { 0i1j2k | i < j < k }
  - Given that pumping lemma are required to at most pump 2 strings in parallel, and this grammar by nature of its relationship between all 3 counts of 0, 1, and 2, would require there to be NO pumping lemma which will succeed for this grammar, Hence, this is not a Context-free language.
- L2 is the set of all strings in {0,1,2}* where the number of 0's is equal to the *higher of* the number of 1's or 2's [so in string *w*, #0(*w*) = max(#1(*w*), #2(*w*))]
  - Again, this language would require keeping track of 0s as well as 1's and 2's in order to figure out which one has a higher number. This is not allowed.

Convert this grammar to Chomsky normal form.

S → AAA | B
A → 1A | B
B → ε

- **S → AB**
- **A → XA**
- **B → AA**
- **X → 1**