

Discussion 3

1. Show using the pumping lemma that the language $\{0^n 1^n 2^n \mid n \geq 0\}$ is not regular.
2. Exercise 2.1
3. Exercise 2.3
4. Give context-free grammars that generate the following languages. Assume the alphabet $\Sigma = \{0, 1\}$.
 - (a) $\{w \mid w \text{ contains at least three } 0s\}$
 - (b) $\{w \mid w \text{ starts and ends with different symbols } \}$
 - (c) $\{w \mid \text{the length of } w \text{ is even } \}$
5. Give a context-free grammar that generates the following language. Assume the alphabet $\Sigma = \{0, 1, 2\}$.

$$L = \{0^i 1^j 2^k \mid i = j \text{ or } i = k, \text{ where } i, j, k \geq 0\}$$