

CS3231  
Tutorial 12

1. Show that the following problems are undecidable:
  - (a) Given two CFG,  $G_1$  and  $G_2$ , is  $L(G_1) = L(G_2)$ ?
  - (b) Given two CFG,  $G_1$  and  $G_2$ , is  $L(G_1) \subseteq L(G_2)$ ?
2. Give unrestricted grammar for
  - (a)  $\{a^i b^j c^k \mid i \leq j \leq k\}$ .
  - (b)  $\{w \mid w \in \{a, b, c\}^*$  and  $w$  contains equal number of  $a$ 's,  $b$ 's and  $c$ 's $\}$ .
  - (c)  $\{ww \mid w \in \{a, b\}^*\}$ .
3. Show that every RE language can be generated by an unrestricted grammar.