

Homework Day #34  
COMP 2230  
Spring 2024  
Prof. Stucki

1) For each of the following grammars, identify the highest level that it belongs to (0-3), and explain your answer.

- a)  $S \rightarrow a \mid TR \mid T, T \rightarrow bb \mid Ta, R \rightarrow baab$
- b)  $S \rightarrow aTb \mid bTa, aTb \rightarrow aSSb, bTa \rightarrow ba$
- c)  $S \rightarrow Ra \mid Qb \mid Ta, R \rightarrow Qa \mid Rb, T \rightarrow \varepsilon, Q \rightarrow a \mid Rb \mid Tb$
- d)  $S \rightarrow \varepsilon$
- e)  $S \rightarrow aTbR, T \rightarrow TT \mid ba, abab \rightarrow abbaab, R \rightarrow aR \mid \varepsilon$

2) For each of the grammars in question 1, list three strings that can be derived from the grammar (and are therefore in the grammar's language) and also list three strings that cannot be derived from the grammar (and are not in the grammar's language). Some of the grammars may not have 3 of each kind.