

## Week 5 Exercises

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### Lecture 6

#### VI.1

Use the standard function scale to directly derive an asymptotic expression for the number of strings in this following CFG:  $S = E + U \times Z \times S + D \times Z \times S$ ,  $U = Z + U \times U \times Z$ ,  $D = Z + D \times D \times Z$ .

#### VI.2

Give an asymptotic expression for the number of rooted ordered trees for which every node has 0, 2, or 3 children. How many bits are necessary to represent such a tree?

### Lecture 7

#### VII.1

Use the tree-like schema to develop an asymptotic expression for the number of bracketings with  $n$  leaves (see Example I.15 on page 69 and Note VII.19 on page 474)

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