

## HOMEWORK 1

1. Let the attribute *val* give the value (in decimal base) of the octal number generated by *S* in the following grammar:

$$S \rightarrow L . L \mid L$$
$$L \rightarrow L B \mid B$$
$$B \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7$$

For example, on input 25.36, the value of *S.val* should be  $2 \times 8^1 + 5 \times 8^0 + 3 \times 8^{-1} + 6 \times 8^{-2} = 21.46875$

Construct an AG to determine *S.val*.

2. Suppose declarations are generated by the following grammar:

$$D \rightarrow \text{id } L$$
$$L \rightarrow , \text{id } L \mid : T$$
$$T \rightarrow \text{int} \mid \text{real}$$

Construct an SDT scheme to enter the type of each identifier into the symbol tables.

*Hint:* Use the pseudo-function `addType()` (Lecture 1) to save information to the symbol tables.

3. Based on the widening hierarchy of type conversions in Java (Lecture 1), write a “beautiful pseudo-code” of the auxiliary function `max()` that can overcome the cumbersomeness of naïve approach.

*(For full credit, show how you derived your answer)*