HW 4a

4.2.2 c

$$S \Rightarrow S(S)S|\epsilon$$

Left Most

$$S \Rightarrow S(S)S$$

$$\epsilon(S)S$$

$$\epsilon(S(S)S)S$$

$$\epsilon(\epsilon(S)S)S$$

$$\epsilon(\epsilon(\epsilon)S)S$$

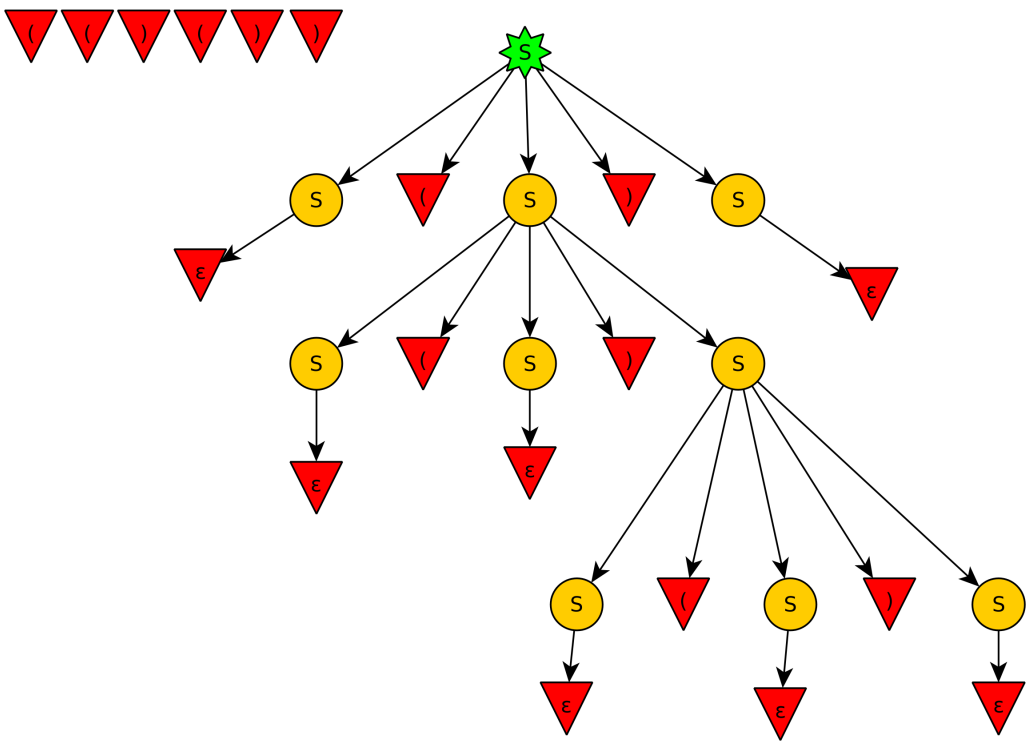
$$\epsilon(\epsilon(\epsilon)S(S)S)S$$

$$\epsilon(\epsilon(\epsilon)\epsilon(S)S)S$$

$$\epsilon(\epsilon(\epsilon)\epsilon(\epsilon)S)S$$

$$\epsilon(\epsilon(\epsilon)\epsilon(\epsilon)\epsilon)S$$

$$\epsilon(\epsilon(\epsilon)\epsilon(\epsilon)\epsilon)\epsilon$$



Right Most

$$S \Rightarrow S(S)S$$

$$S(S)\epsilon$$

$$S(S(S)S)\epsilon$$

$$S(S(S)\epsilon)\epsilon$$

$$S(S(S)\epsilon)\epsilon$$

$$S(S(\epsilon)\epsilon)\epsilon$$

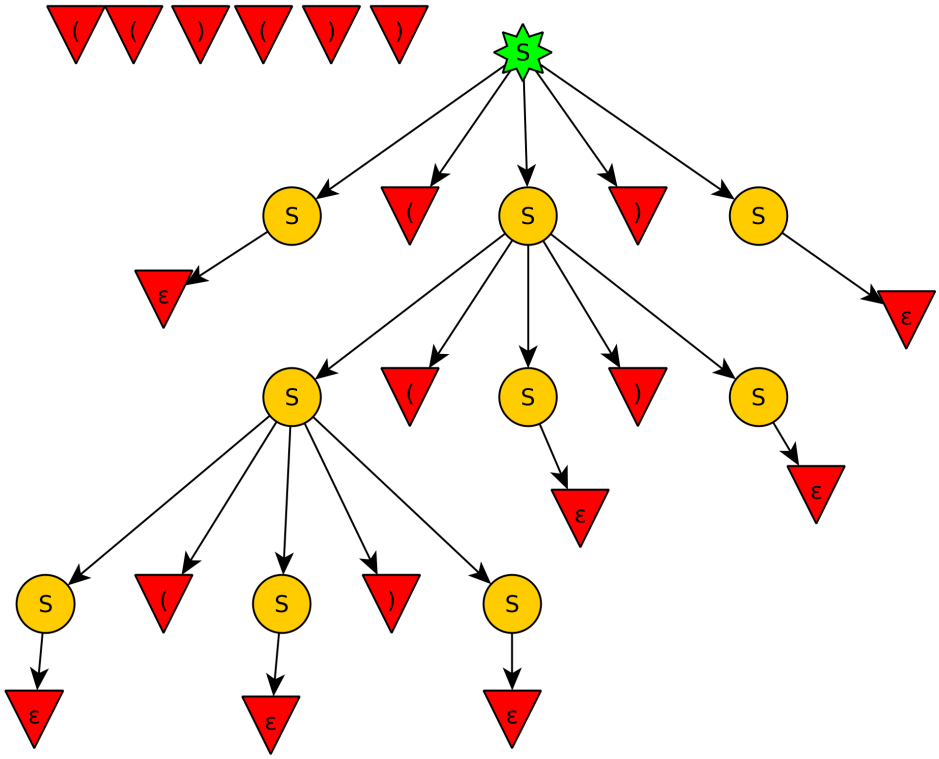
$$S(S(S)S(\epsilon)\epsilon)\epsilon$$

$$S(S(S)\epsilon(\epsilon)\epsilon)\epsilon$$

$$S(S(\epsilon)\epsilon(\epsilon)\epsilon)\epsilon$$

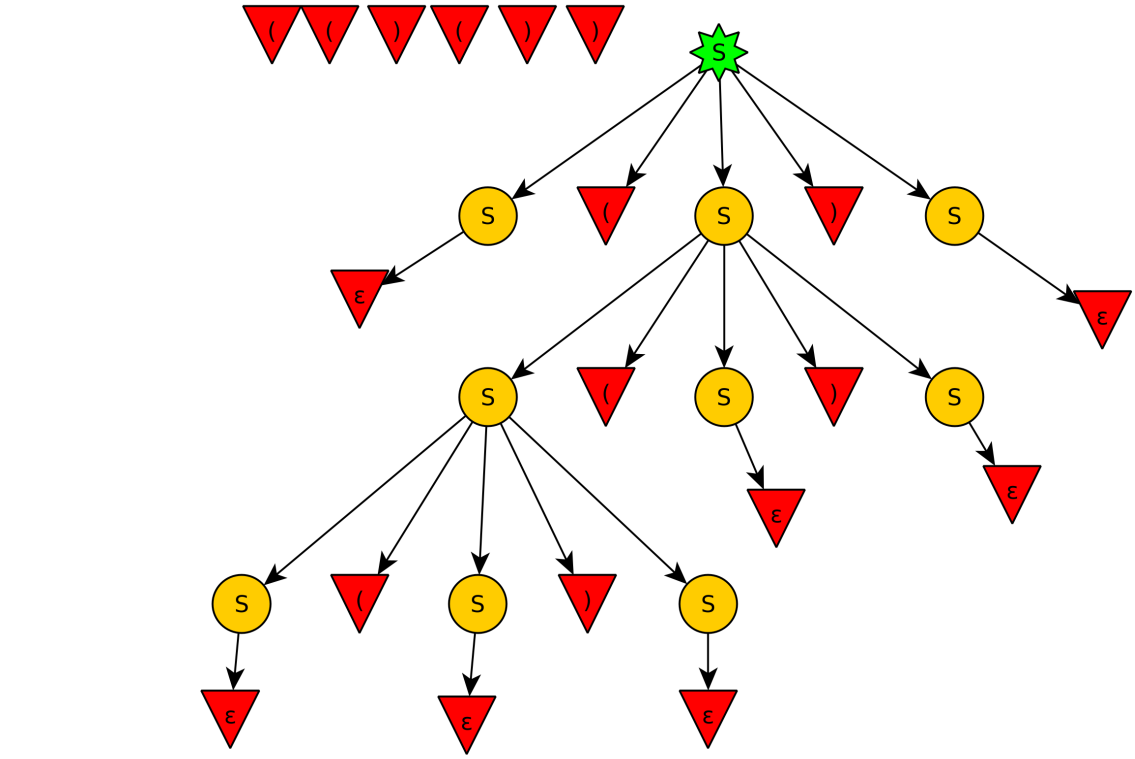
$$S(\epsilon(\epsilon)\epsilon(\epsilon)\epsilon)\epsilon$$

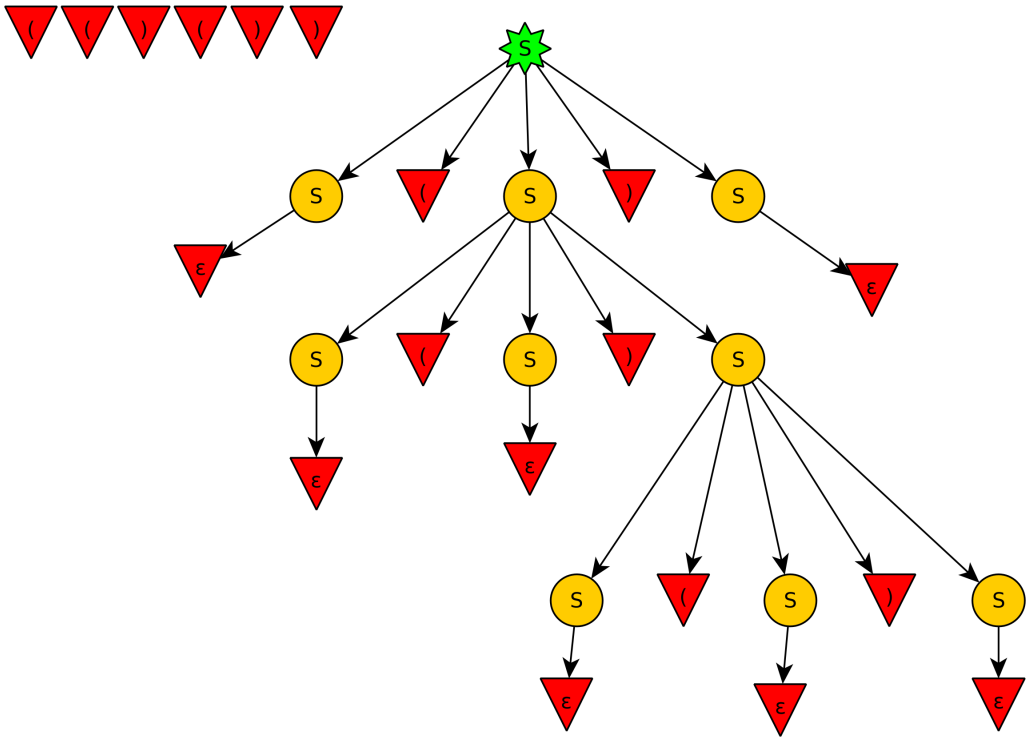
$$\epsilon(\epsilon(\epsilon)\epsilon(\epsilon)\epsilon)\epsilon$$



Parse Trees

Here are two valid parse trees!





Is the grammar ambiguous?

It is ambiguous because you can generate two different trees using left derivation (same for right derivation) on the same input string.

Describe the language

All possible strings of balanced brackets (opening and closing.)

4.2.3 a

$$S \Rightarrow 01S|1S|\epsilon$$

4.4.1 c