Parsing Beyond CFG
Homework 3: TAG

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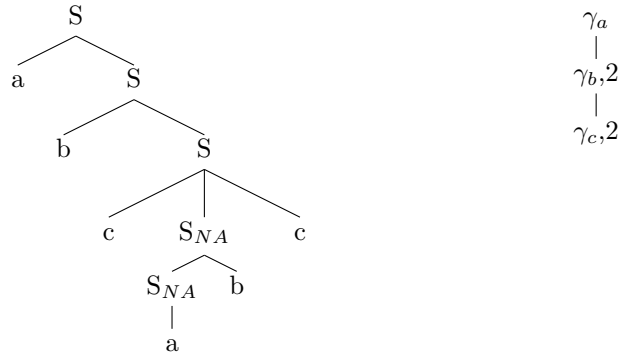
Question 1 *Consider the following elementary trees:*

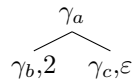$$\gamma_a = \quad \gamma_b = \quad \gamma_c = \qquad]$$
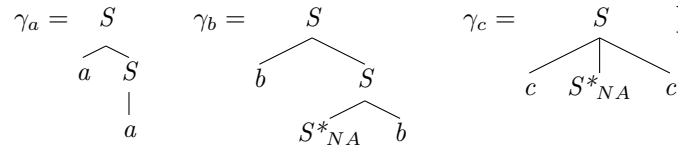
1. *Give the derived tree and the derivation tree for abcabc, given these trees.*

2. *Is it possible to derive the following strings with this grammar?*
   (a) cbaabc   (b) bacabc
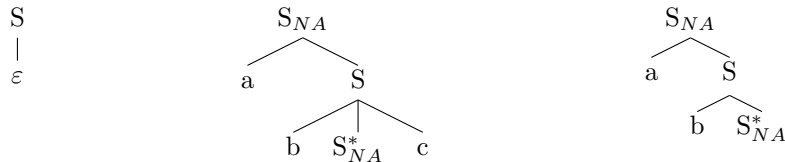
Solution:

1.

2. (a) yes, derivation tree

   (b) no

Question 2 *Give a TAG with adjunction constraints for the following string language:*
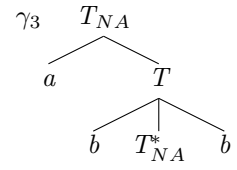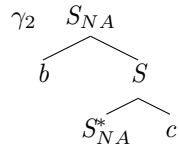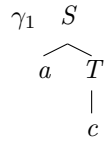
$$\{a^n b^n c^m \mid n \geq m \geq 0\}$$

Solution:

(This is of course not the only solution.)

Question 3 *Now consider the following elementary trees:*

γ_1 $\quad S$

```
  S
 / \
a   T
    |
    c
```

γ_2 $\quad S_{NA}$

```
   S
  / \
 b   S
    / \
 S*_{NA}  c
```

γ_3 $\quad T_{NA}$

```
   T
  / \
 a   T
    /|\
   b T*_{NA} b
```

1. *Give the derived and derivation tree for baabcbc.*

2. *Which string language does this TAG generate?*

Solution:

1.

```
        S
       / \
      b   S
         / \
        S   c
       / \
      a   T
         / \
        a   T
           /|\
          b T  b
            |
            c
```

```
        γ_1
       /   \
   γ_2,ε   γ_3,2
```

2. $\{b^n aa^m b^m cb^m c^n \mid n, m \geq 0\}$