

# Tree Connector Pattern Study

Leon Starr

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mint.flatland3.tn.2

Version 0.6



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## Change Log

Version	Date	Changes	Modified by
0.4	July 6, 2020	Initial patterns	Leon Starr
0.5	Nov 12, 2020	Layout grammar added	Leon Starr
0.6	Nov 13, 2020	Color code node names purple and renamed from L to LF to avoid confusion between lane numbers and leaf nodes	Leon Starr

# Pattern 1




We start with a simple pattern of one Trunk Stem and two Leaf Stems

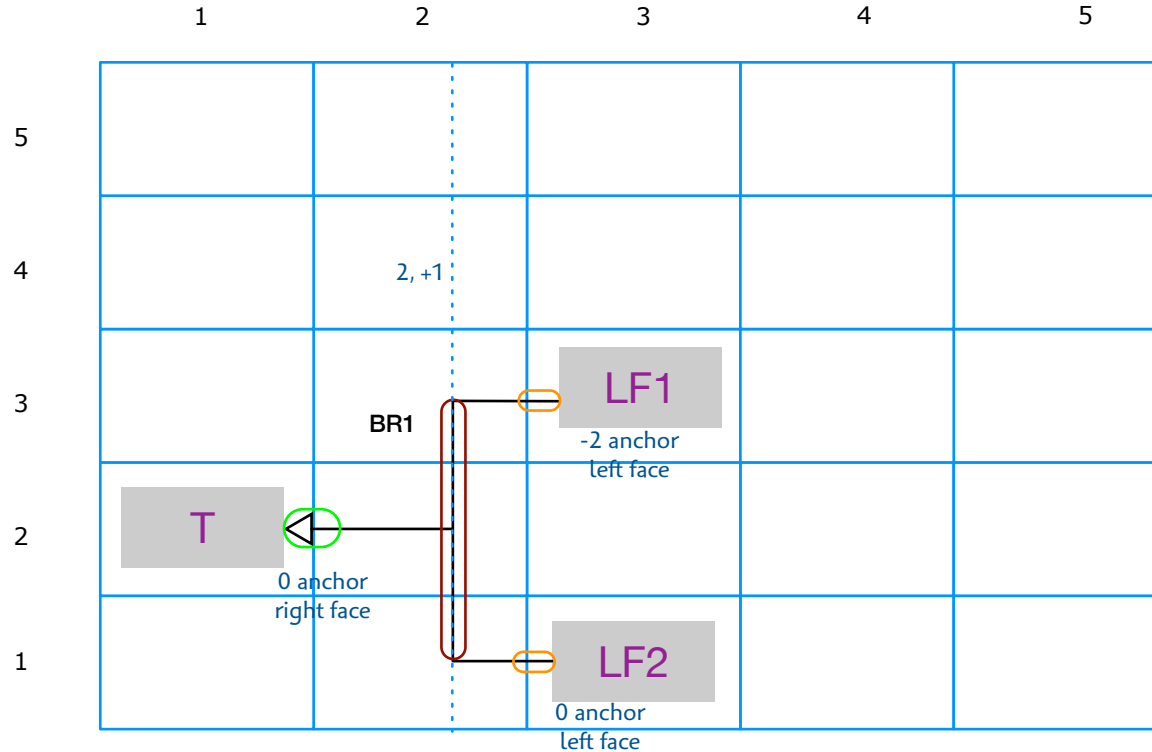
## Layout grammar

+R1 r|T { l-2|LF1 l|LF2 L2R+1 }

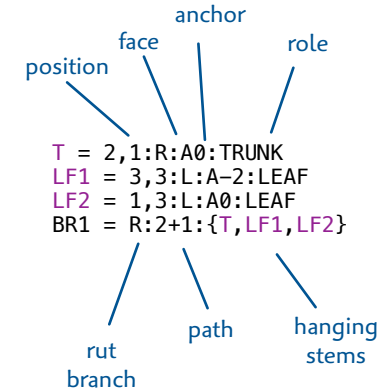
BR1 is a Rut Branch running through lane 2 in rut +1

There is one trunk and two leaf stems hanging from Rut Branch BR1

-  Trunk Stem
-  Anchored Leaf Stem
-  Rut Branch



## User specification



The user specifies the roles each Node plays (Trunk or Leaf).

For each node with a Branch Stem, where is it attached (which face and anchor position)

Finally, a Branch is specified. In this case there is only one Branch connecting all Nodes. One Node, LF1, however, is special since it defines where the Branch is drawn.

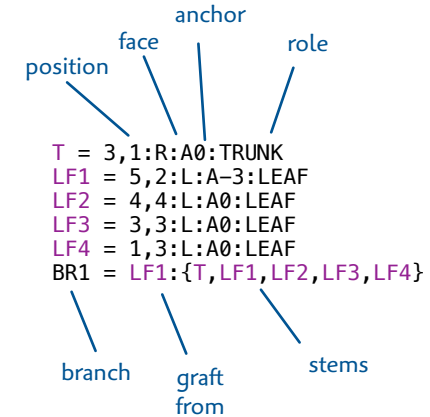
# Pattern 10

Single Branch where one Node (**LF1**) attaches its Leaf Stem in line with the Branch

## Layout grammar

+R1 r|T { b-2|**LF1**> l|**LF2** l|**LF3** l|**LF4** }

## User specification



The user specifies the roles each Node plays (Trunk or Leaf).

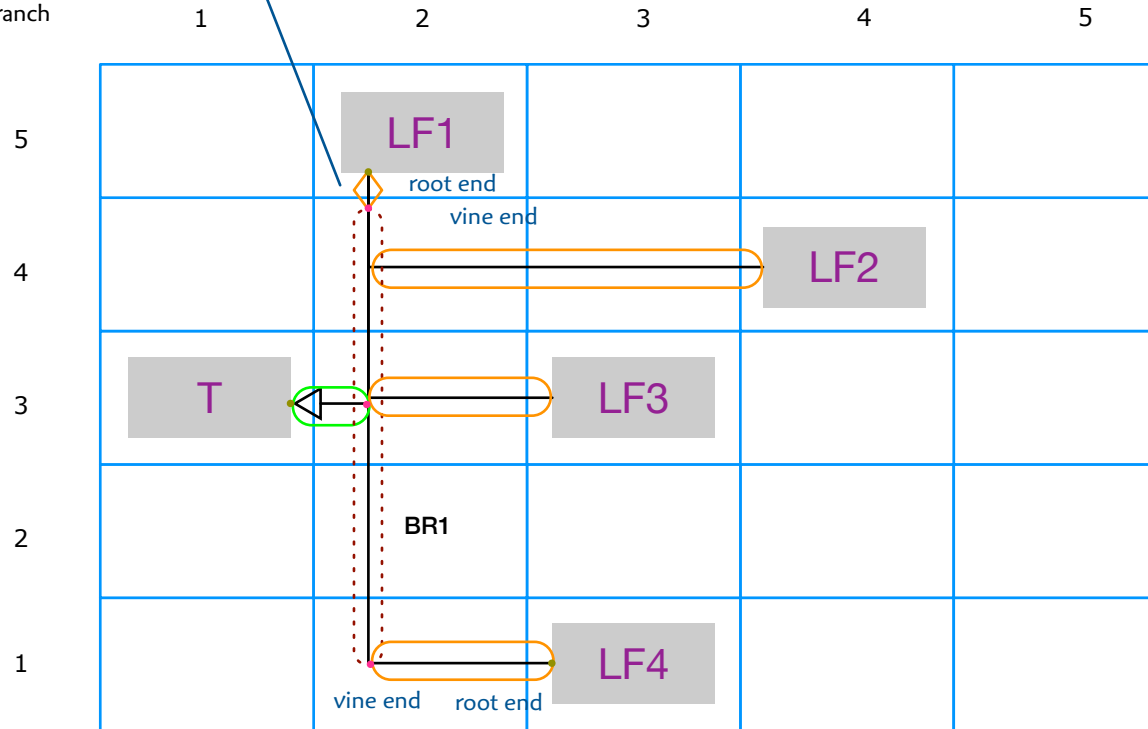
For each node with a Branch Stem, where is it attached (which face and anchor position)

Finally, a Branch is specified. In this case there is only one Branch connecting all Nodes. One Node, **LF1**, however, is special since it defines where the Branch is drawn.

- Trunk Stem
- Anchored Leaf Stem
- Grafting Leaf Stem
- Grafted Branch

The Branch is defined as extending from **LF1**, so **LF1** has a special role as “grafting” the Branch.

Since **LF1** grafts a Branch, its Leaf Stem extends to the default stem length specified for its notation and stem type



The Trunk and all other Leaf Stems extend to meet the single Grafted Branch

The length of the **LF1** Leaf Stem is determined by the default length for its Stem Type. This length allows enough room to draw any decorations which this Stem Type does not have. So it is just a short distance. But the x position of the stem anchor point determines the x value of the BR1 branch which extends to the furthest Leaf Stem which is on **LF4**.

Pattern 2

Layout grammar

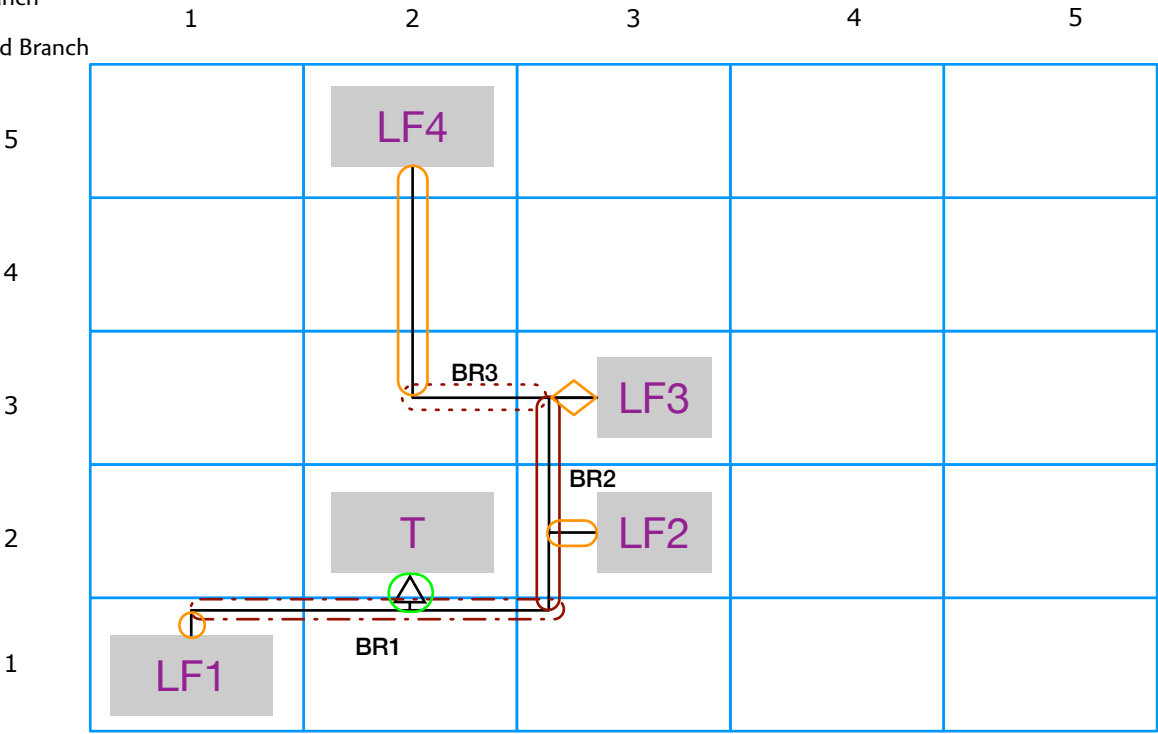
- Trunk Stem
- Anchored Leaf Stem
- Grafting Leaf Stem
- Rut Branch
- Grafted Branch
- Interpolated Branch

Three Branches are required in this Tree Connector

+R1 b|T { t|LF1 } { l|LF2 l|LF3 : L3R-2 } LF3 >{ b|LF4 }

Branch BR3 is grafted by Node in LF3 position

Branches BR1 and BR2 are drawn to connect the Leaf Stem Vine Ends



Trunk Stem extends to meet Branch Path

Grafting is the policy of establishing the axis of a Branch Path by extending the vine end of an Anchored Stem. Note that the LF3 Node both extends to meet BR2 and sets the axis for BR3

User specification

T = 2,2:B:A0:TRUNK  
LF1 = 1,1:T:A0:LEAF  
LF2 = 2,3:L:A0:LEAF  
LF3 = 3,3:L:A0:LEAF  
LF4 = 5,2:B:A0:LEAF  
BR1 = IBR:: {T, LF1}  
BR2 = RBR:3-2: {LF2, LF3} Rut Branch lane 3, Rut -2  
BR3 = GBR:LF3: {LF4} Grafted Branch from LF3  
[ BR1, BR2, BR3 ] branch sequence

The user specifies the placement of three distinct Branches.

Branch BR1 connects only the Trunk Stem and the LF1 Branch Stem. The Node faces establish the need for a horizontal line. This line is drawn from the LF1 stem past the T stem and stopping at the x axis of the next Branch, BR2.

BR2 is placed in Rut -2 within Lane 3. Node faces and the Branch sequence determines vertical or horizontal orientation of the Lane.

When there are multiple Branches they must be sequenced so that when drawing one Branch, the adjacent Branch can be located. Adjacency is what matters so that the Branches could be drawn in any order.

BR1 is positioned midway between the Trunk Stem and Branch Stem vine ends since there is no Lane specification. There will be an error if the vine ends overlap. This is called an Interpolated Branch.

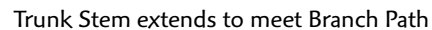
- Here we have a Tree Connector with a single Branch grafted by one of the Anchored Leaf Stems with a Floating Leaf Stem on the opposite end of the Grafted Branch.

```
+R1 b|T { r+1|LF1> t|LF2 t|LF3 b|LF4 l*|LF5 }
```

```
T = 4,2:B:A0:TRUNK
LF1 = 3,1:R:A0:LEAF
LF2 = 1,2:T:A0:LEAF
LF3 = 1,3:T:A0:LEAF
LF4 = 5,3:B:A1:LEAF
LF5 = 3,4:L:LEAF
BR1 = GBR:LF1:{T,LF1,LF2,LF3,LF4}:LF5
```




The user specifies a single Branch grafted from the Leaf Stem at **LF1**.

Leaf Stem **LF5** floats on the BR1 Branch. In other words, the root end of the Leaf Stem attaches to the **LF5** Node face where the line from BR1 intersects the face. So **LF5** is a Floating rather than an Anchored Stem.



## Pattern 4

The single Branch in this pattern runs through a user specified Lane and Rut.

-  Trunk Stem
-  Anchored Leaf Stem
-  Rut Branch

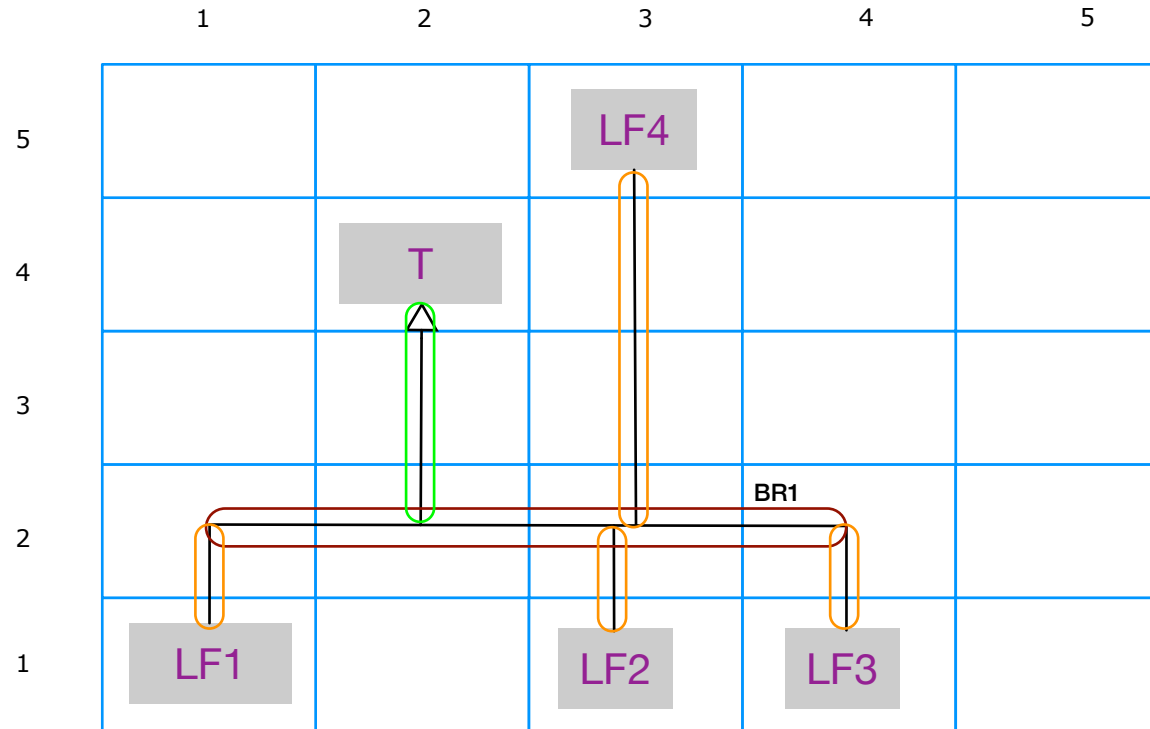
### Layout grammar

+R1 b|T { t|LF1, t|LF2, t|LF3, b|LF4 : L2 }

### User specification

T = 4,2:B:A0:TRUNK  
 LF1 = 1,1:T:A0:LEAF  
 LF2 = 1,2:T:A0:LEAF  
 LF3 = 1,4:T:A0:LEAF  
 LF4 = 5,3:B:A0:LEAF  
 BR1 = RBR:2-0:{T,LF1,LF2,LF3,LF4}




The user has specified that Lane 2, position 0 (center) is to be used for the Branch Path. The user does not specify row or column since the lane orientation is readily determined from the Node face arrangement.



Trunk Stem extends to meet Branch BR1

## Pattern 5

The Single Branch is an extension from the Anchored Trunk Stem

-  Grafting Trunk Stem
-  Branch Stem
-  Grafted Branch

### Layout grammar

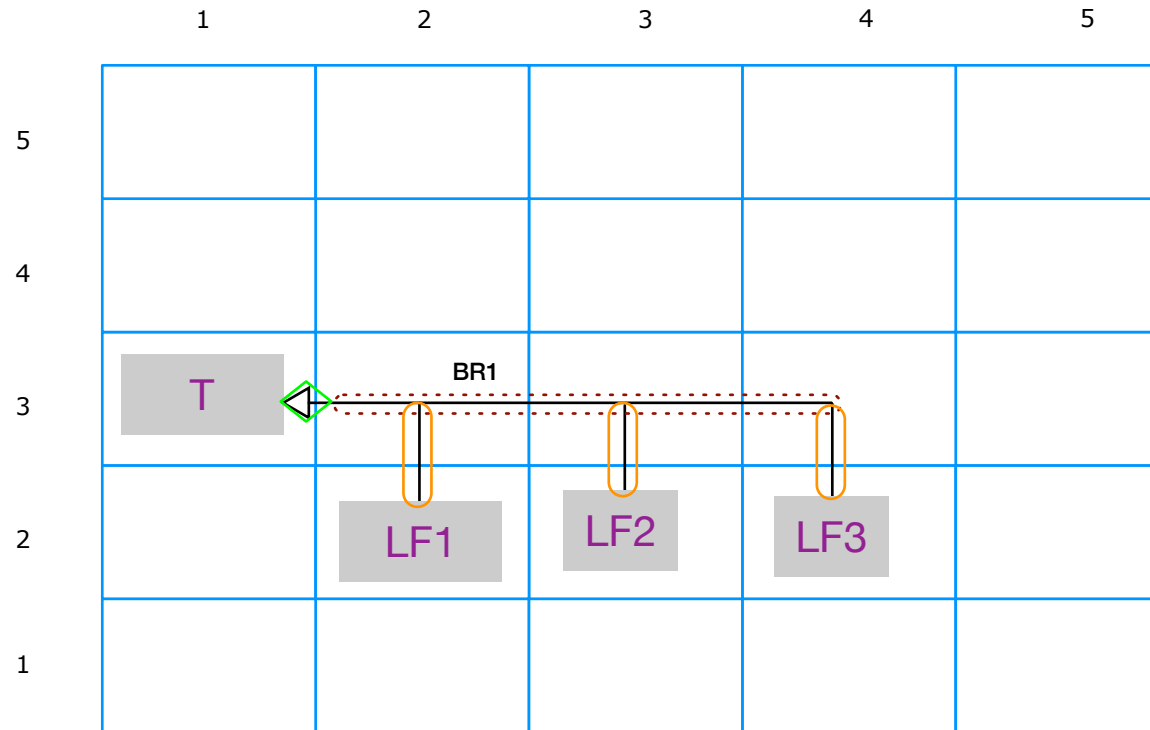
+R1 r|T> { t|LF1, t|LF2, t|LF3 }

### User specification

T = 3,1:R:A0:TRUNK  
 LF1 = 2,2:T:A0:LEAF  
 LF2 = 2,3:T:A0:LEAF  
 LF3 = 2,4:T:A0:LEAF  
 BR1 = GBR:T:{T,LF1,LF2,LF3}

graft  
from

The Branch is grafted from the Trunk Stem



Leaf Stems hang from the Branch



## Pattern 6

### Layout grammar

$$+R1 \ r|T \{ L2R-2 \} \{ t|LF1, t|LF2, t|LF3 : L3 \}$$

 Trunk Stem

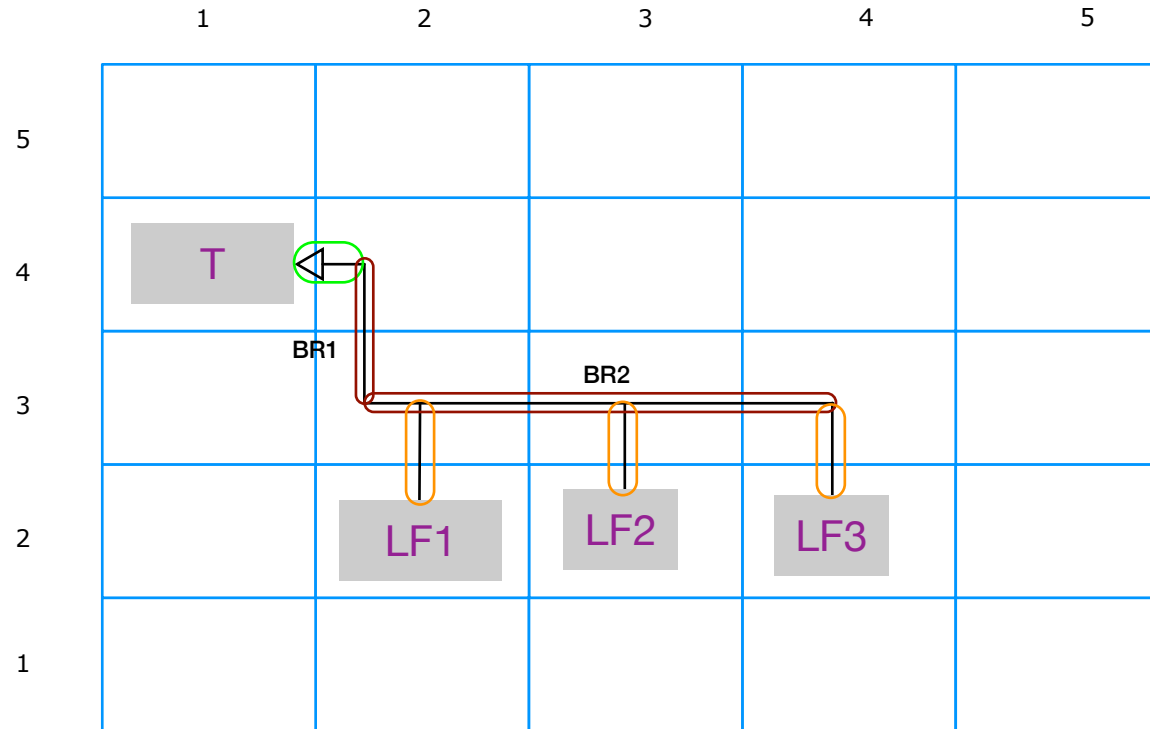
 Anchored Leaf Stem

 Rut Branch

The Trunk Stem is the only Tree Stem in its Rut Branch.  
All of the Leaf Stems hang from an adjacent Rut Branch.




### User specification

```
T = 4,1:R:A0:TRUNK
LF1 = 2,2:T:A0:LEAF
LF2 = 2,3:T:A0:LEAF
LF3 = 2,4:T:A0:LEAF
BR1 = RBR:2-2:{T}
BR2 = RBR:3-0:{LF1,LF2,LF3}
[ BR1, BR2 ]
```

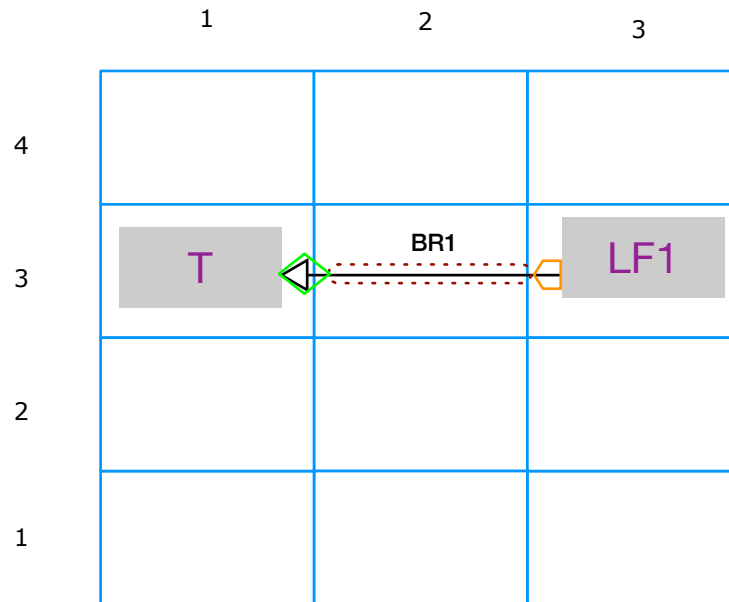


Branch Stems hang from the Branch

# Pattern 7

-  Grafting Trunk Stem
-  Branch Stem
-  Grafted Branch

A minimal case with only one Anchored Tree Stem



## Layout grammar

+R1 r|T >{ l\*|LF1 }

## User specification

T = 3,1:R:A0:TRUNK  
 LF1 = 3,3:L:LEAF  
 BR1 = GBR:T:{T}:LF1

graft  
from

float

The Branch is grafted from the Trunk Stem