An implementer's variable $A$ holds a binary tree representation as follows. If the tree is empty, $A = [\text{nil}]$. If the tree has left subtree $L$ and right subtree $R$ and root value $n$, then $A = [L; n; R]$. The tree

```
  3
 / \  \
2   7
```

is represented as $A = [[[\text{nil}]; 2; [[\text{nil}]; 5; [\text{nil}]]]; 3; [[\text{nil}]; 7; [\text{nil}]]]$. The tree must be reimplemented using implementer's variable $B$ as follows. If the tree is empty, $B = 0$. If the tree has left subtree $L$ and right subtree $R$ and root value $n$, then

$B = \text{"left"}$→$L \mid \text{"root"}$→$n \mid \text{"right"}$→$R$

The same example tree is represented as

$B = \text{"left"}$→ (\text{"left"}$→ 0

| \text{"root"}$→ 2

| \text{"right"}$→ (\text{"left"}$→ 0

| \text{"root"}$→ 5

| \text{"right"}$→ 0 )

| \text{"root"}$→ 3

| \text{"right"}$→ (\text{"left"}$→ 0

| \text{"root"}$→ 7

| \text{"right"}$→ 0 )$

(a) What is the data transformer?

(b) A user has natural variable $n$ and the operation

```
root = n := A 1
```

which assigns to $n$ the root value. Use your transformer from part (a) to transform $root$. 