BOOLEAN-EQUALITY TREE-INSERT (T, z)

```
y ← NIL
x ← root[T]
while x≠ NIL
    do y ← x
        if key[z] = key[x]
            then b[x] ← NOT b[x]
                    if b[x]
                        then x ← left[x]
                        else x ← right[x]
            else if key[z] < key[x]
                    then x ← left[x]
                    else x ← right[x]
p[z] ← y
b[z] ← TRUE
if y = NIL
    then root[T] ← z
    else if key[z] = key[y]
            then if b[y]
                    then left[y] ← z
                    else right[y] ← z
            else if key[z] < key[y]
                    then left[y] ← z
                    else right[y] ← z
```

RANDOMIZED-EQUALITY TREE-INSERT (T, z)

```
y ← NIL
x ← root[T]
while x≠ NIL
    do y ← x
        if key[z] = key[x]
            then i ← RANDOM(0,1)
                    if i = 0
                        then x ← left[x]
                        else x ← right[x]
            else if key[z] < key[x]
                    then x ← left[x]
                    else x ← right[x]
p[z] ← y
if y = NIL
    then root[T] ← z
    else if key[z] = key[y]
            then if i = 0
                    then left[y] ← z
                    else right[y] ← z
            else if key[z] < key[y]
                    then left[y] ← z
                    else right[y] ← z
```