Software Verification
Exercise: Separation Logic

In the lecture you have seen how separation logic can be used to prove

{tree _ p} disptree(p) {empty}

Now prove

{tree τ i} copytree(i; j) {tree τ i * tree τ j}

where

```
copytree(i; j) =
        if i = nil then
                j := i
        else
                newvar i1, i2, v, j1, j2 in
                        i1 := [i];
                        v := [i + 1];
                        i2 := [i + 2];
                        copytree(i1, j1);
                        copytree(i2, j2);
                        j := cons(j1, v, j2);
                end
        end
```

Only a proof outline similar to the one in the lecture (i.e. assertion-annotated code) is required, since a detailed proof would be very large.