

An aerial photograph of a busy multi-lane road. In the center, a long, white and green double-decker bus is moving across the frame. The bus has the number '09461' on its side. The road is filled with various cars, including sedans, SUVs, and a yellow taxi. The traffic appears to be moving in both directions. In the background, there are buildings and a body of water. The overall scene depicts a complex traffic environment.

# Merging merges, more or less

Amos Robinson, UNSW

# No buffer

```
zipf (xs ys : Source Int)
= let xs' = filter (>0) xs
     ys' = filter (<0) ys
  in zip xs' ys'
```

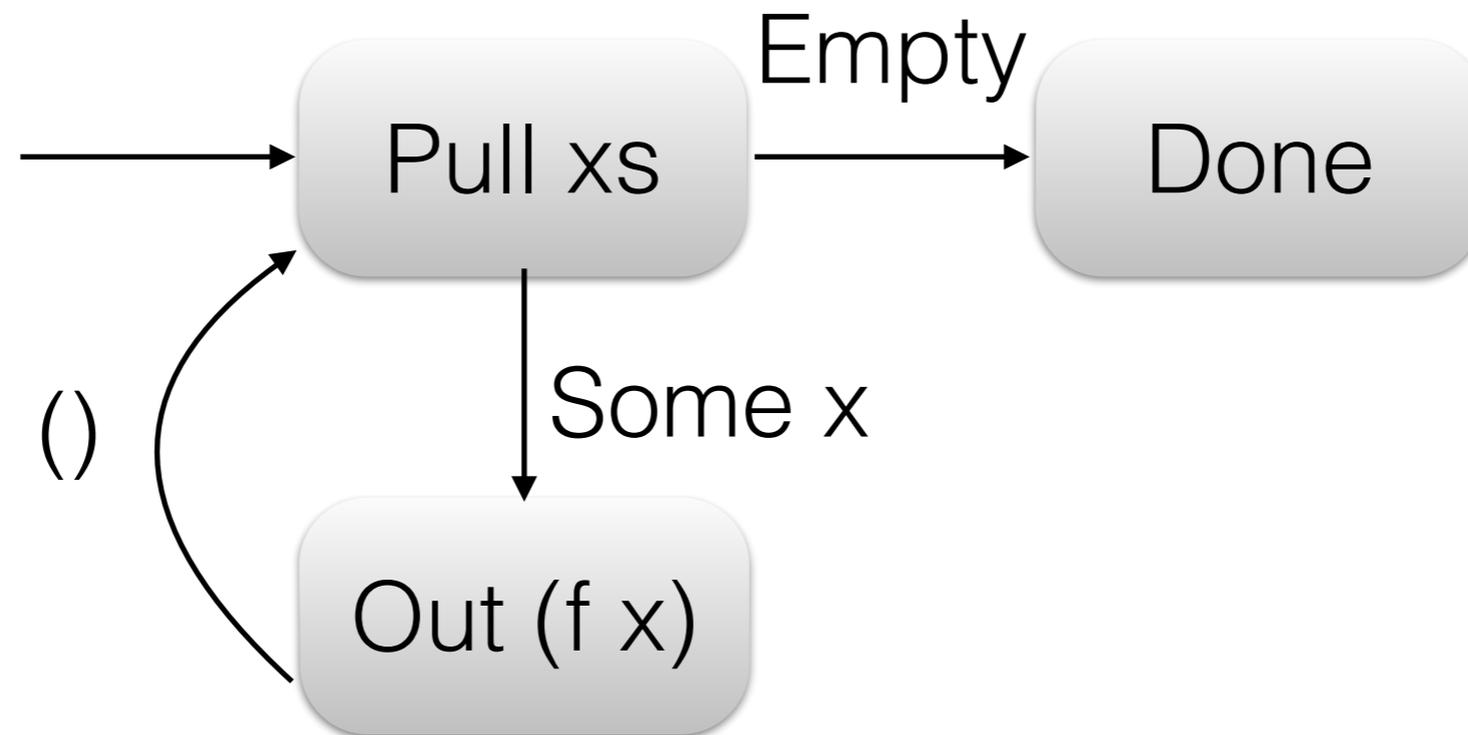
# Unbounded buffer

```
bad (xs : Source Int)
  = let xs' = filter (>0) xs
      xs'' = filter (<0) xs
      in zip xs' xs''
```

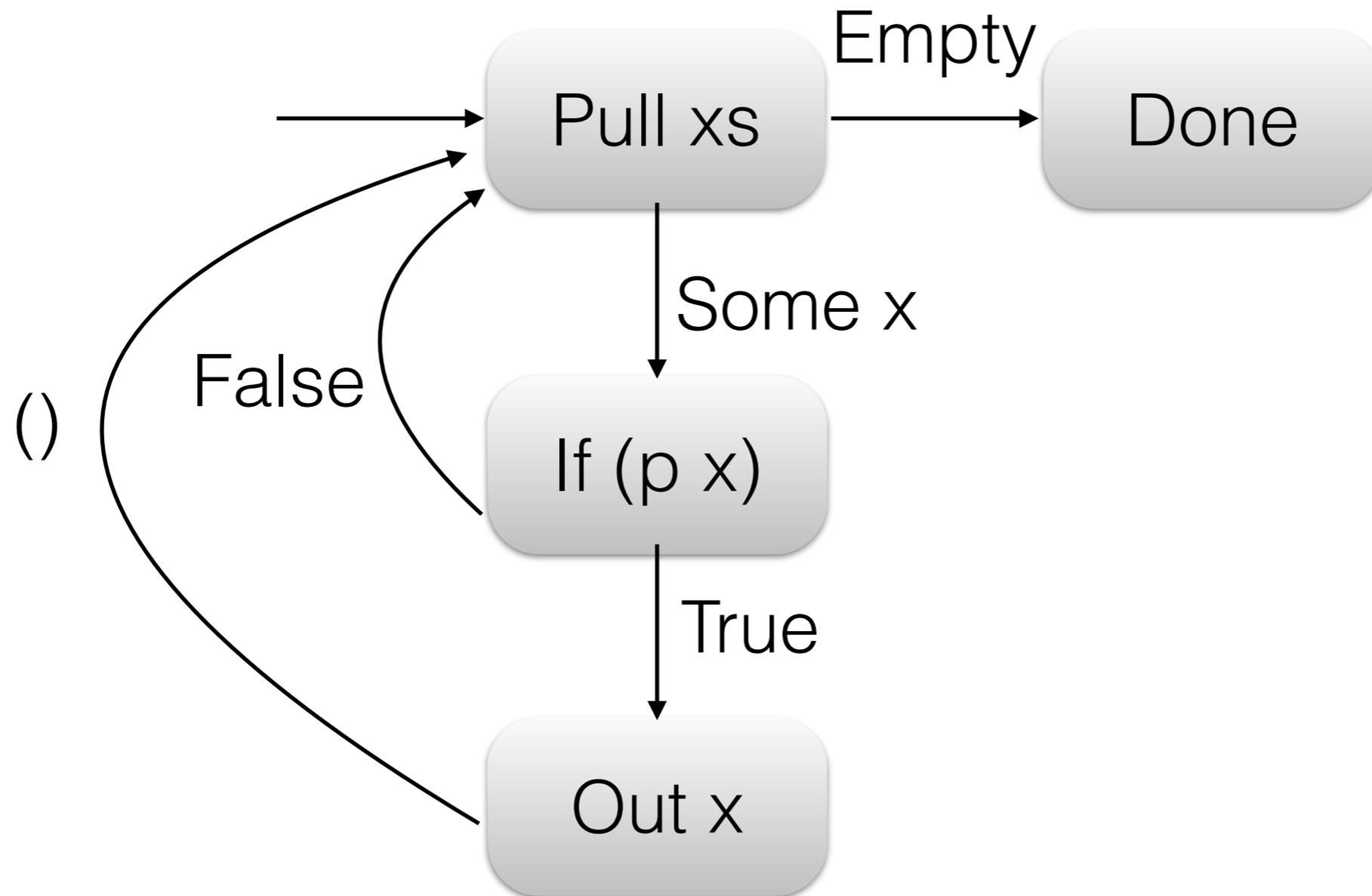


# Combinators

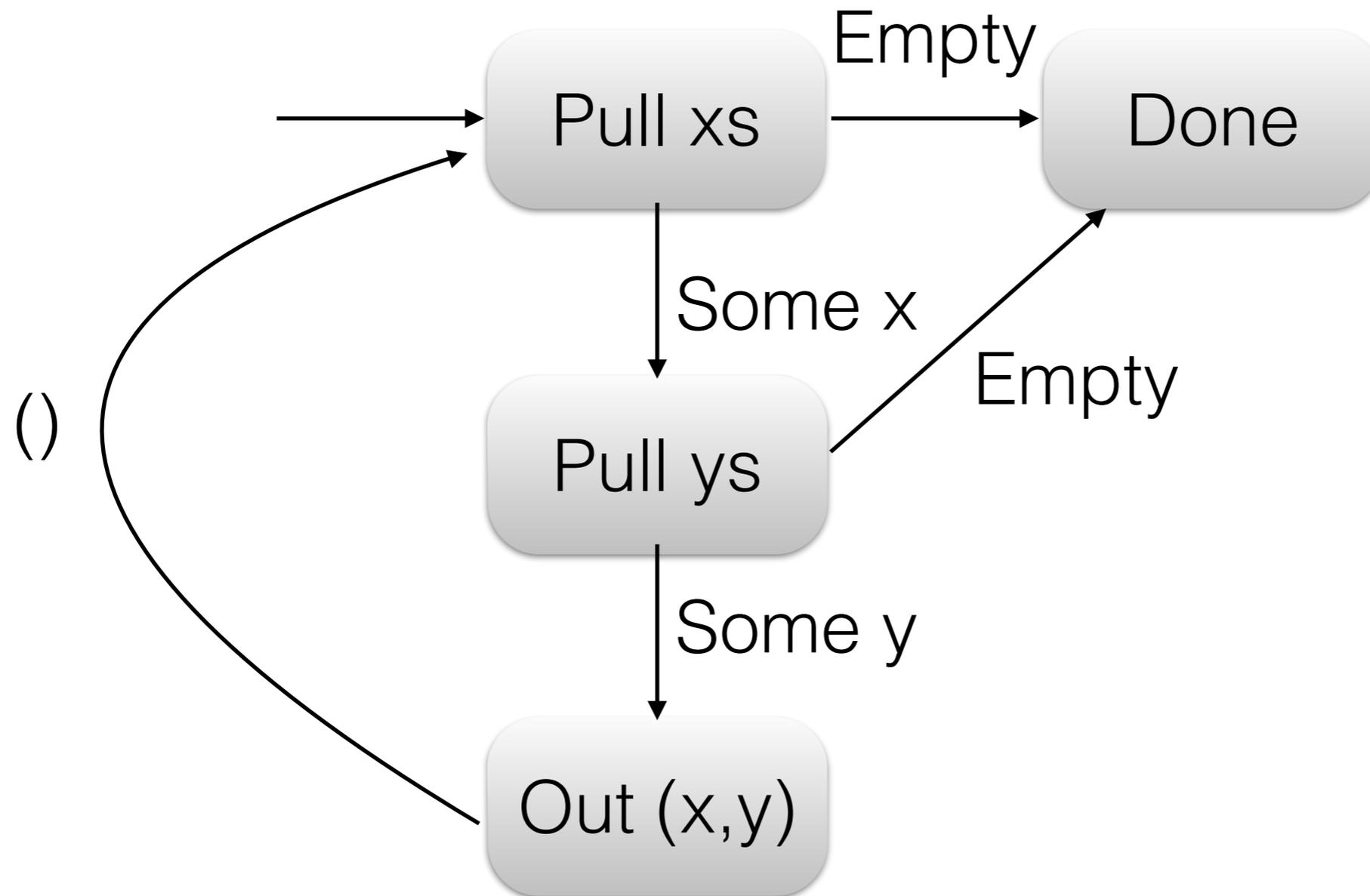
# Map f xs



# Filter p xs



# Zip xs ys



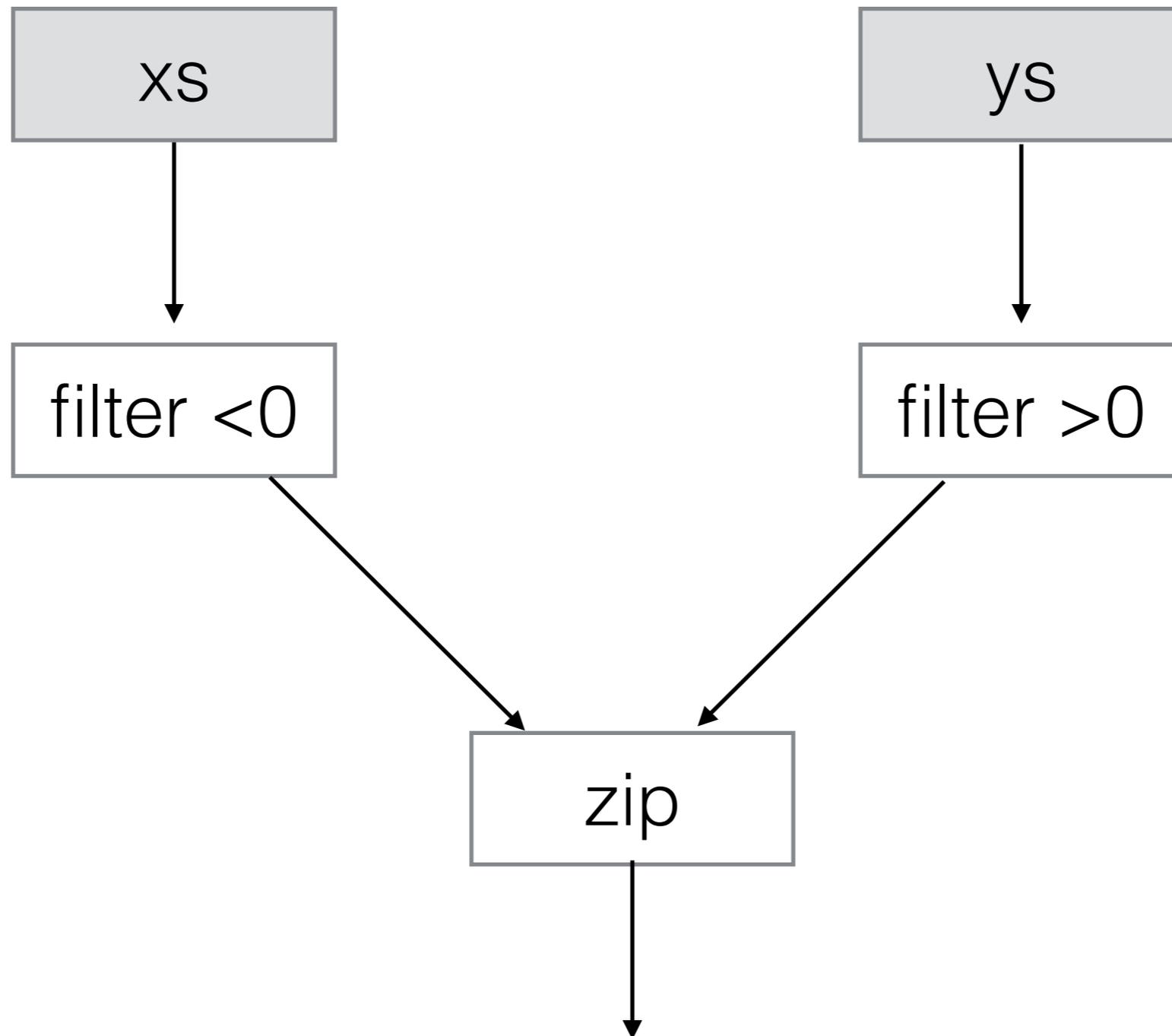


# Fusion

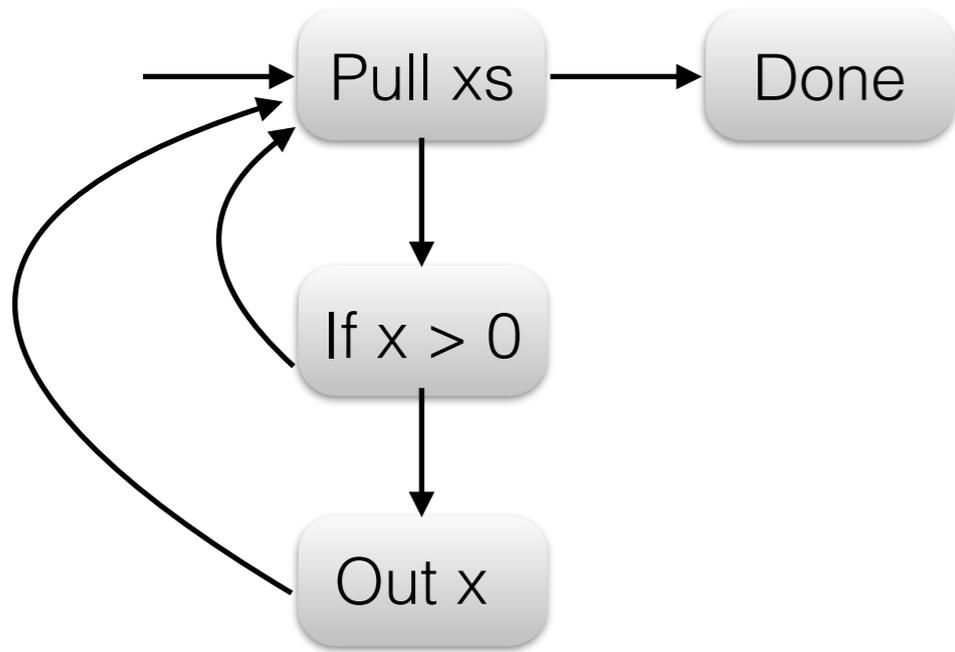
# zipf again

```
zipf (xs ys : Source Int)
= let xs' = filter (>0) xs
     ys' = filter (<0) ys
  in zip xs' ys'
```

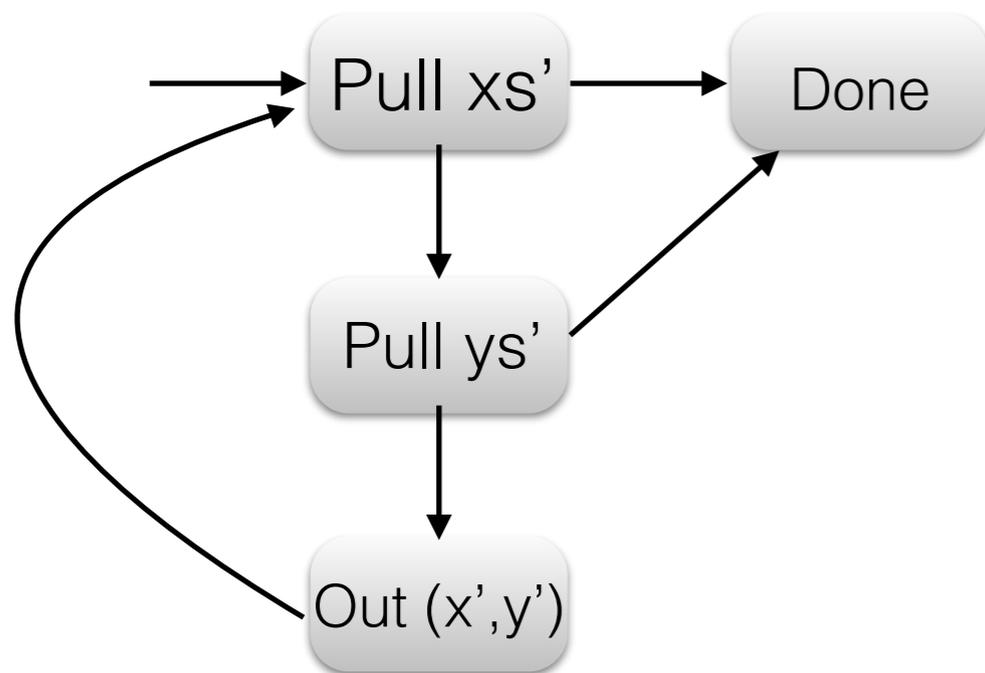
# zipf again



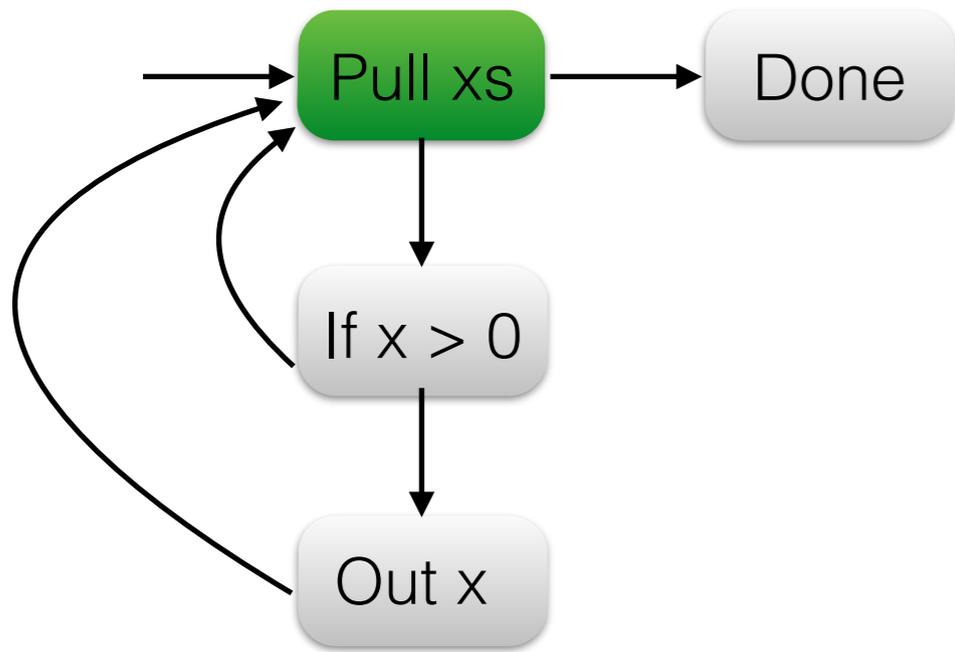
filter ( $>0$ ) xs



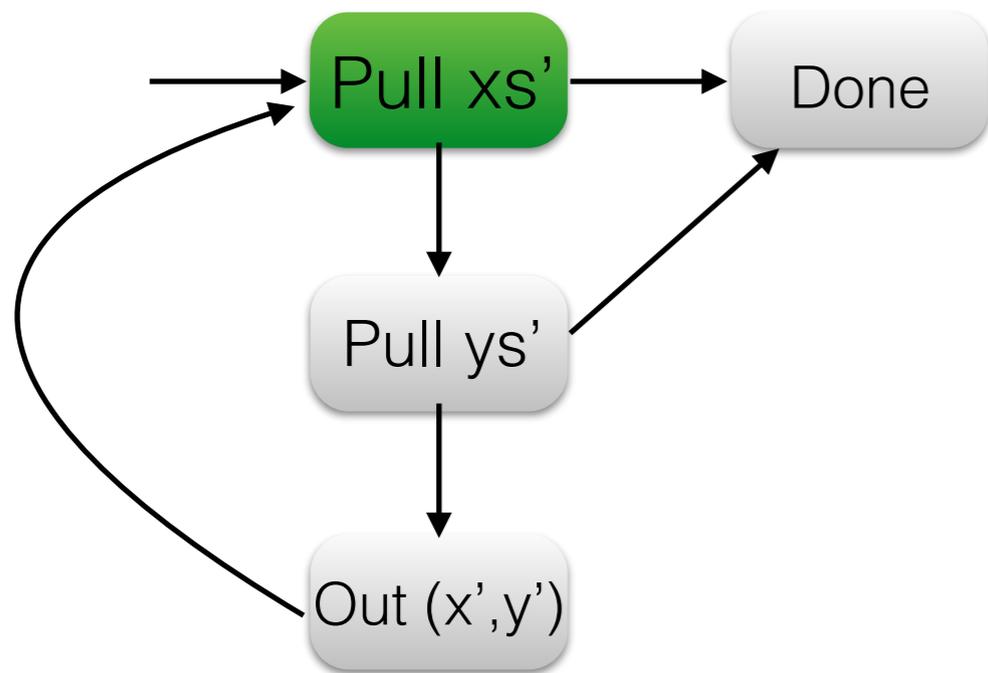
zip xs' ys'



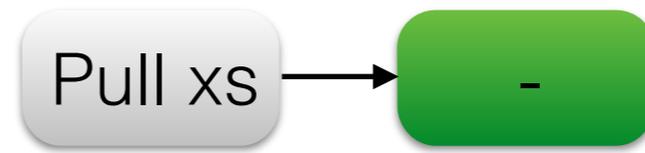
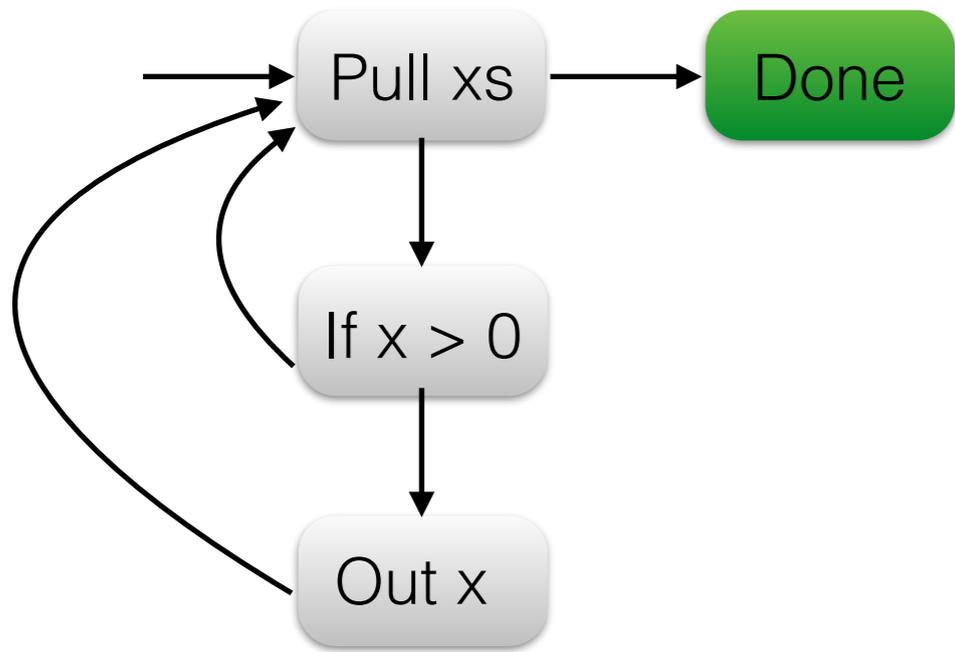
filter ( $>0$ ) xs



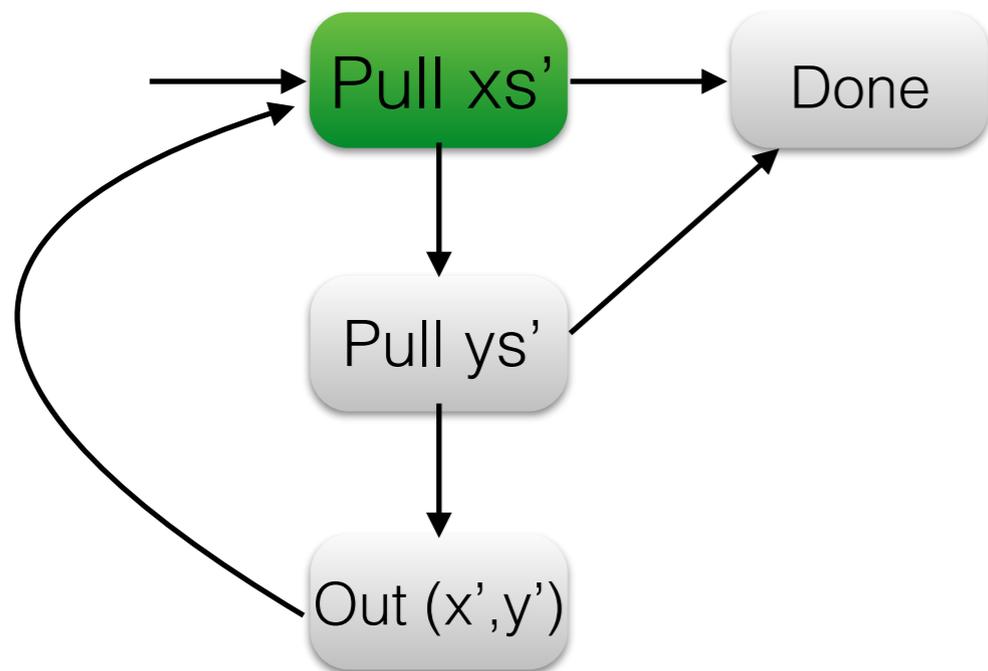
zip xs' ys'



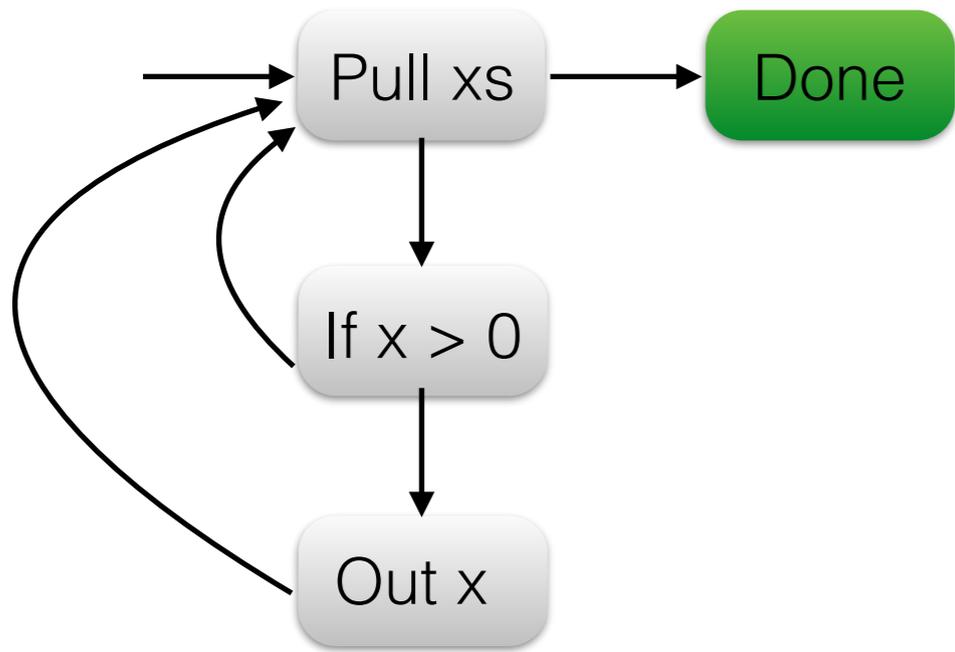
filter ( $>0$ ) xs



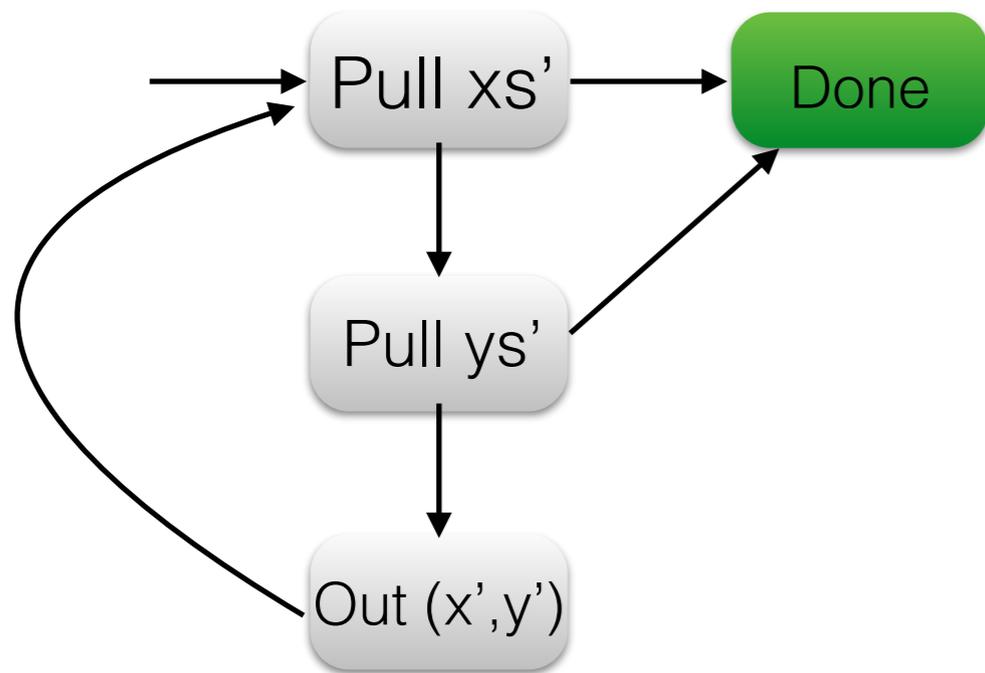
zip xs' ys'



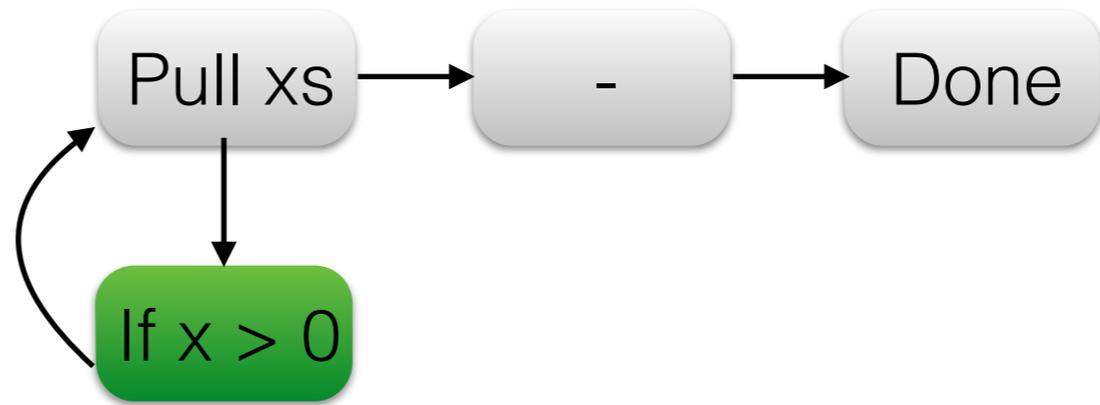
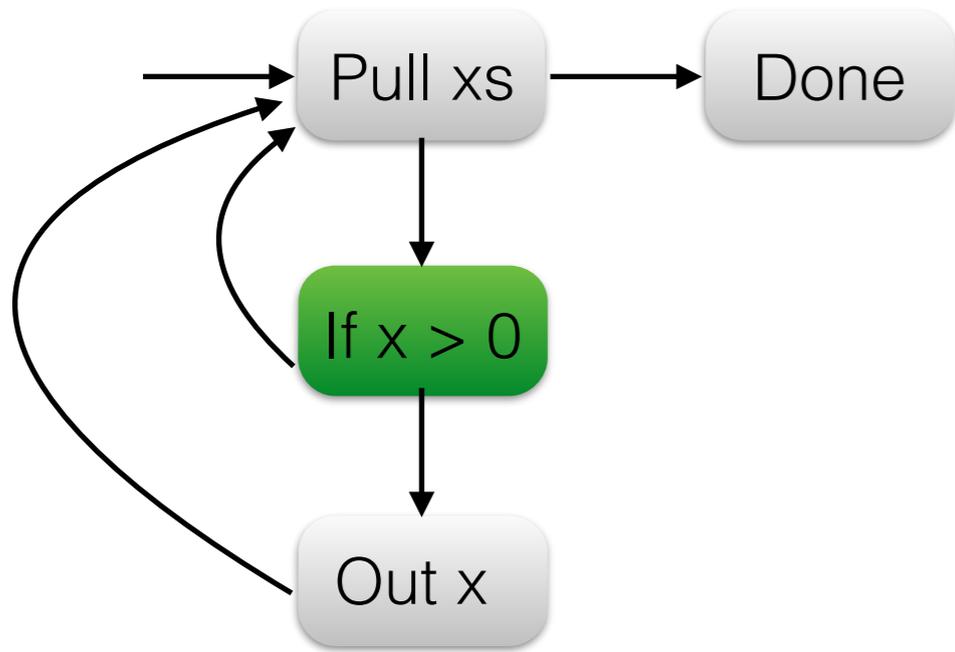
filter ( $>0$ ) xs



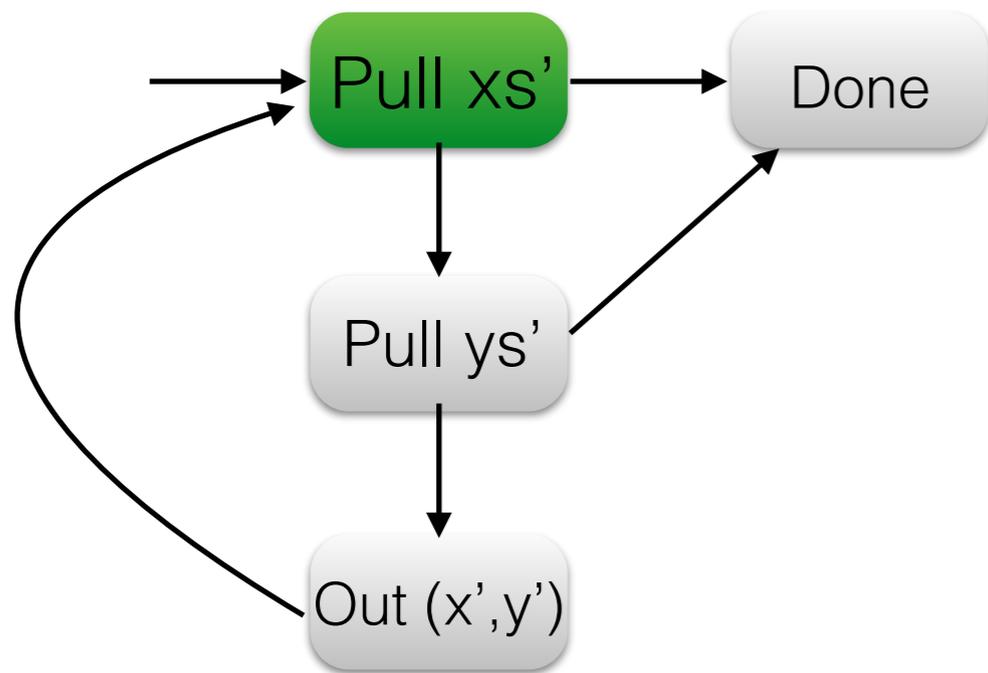
zip xs' ys'



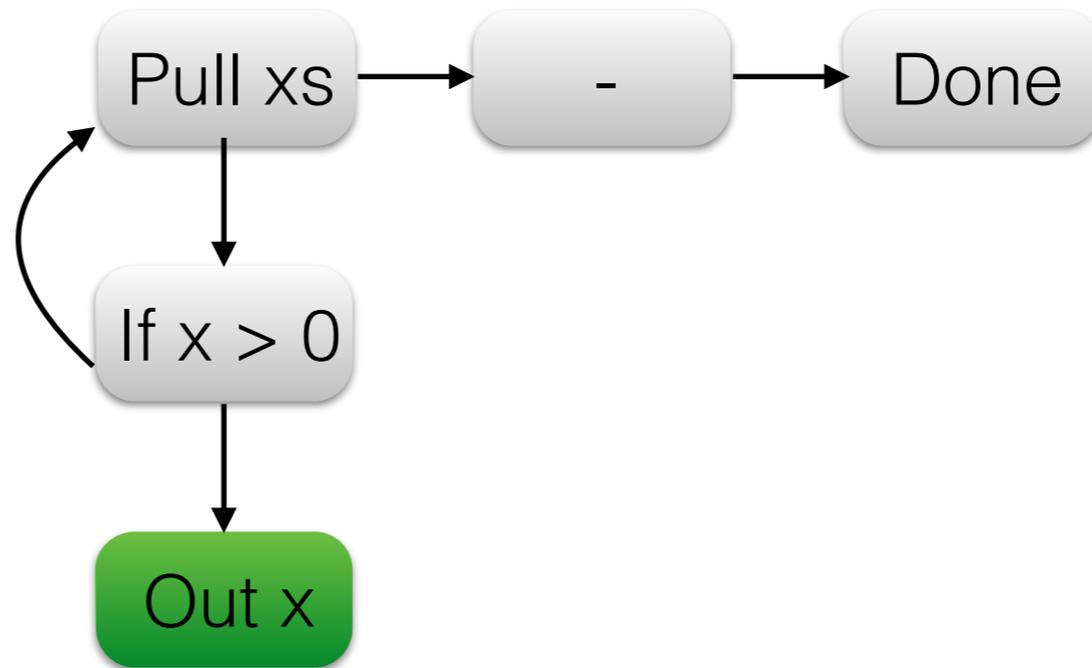
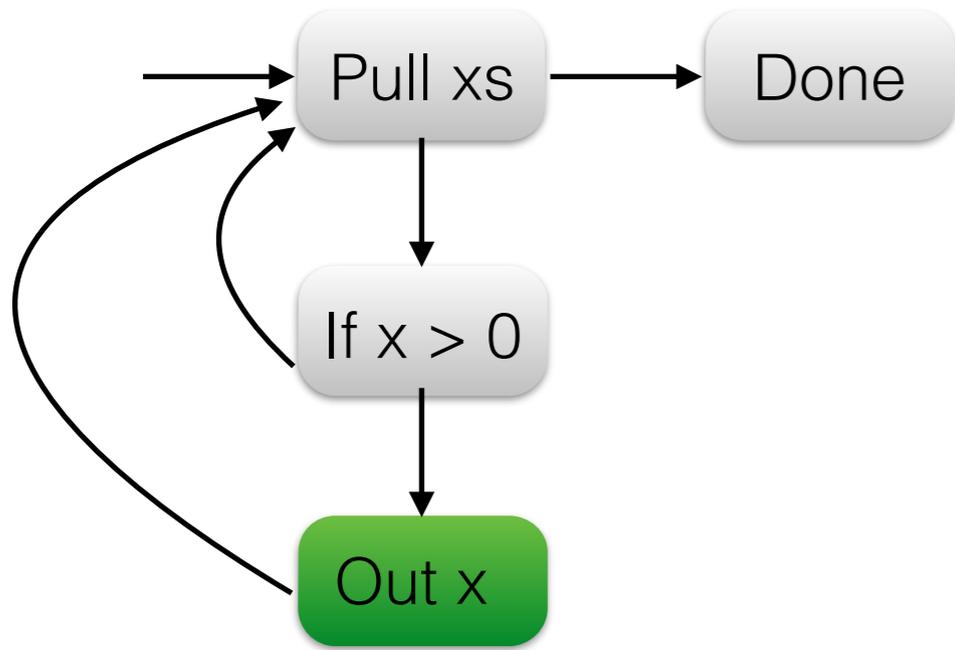
filter ( $>0$ ) xs



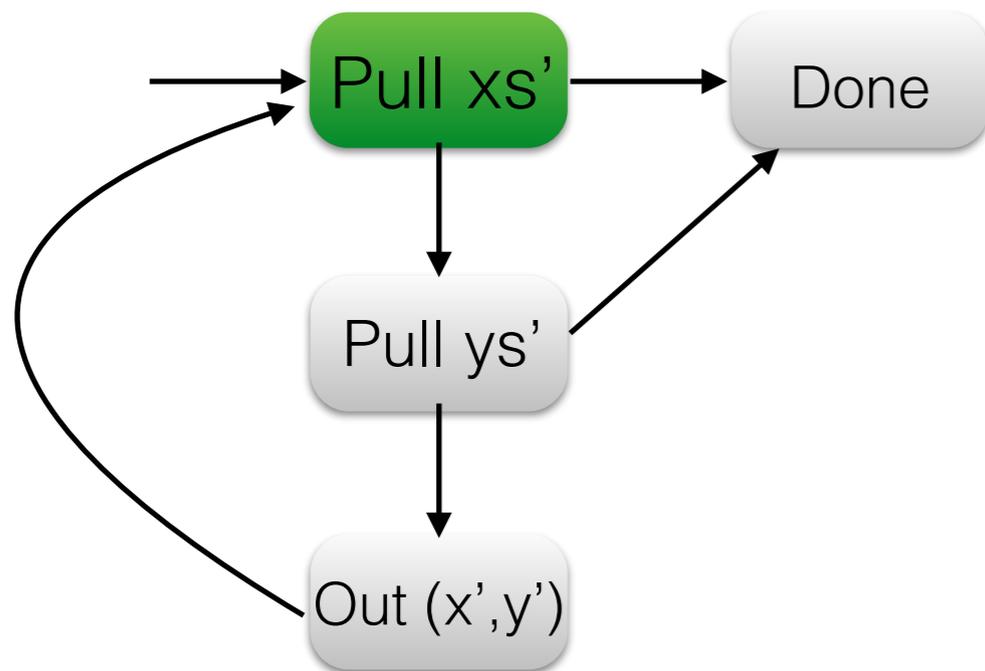
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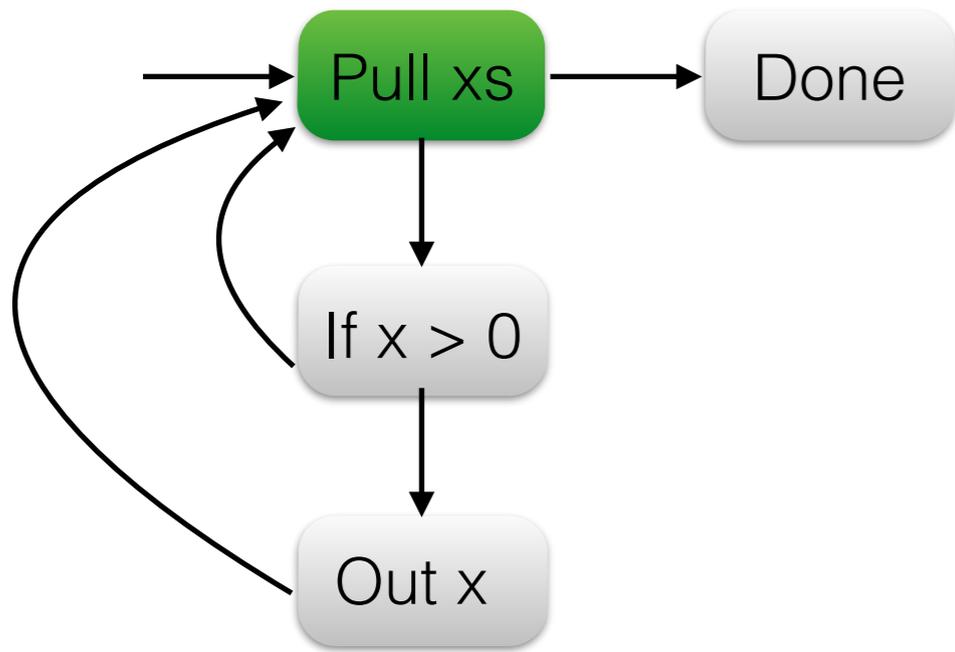
filter ( $>0$ ) xs



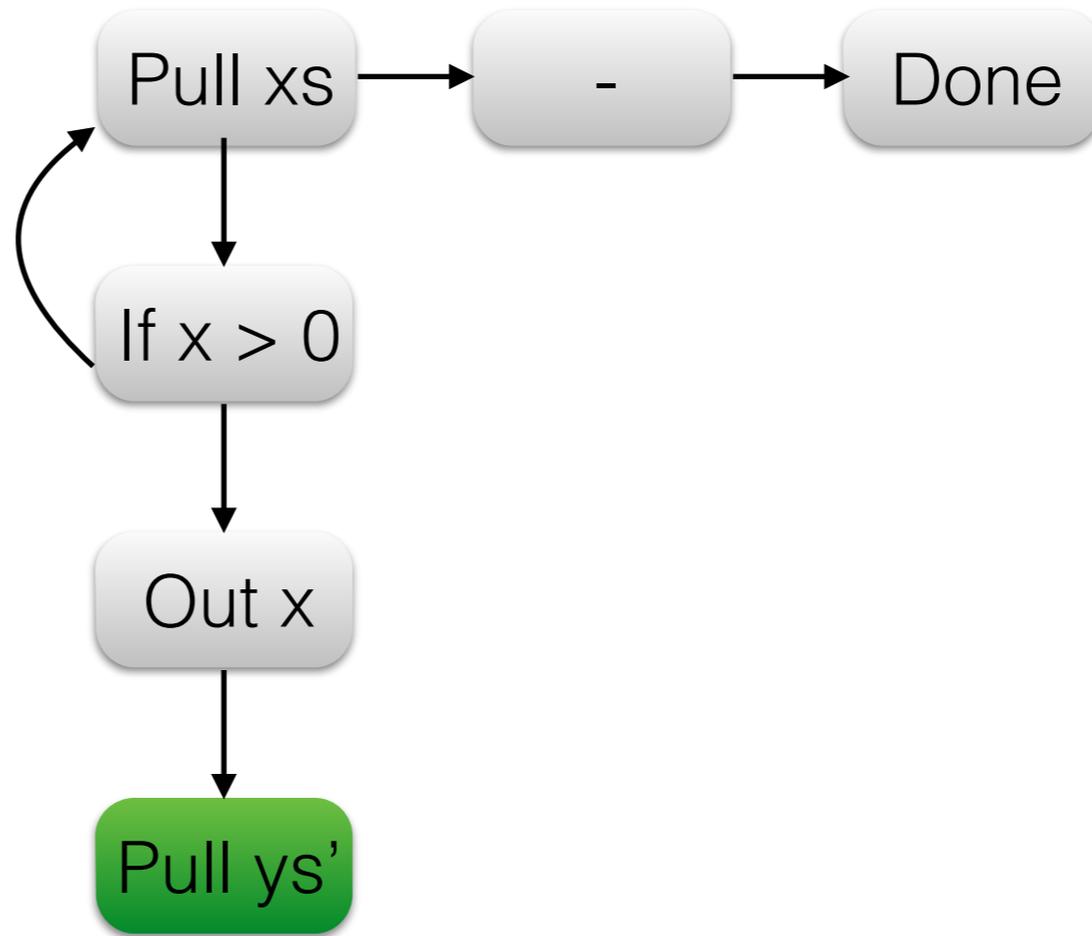
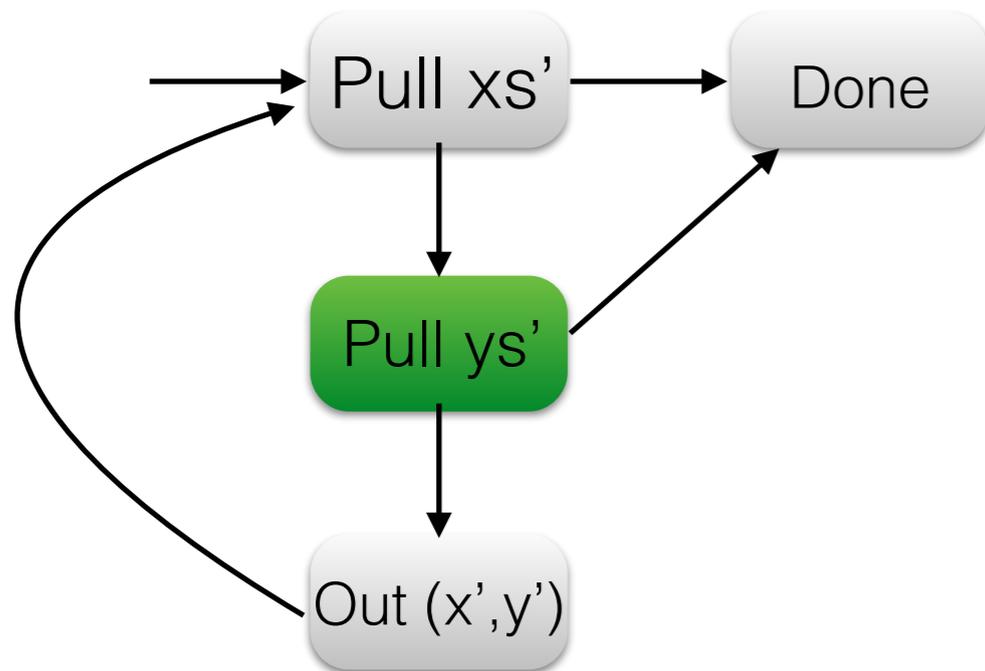
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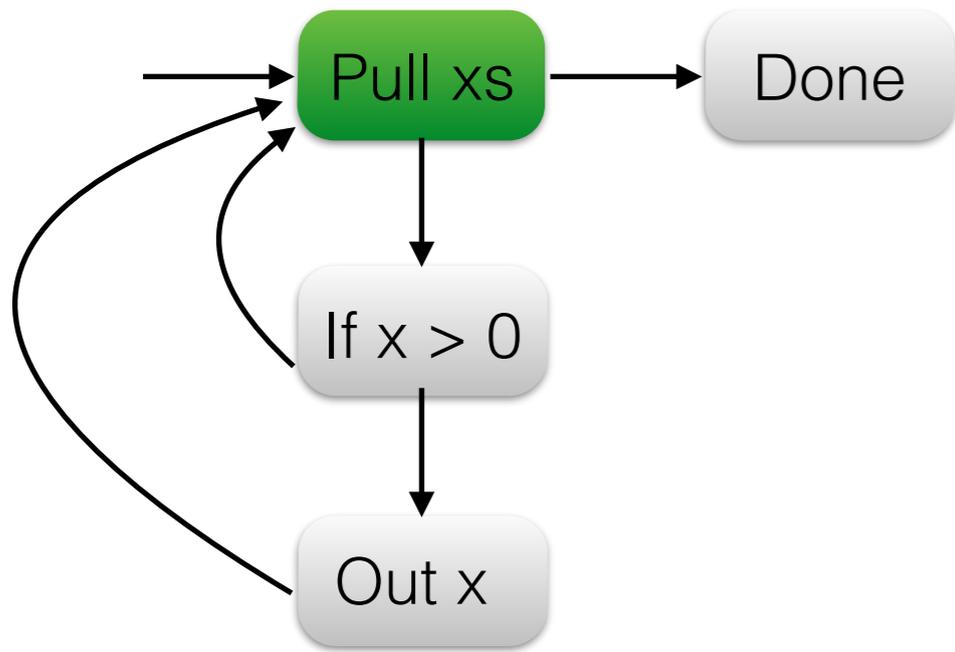
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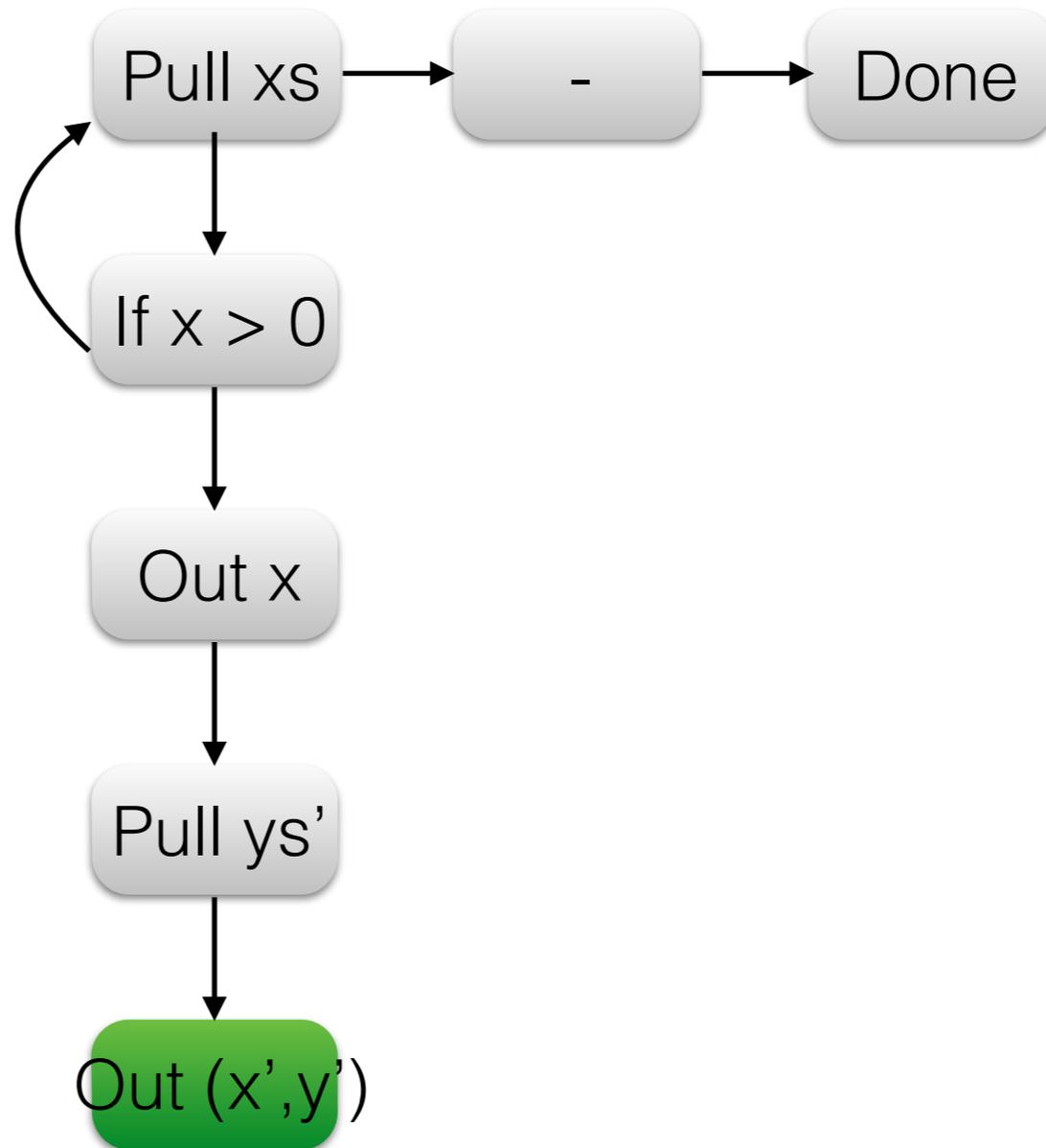
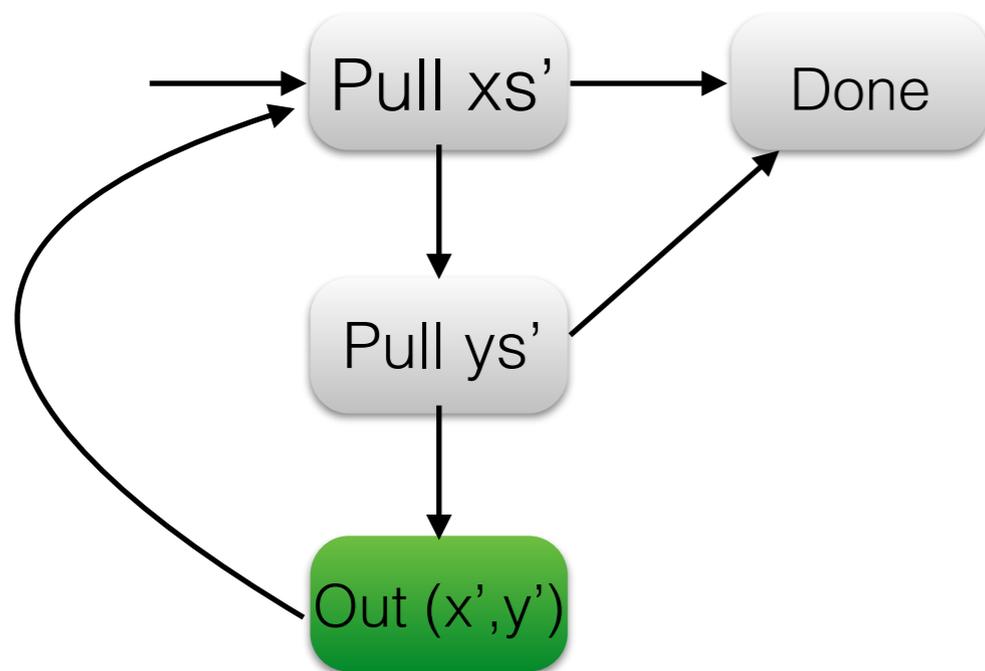
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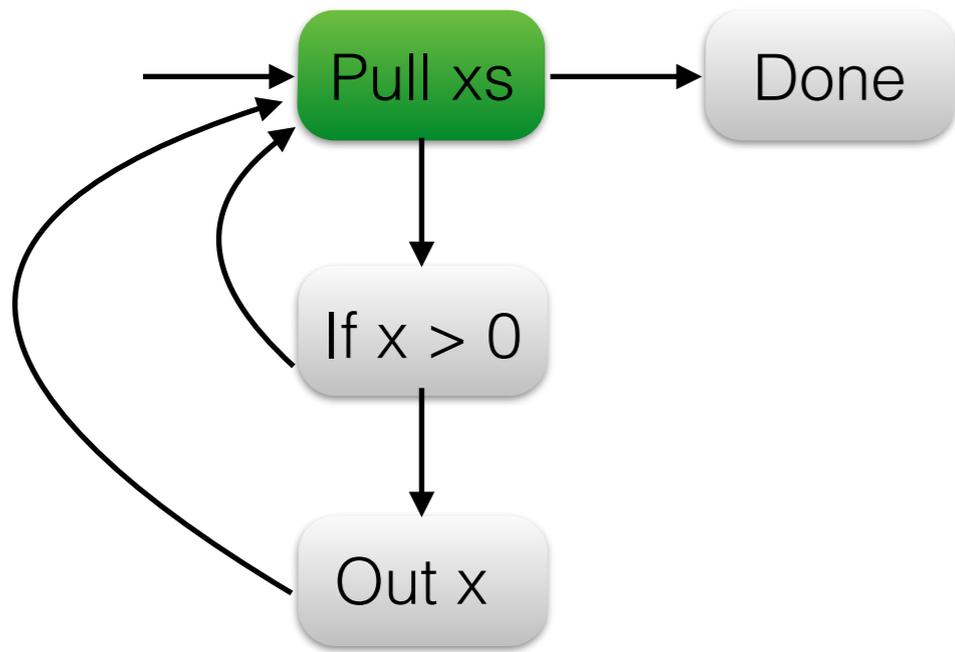
filter ( $>0$ ) xs



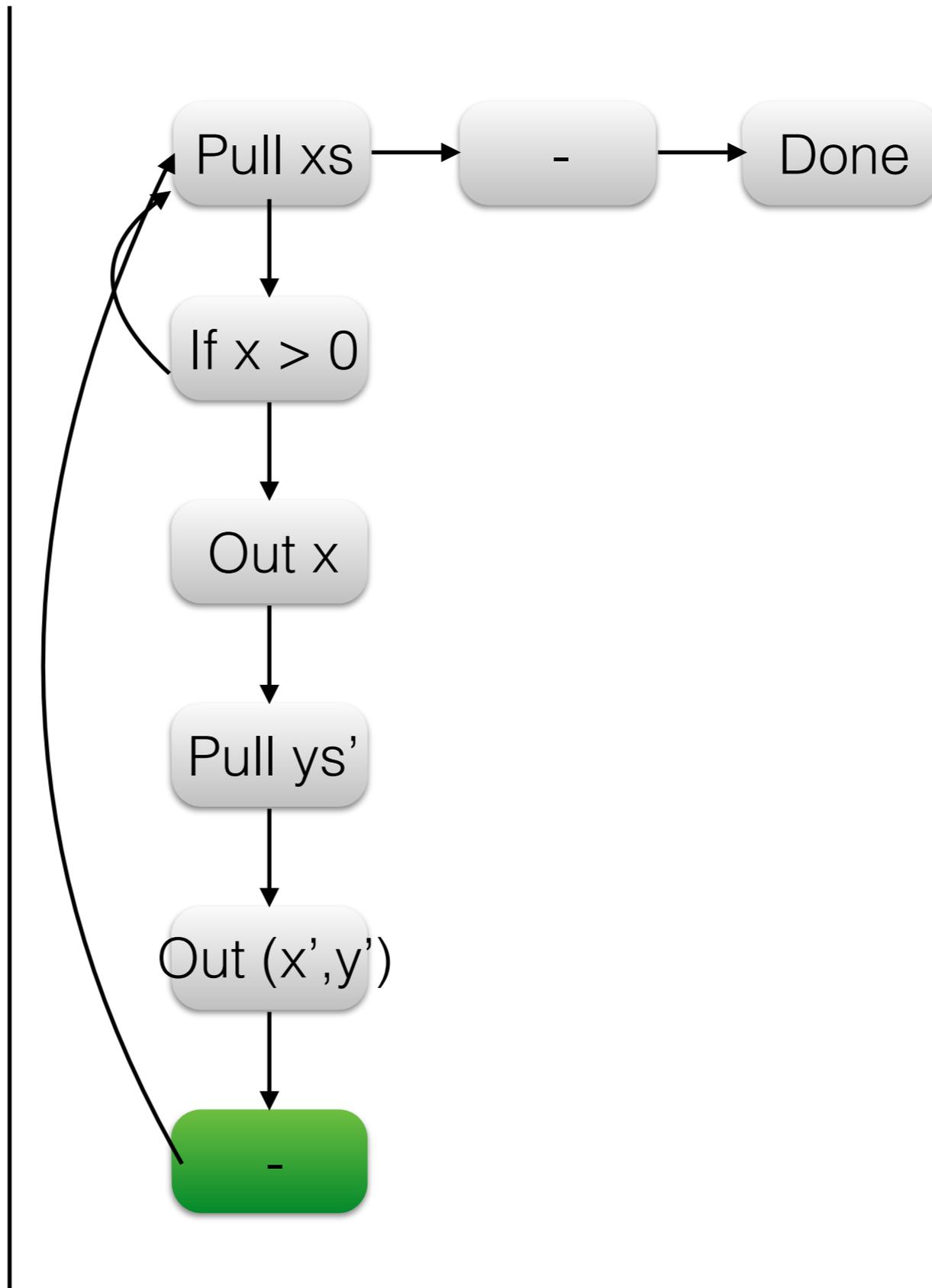
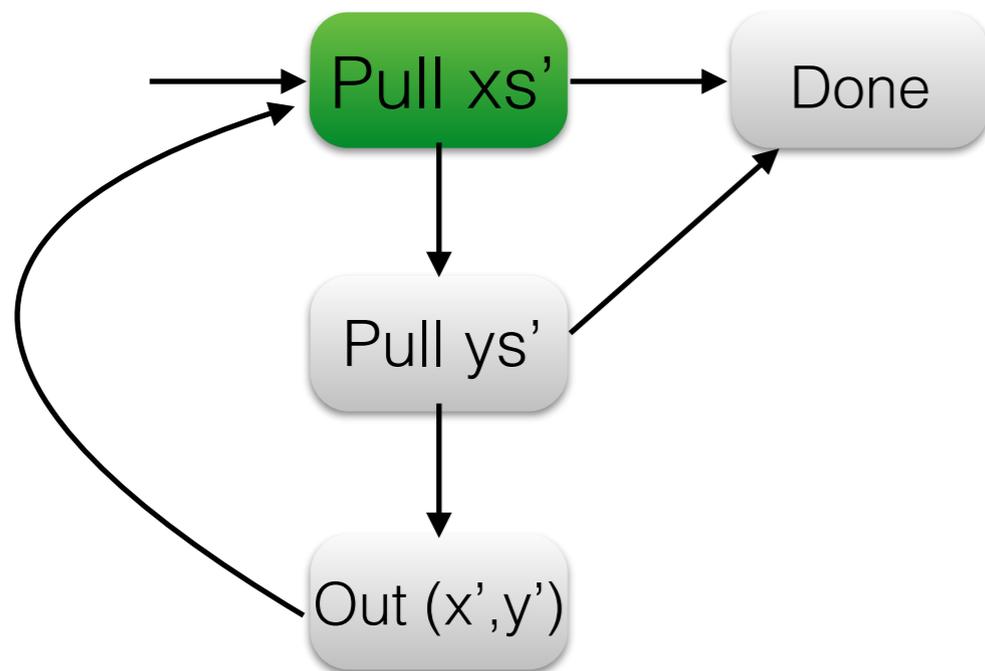
zip xs' ys'



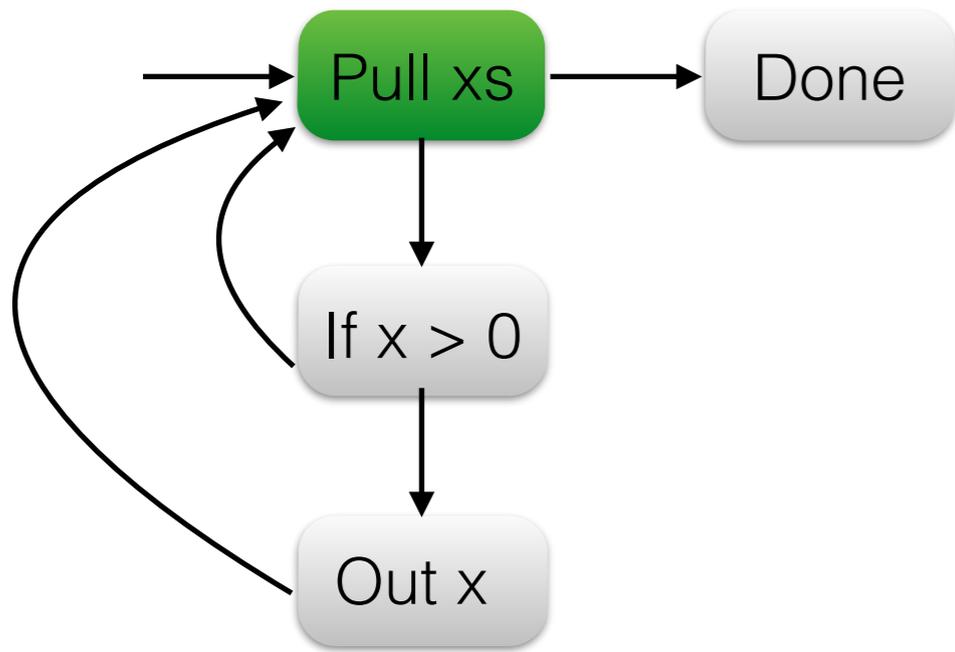
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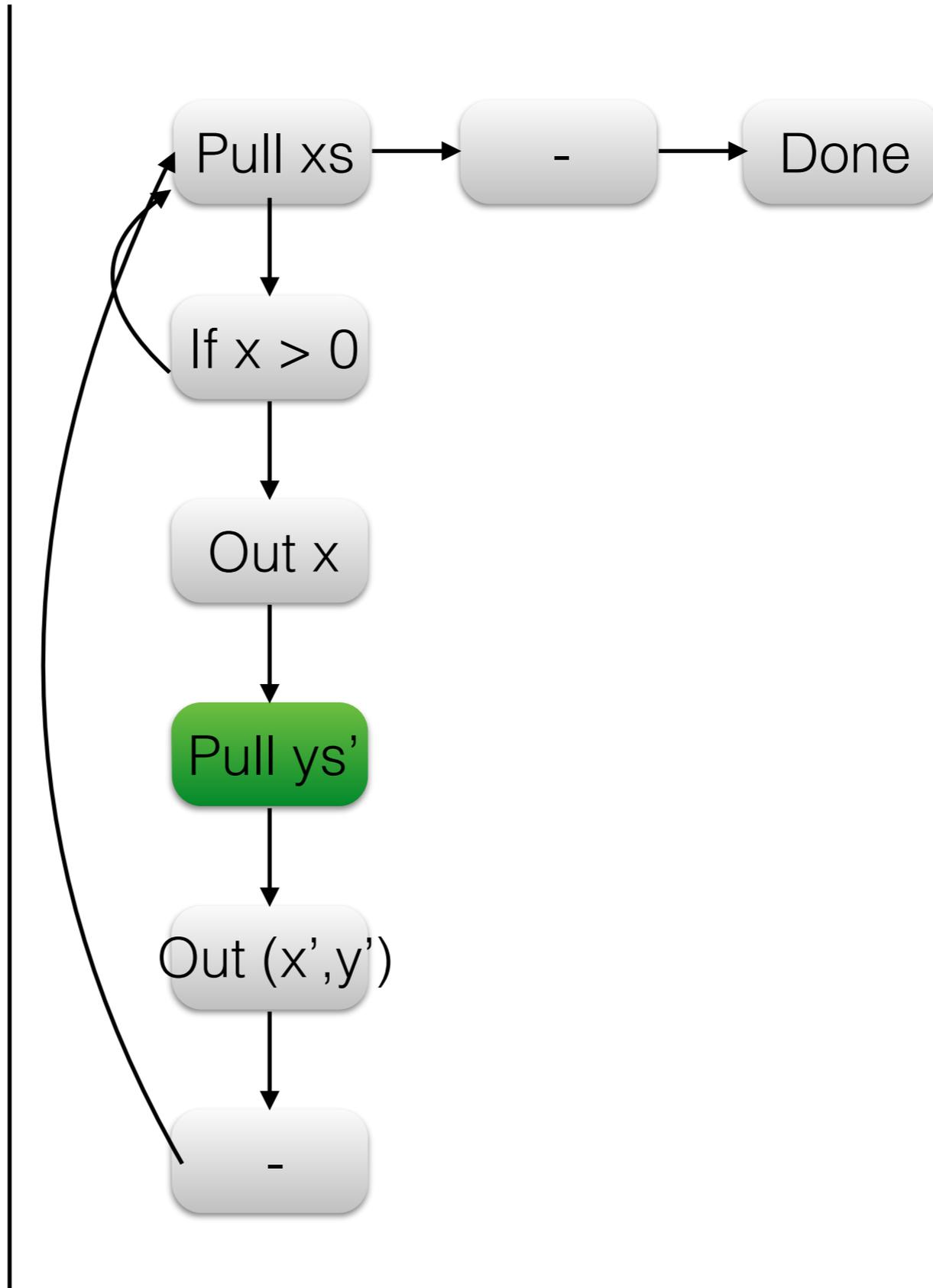
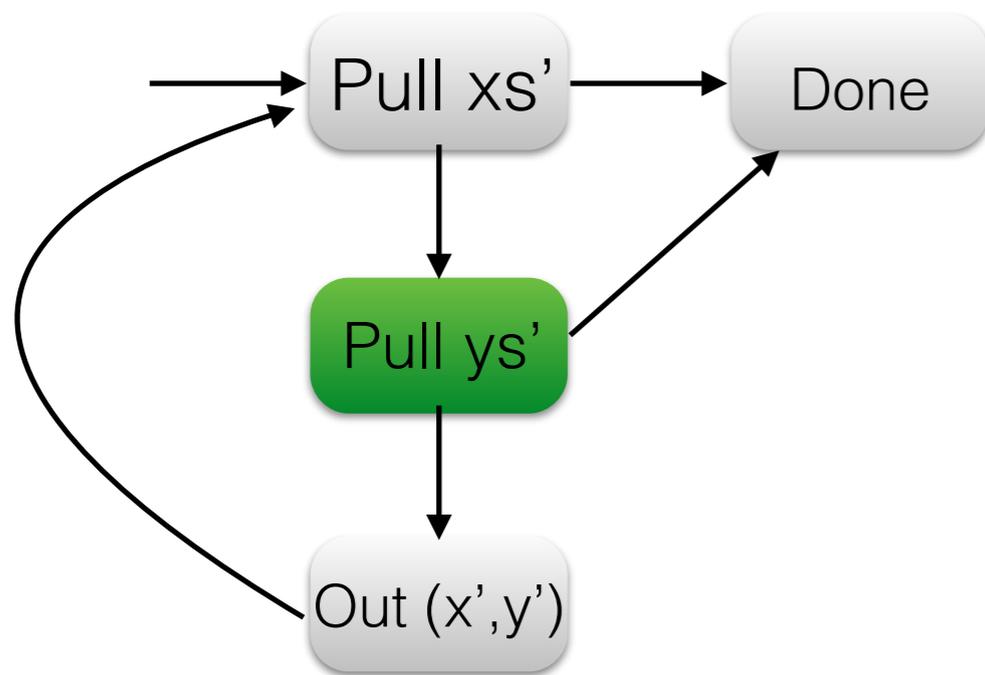
zip xs' ys'



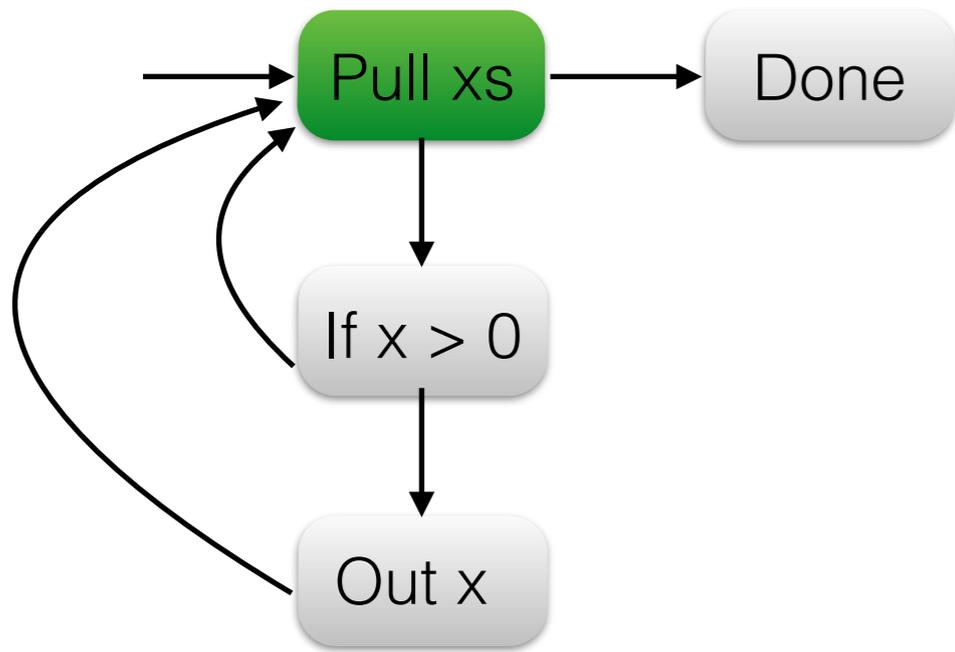
filter ( $>0$ ) xs



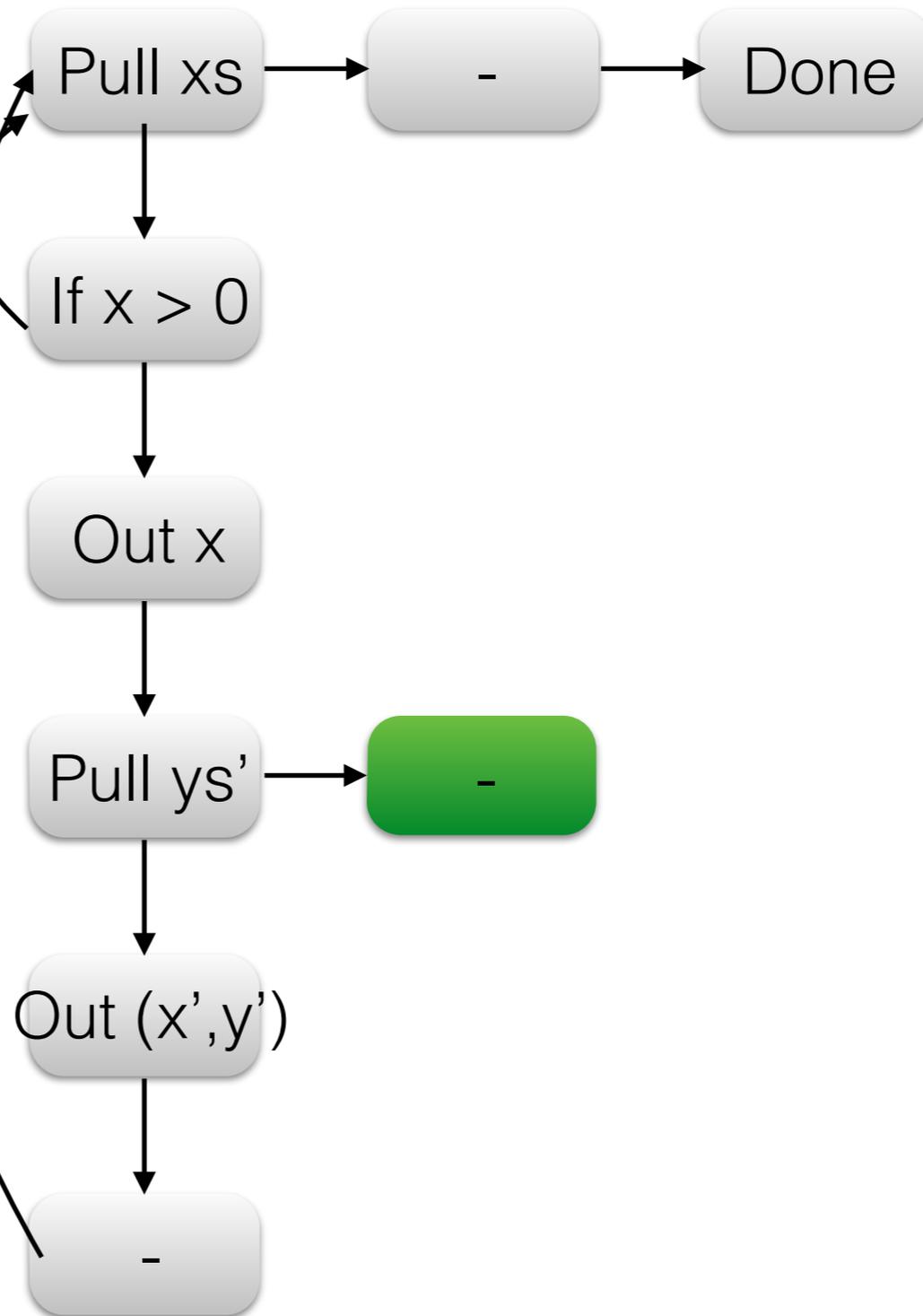
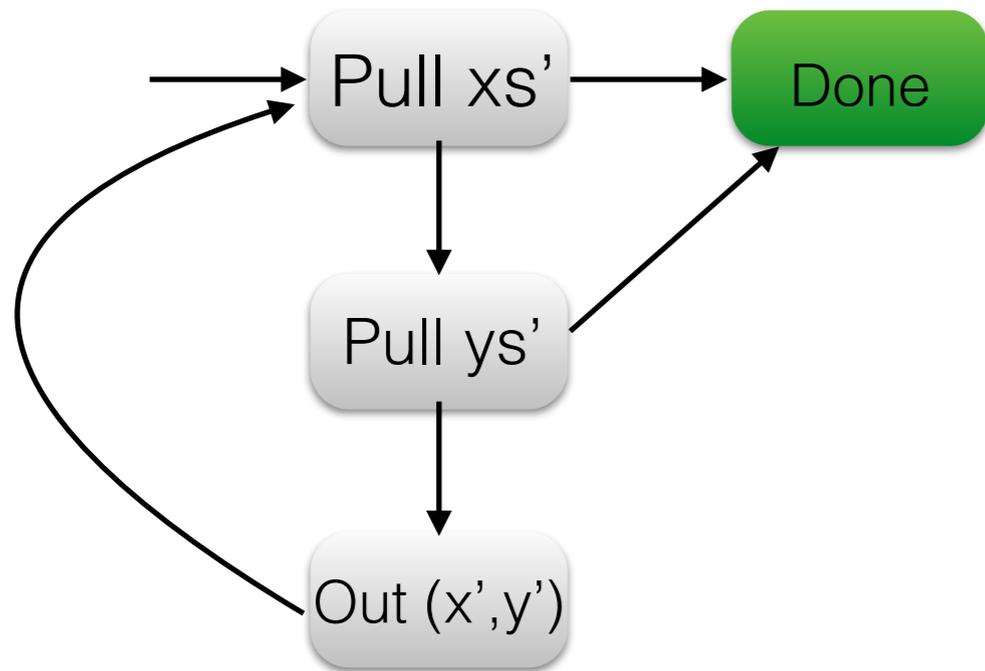
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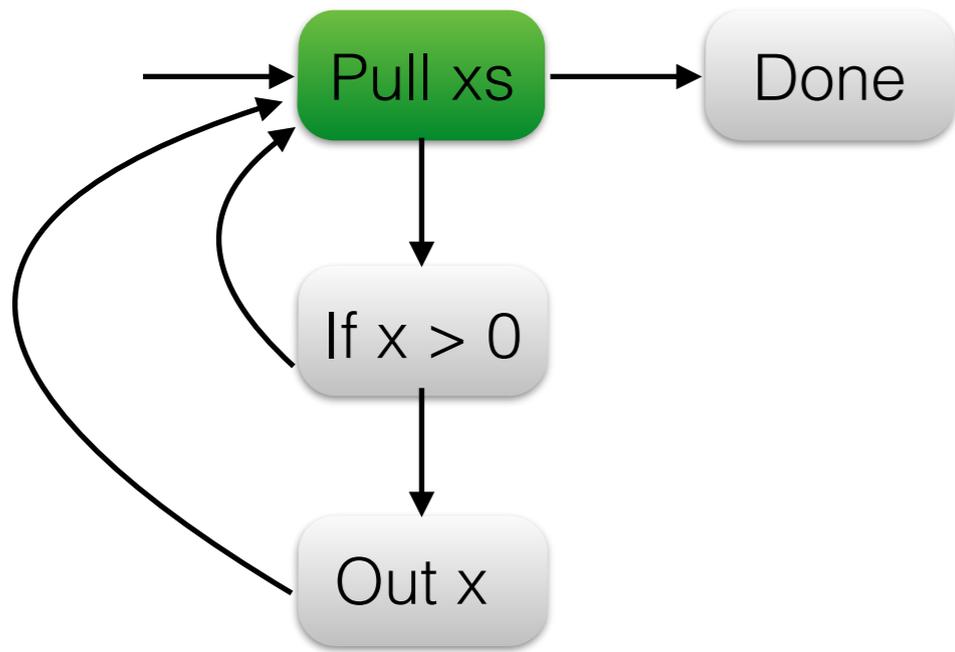
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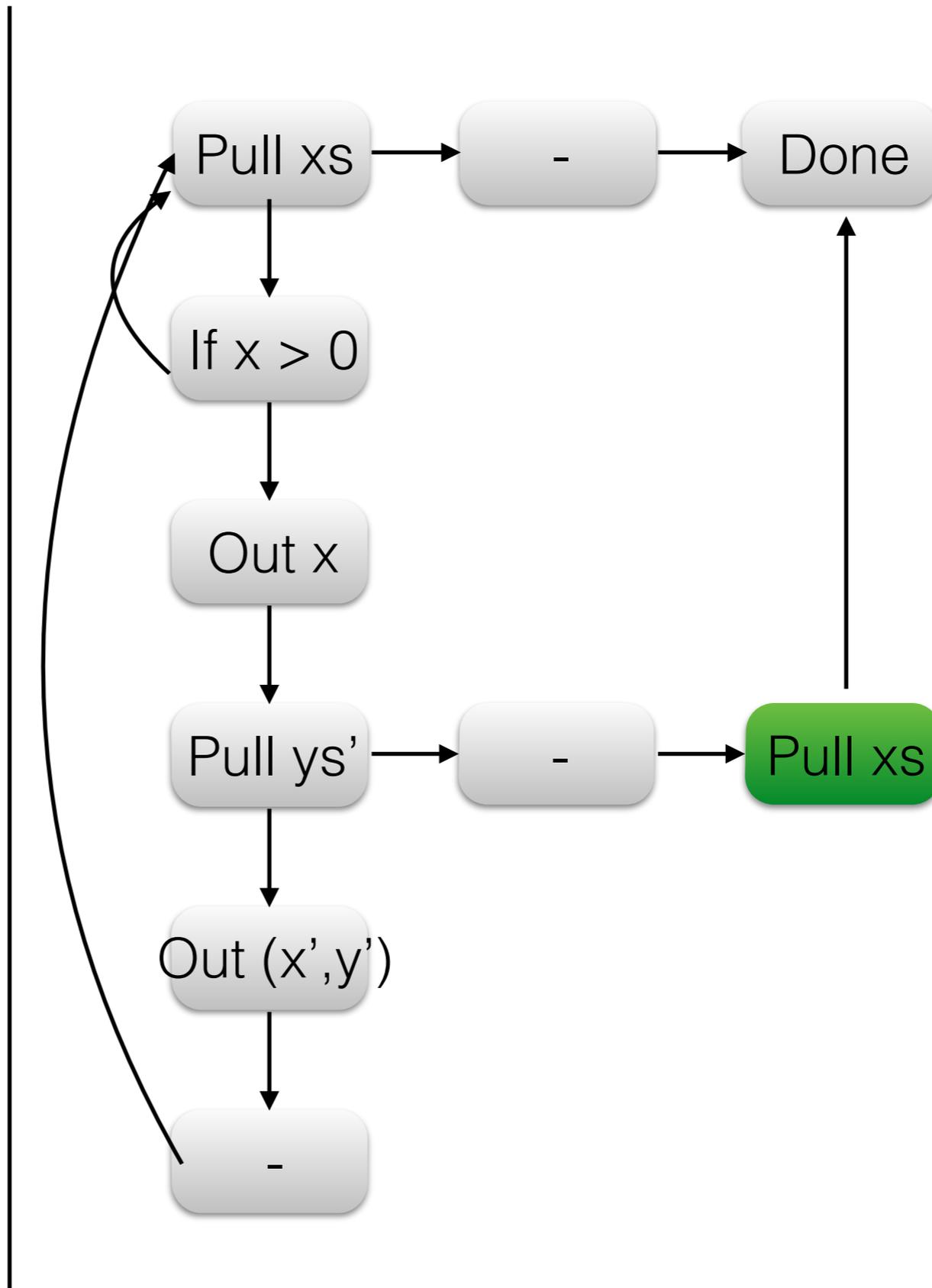
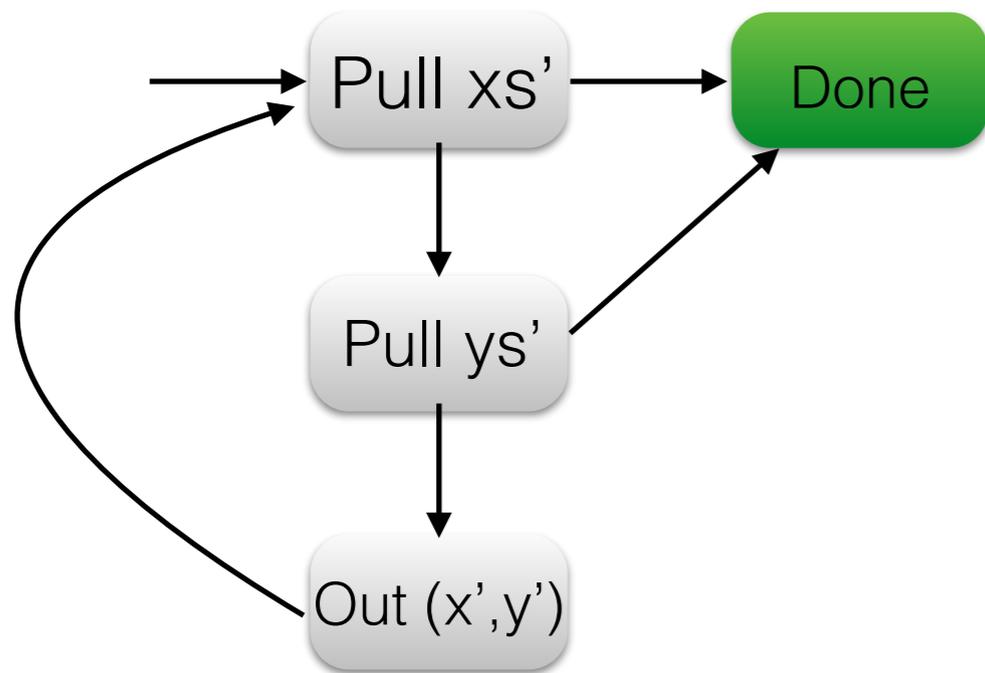
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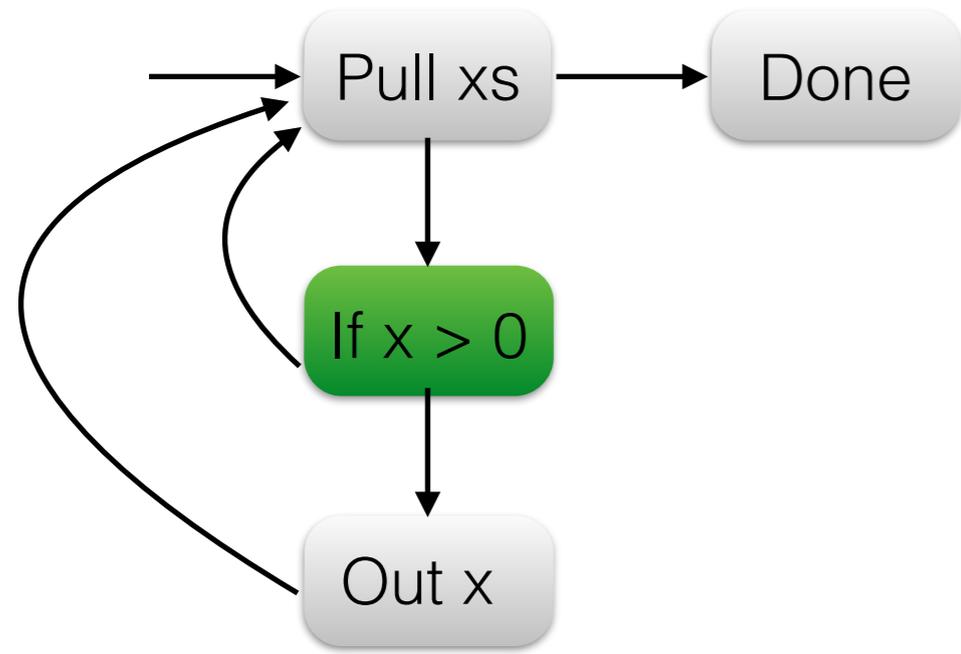
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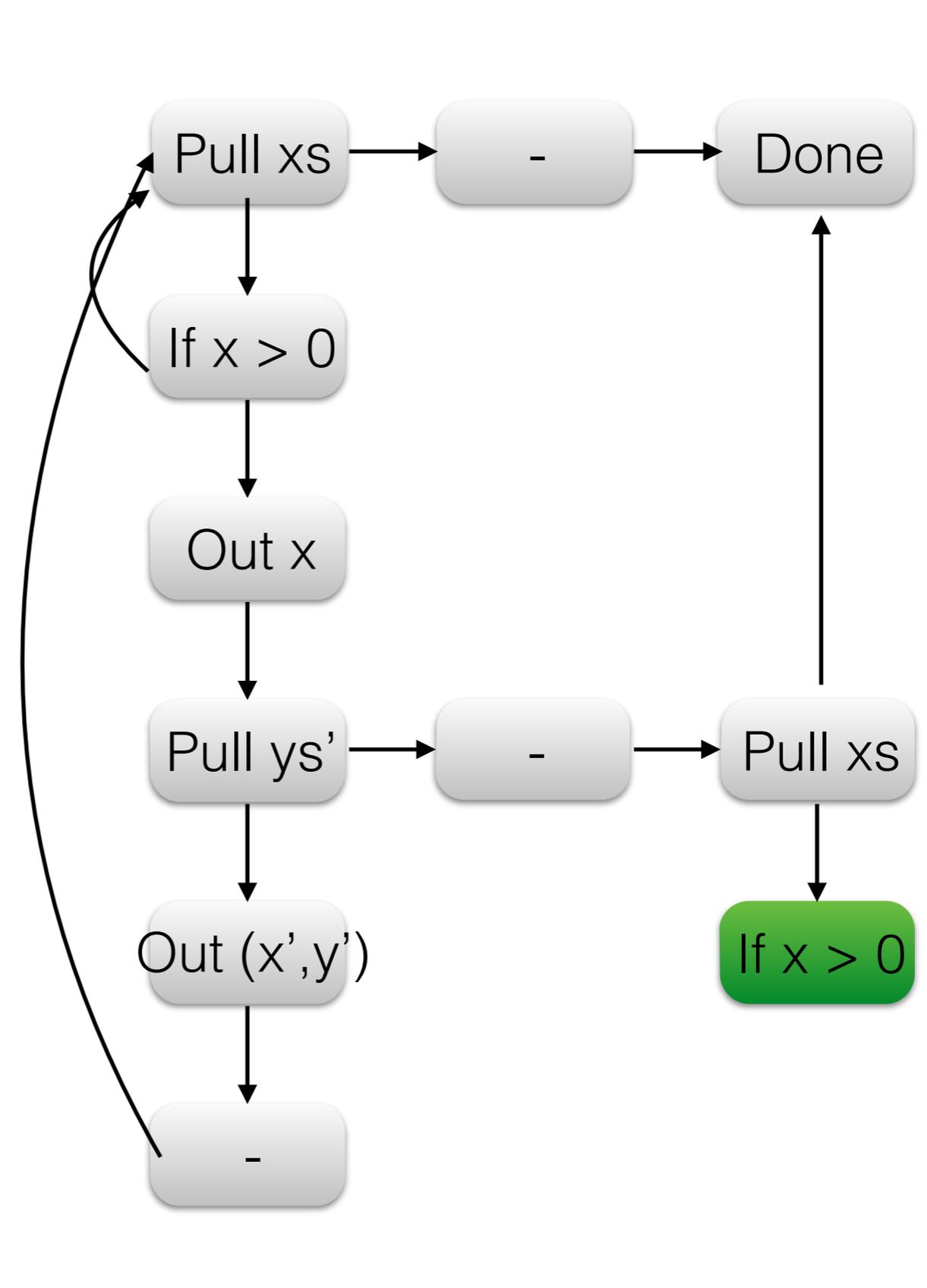
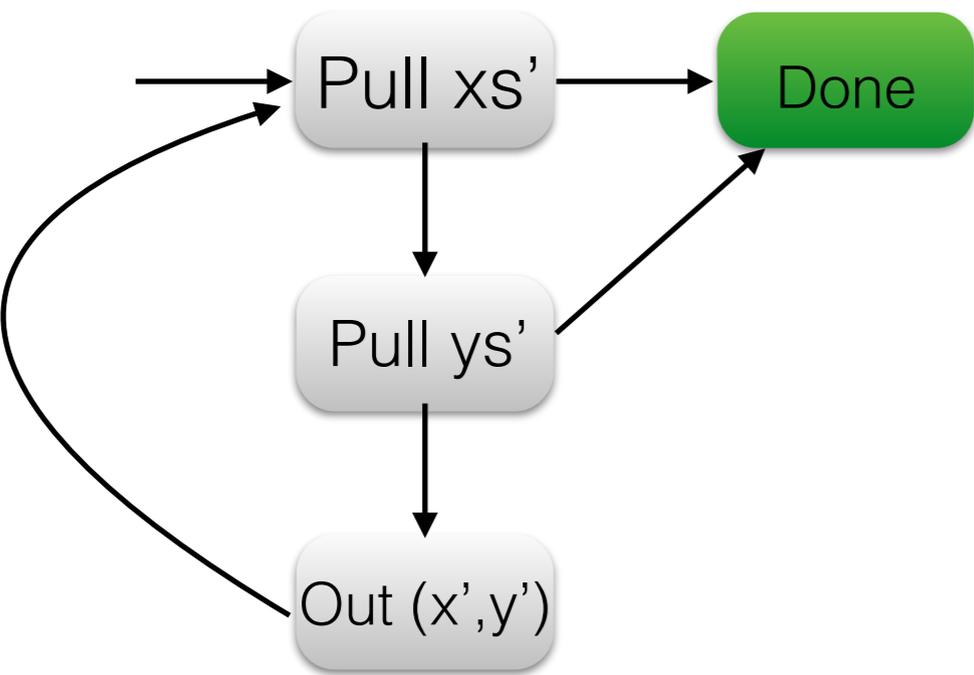
zip xs' ys'



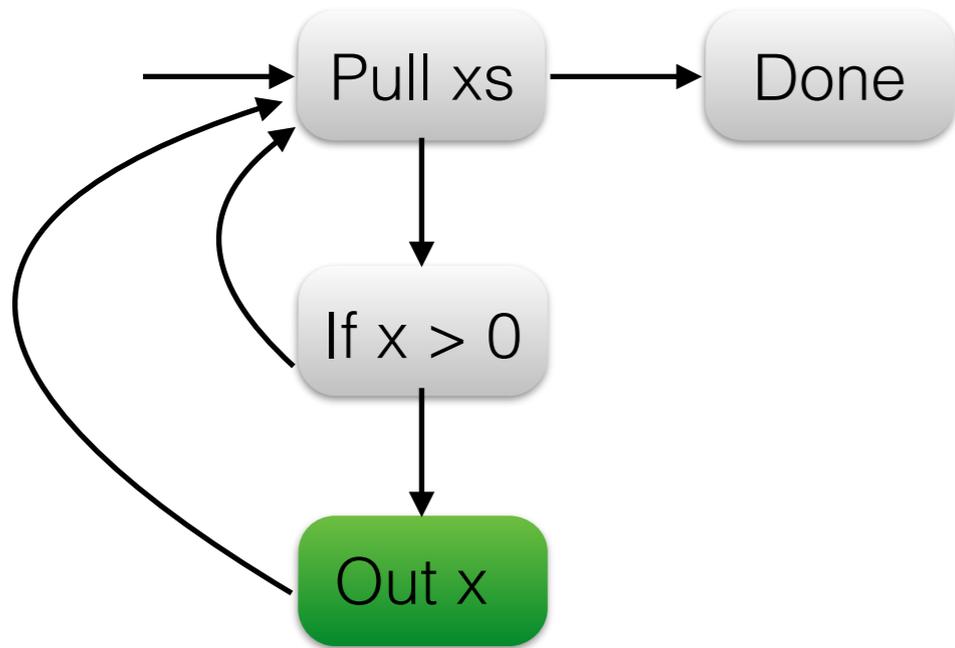
filter ( $>0$ ) xs



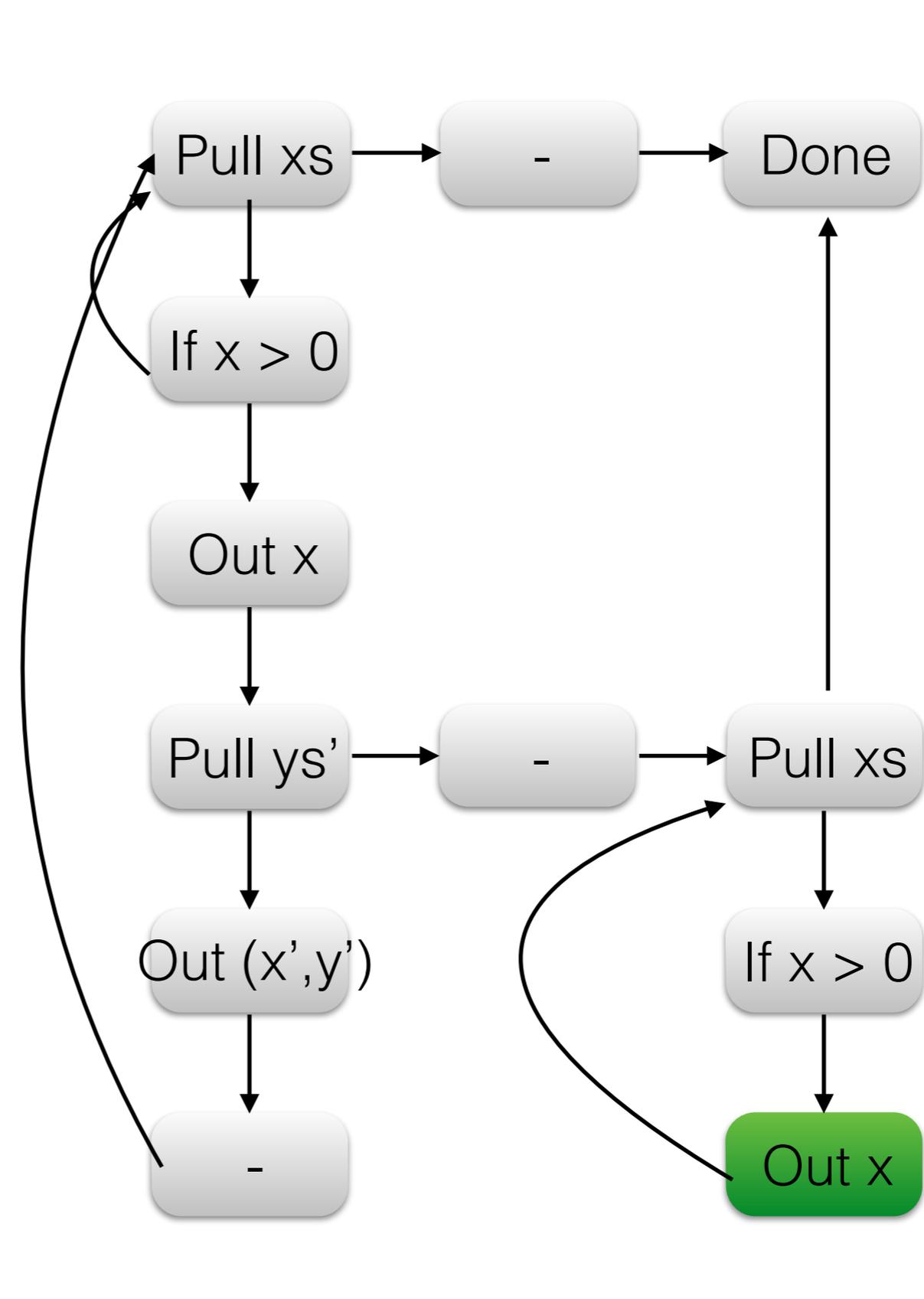
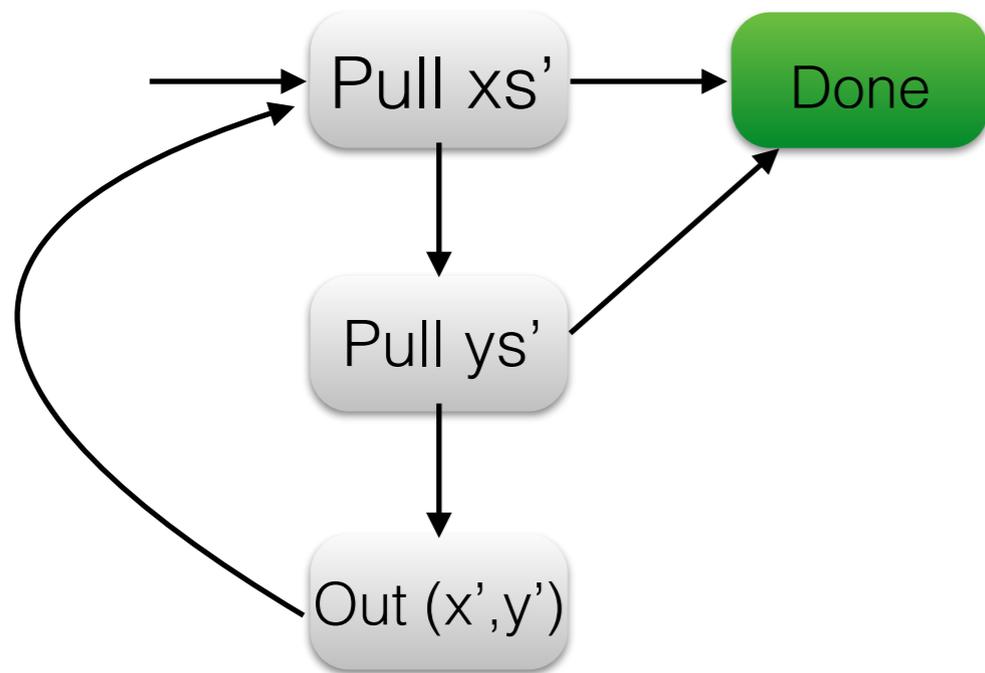
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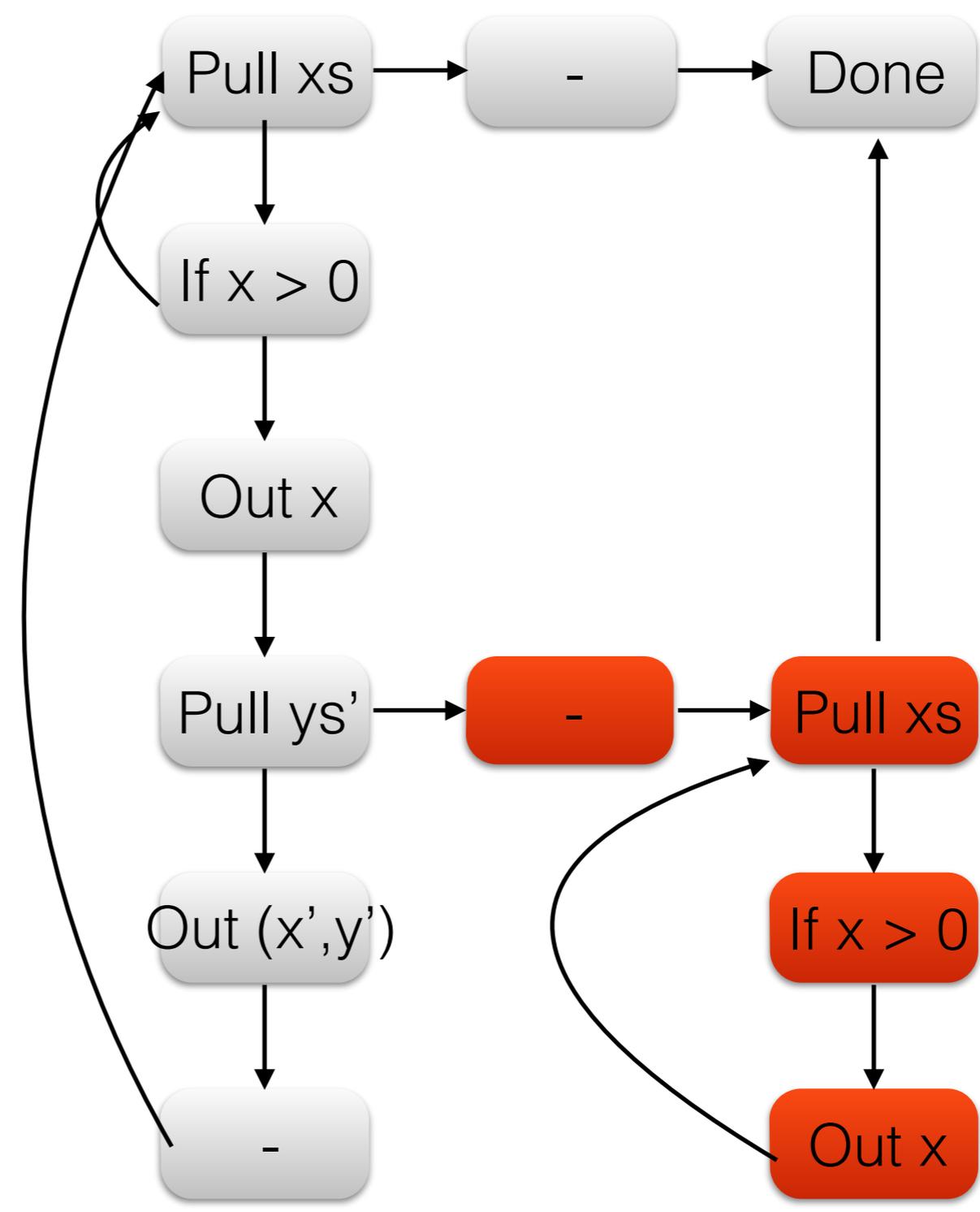


filter ( $>0$ ) xs

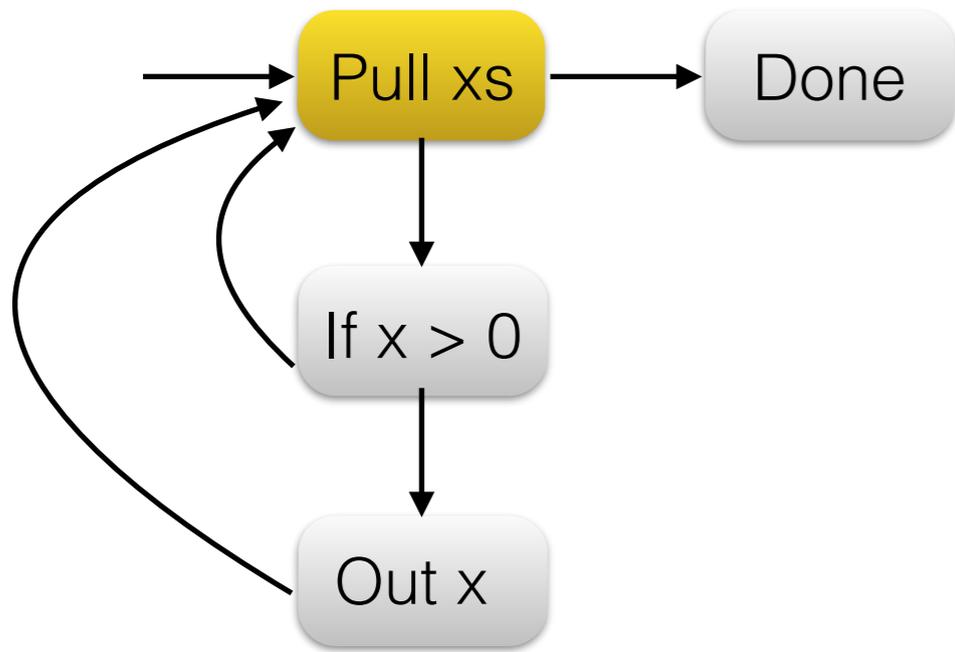


zip xs' ys'

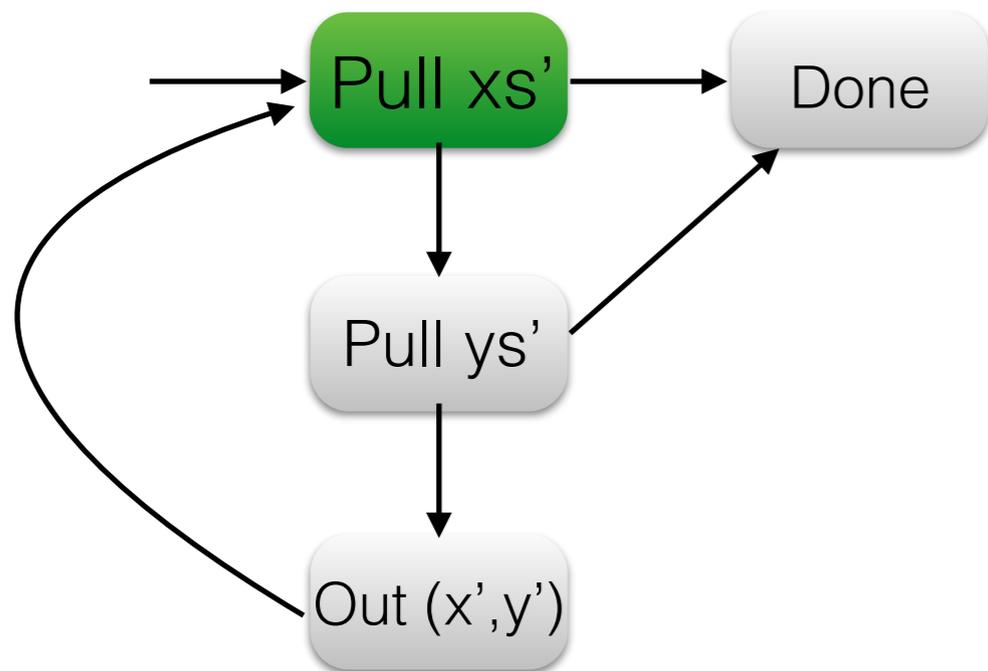




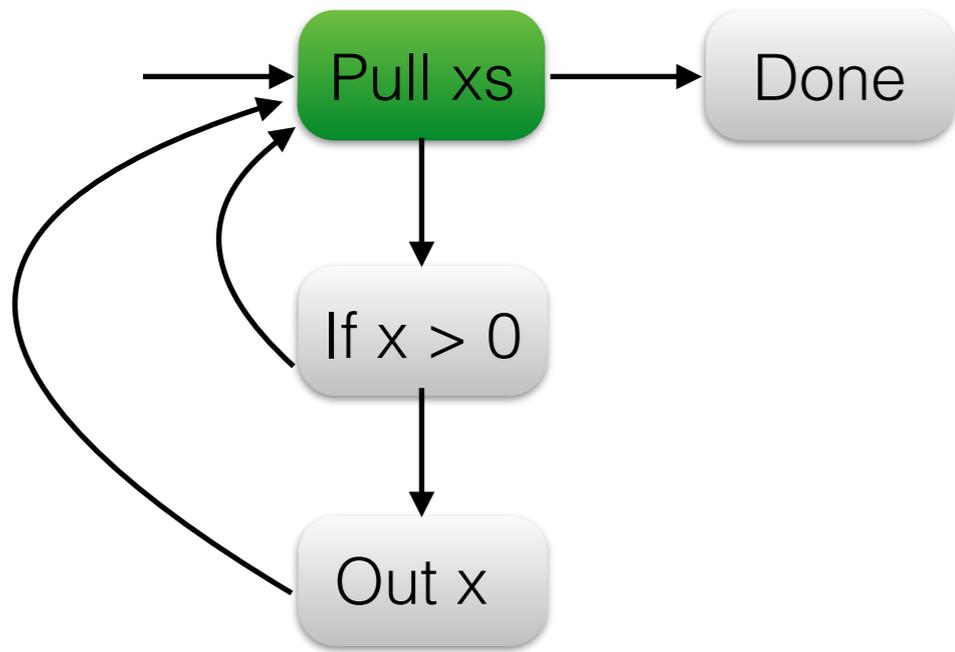
filter ( $>0$ ) xs



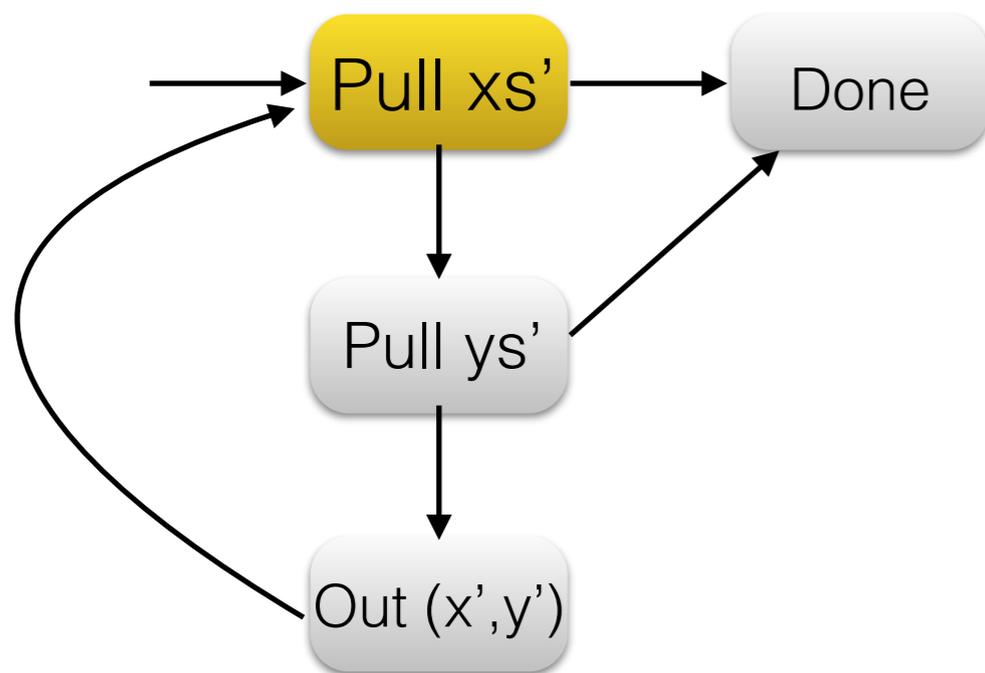
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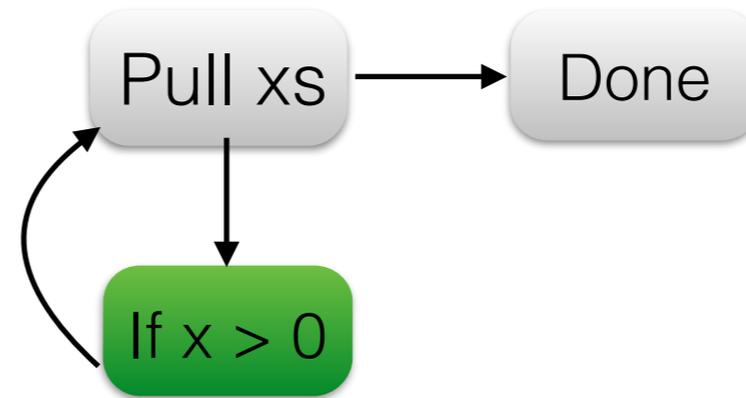
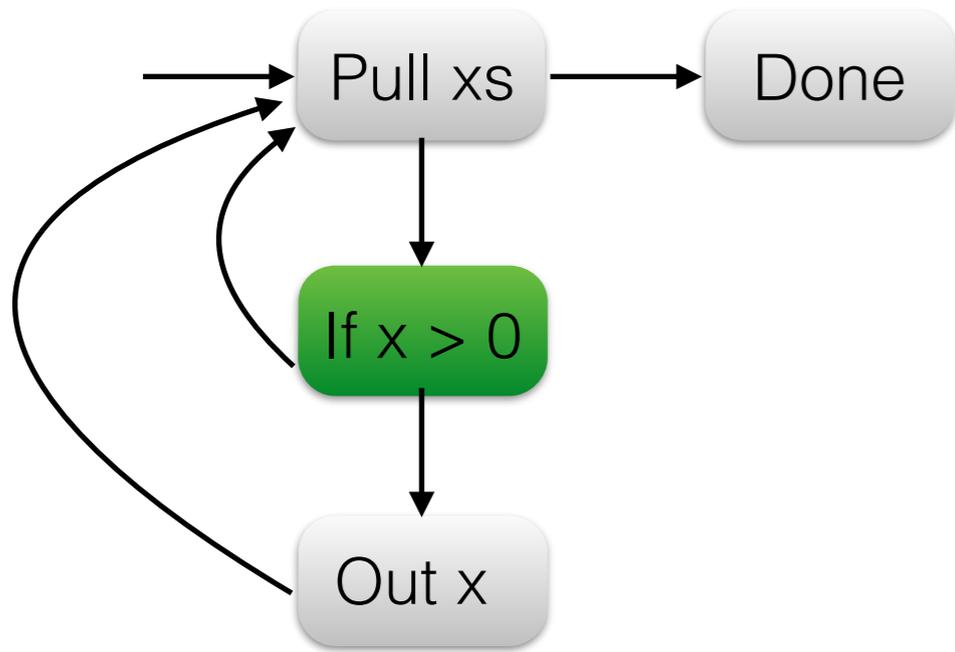
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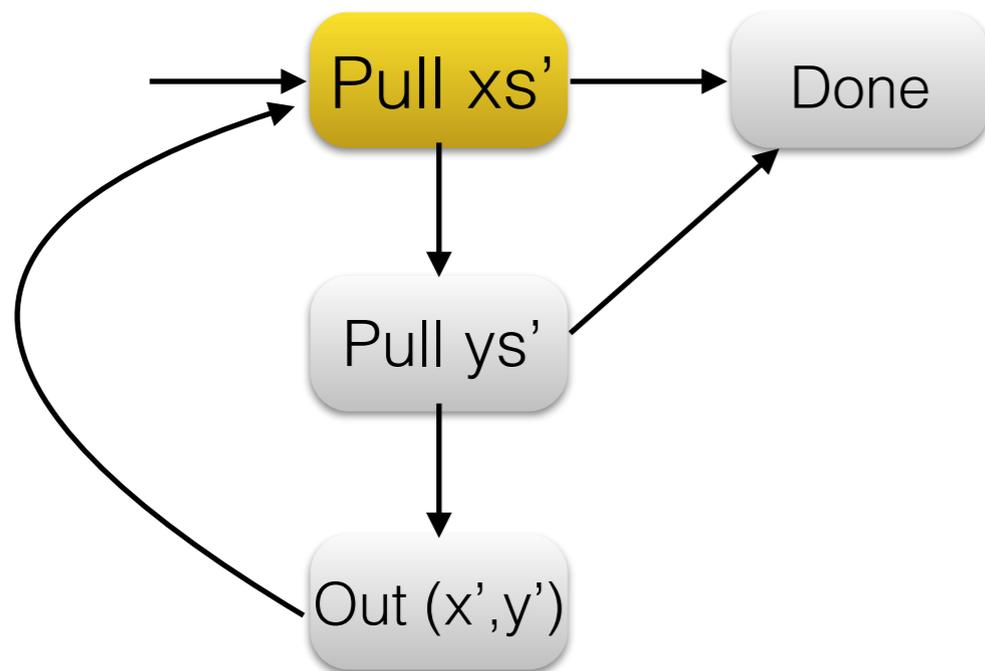
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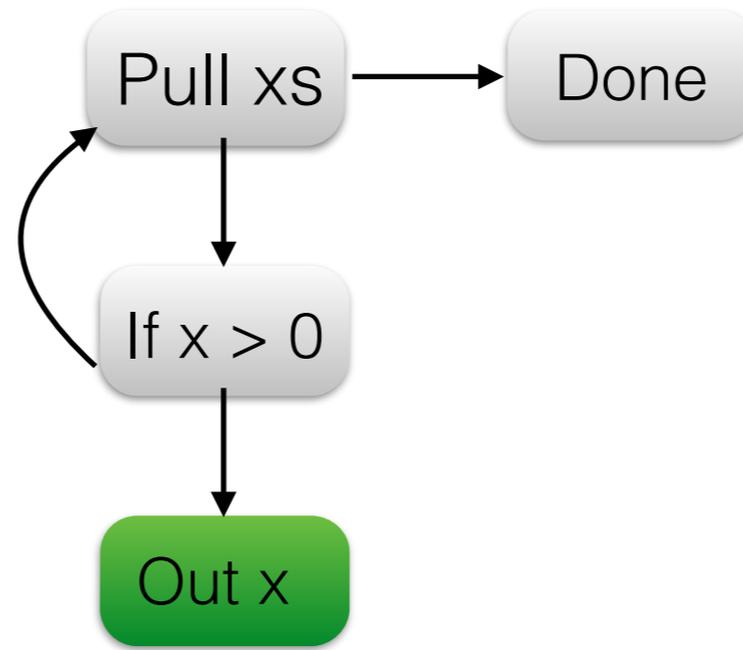
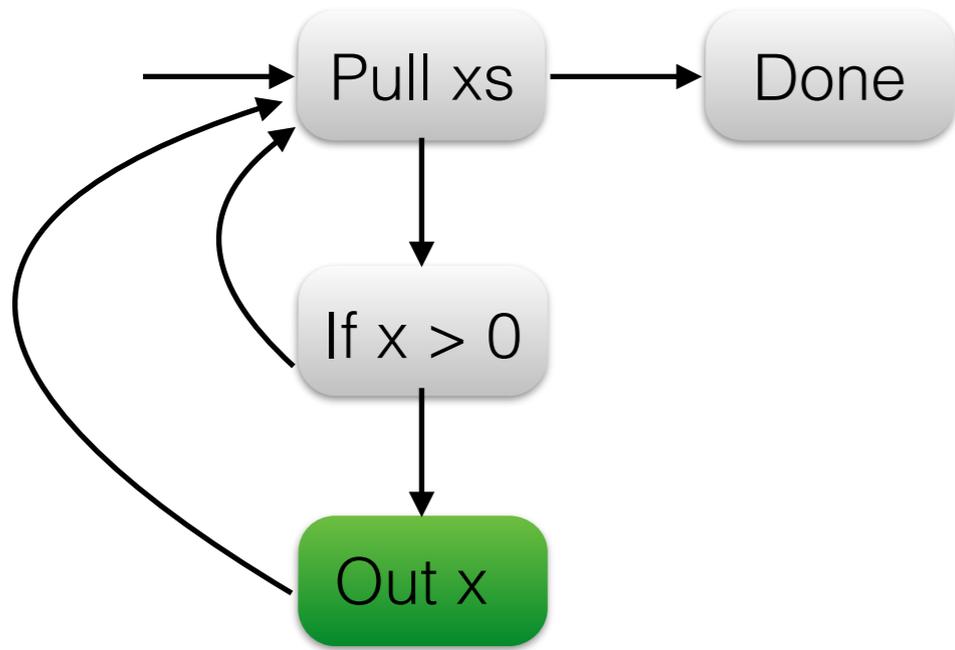
filter ( $>0$ ) xs



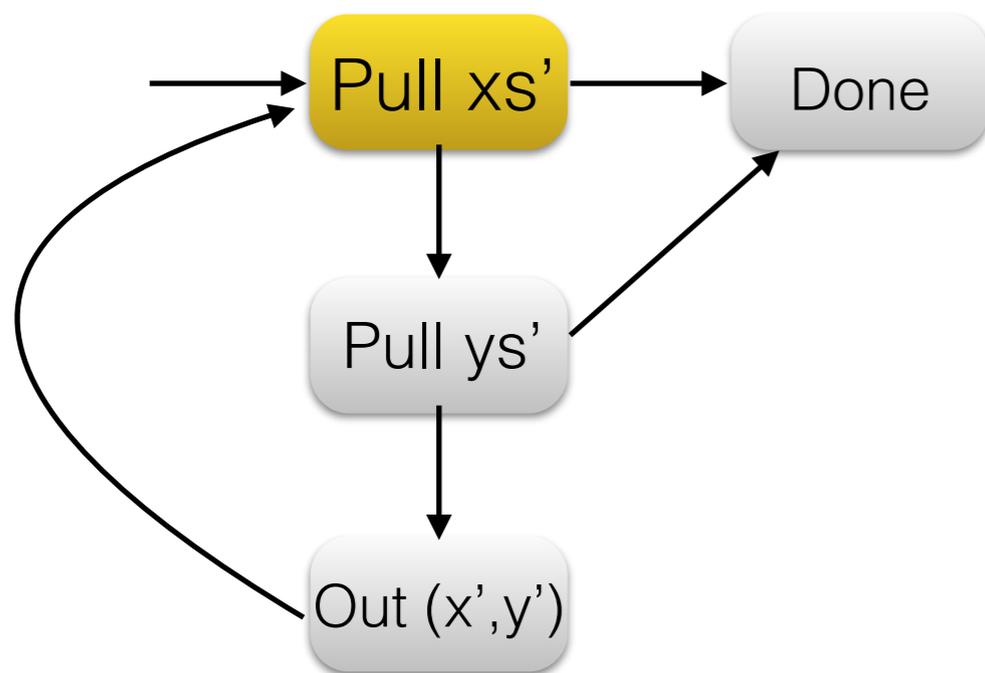
zip xs' ys'



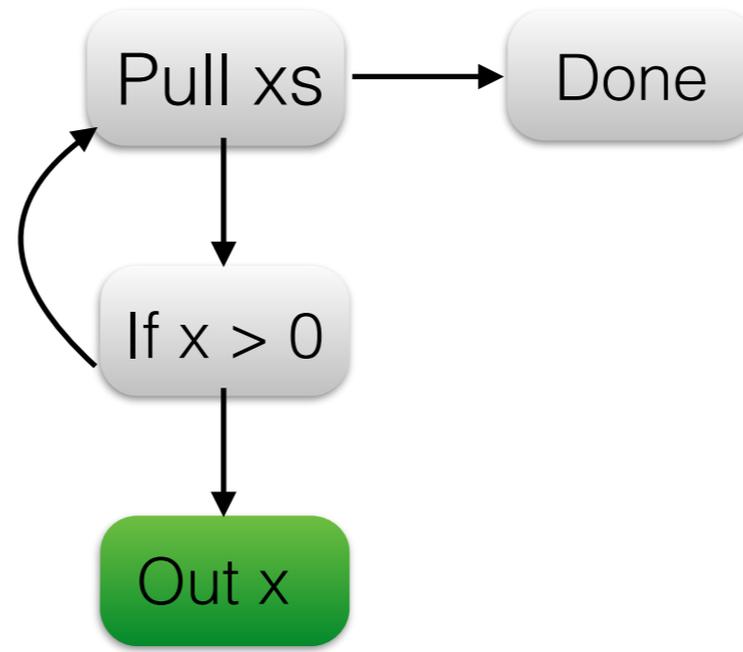
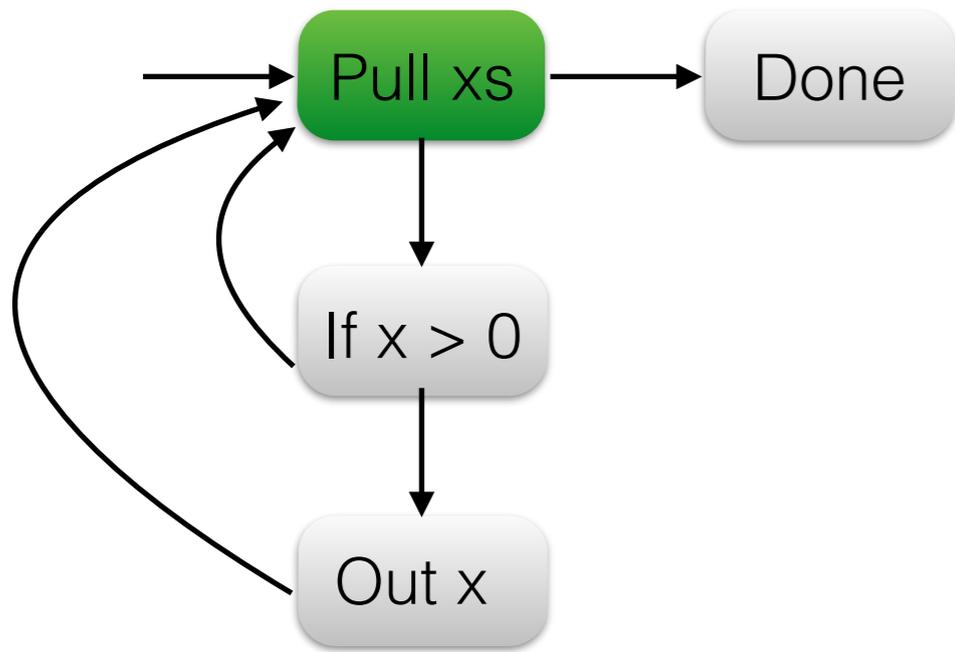
filter ( $>0$ ) xs



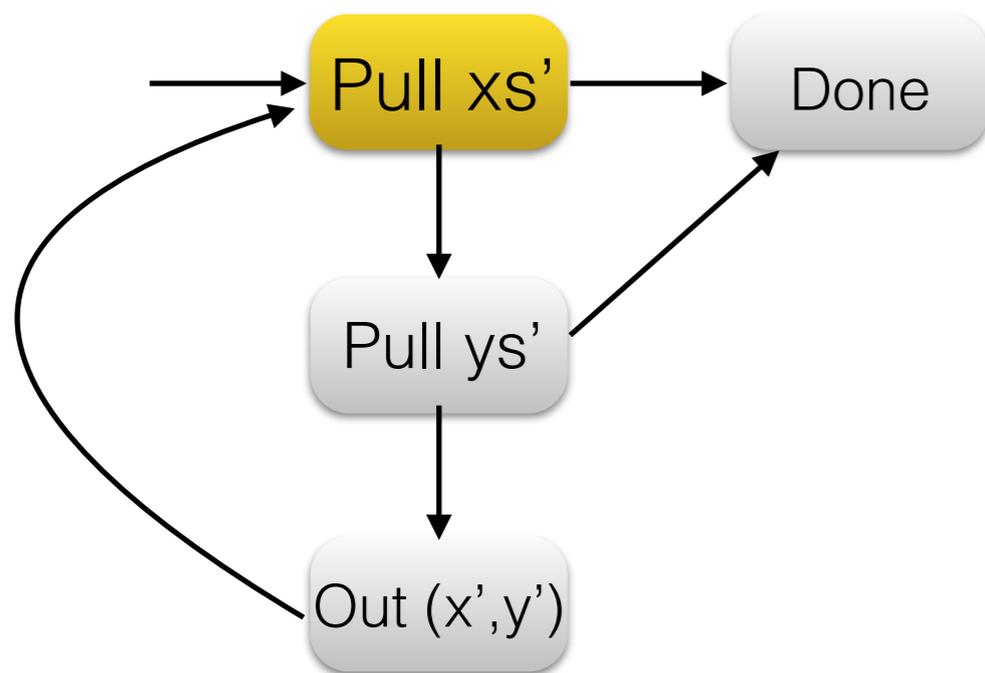
zip xs' ys'



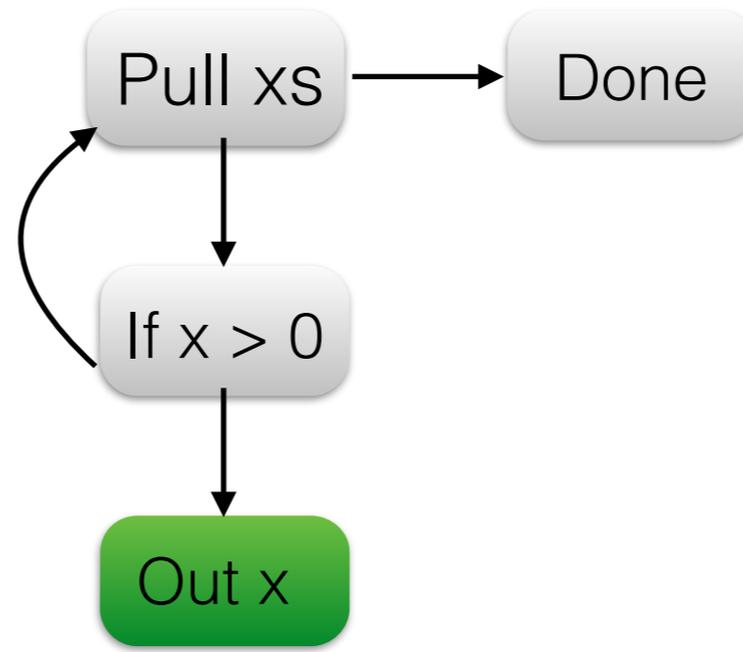
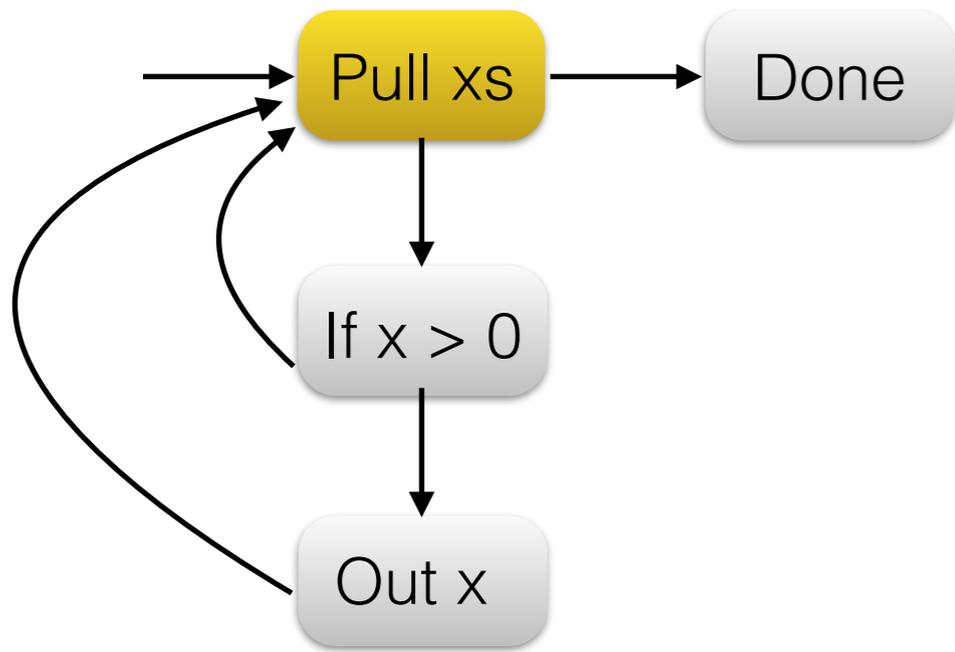
filter ( $>0$ ) xs



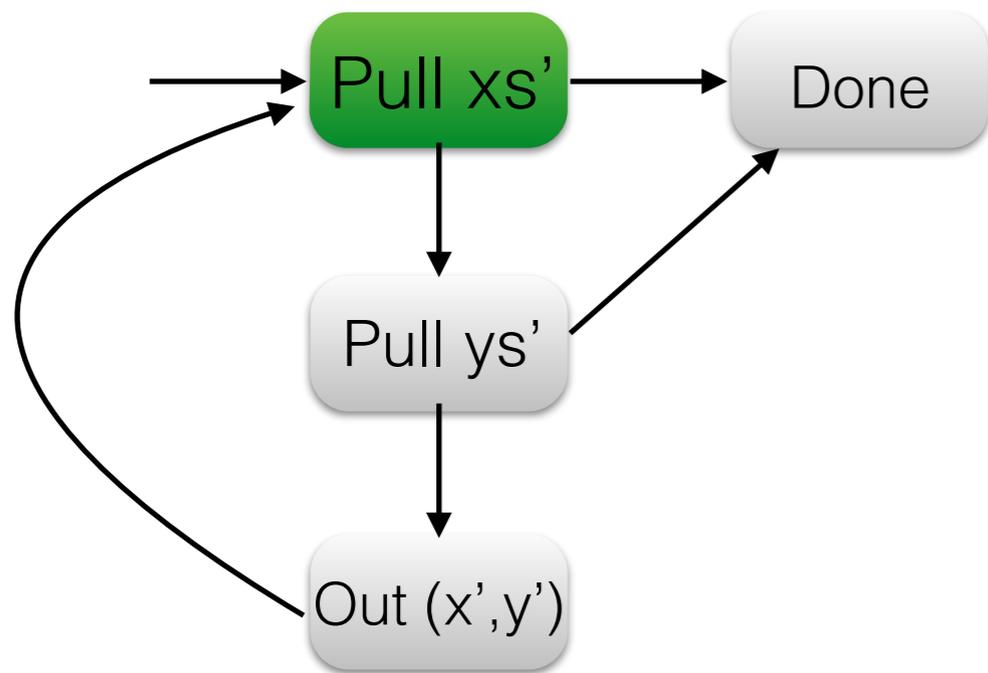
zip xs' ys'



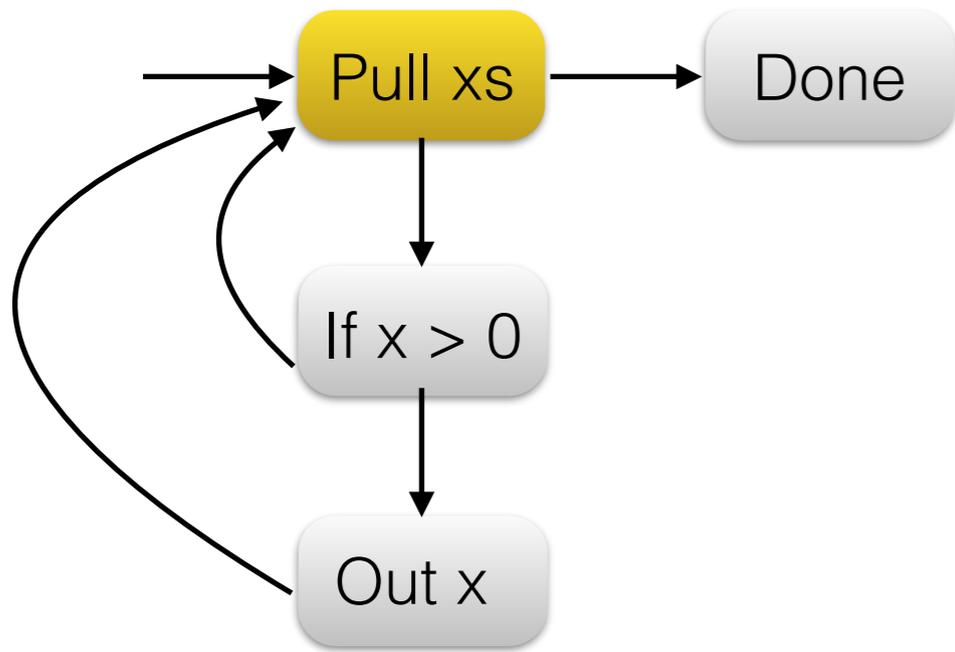
filter ( $>0$ ) xs



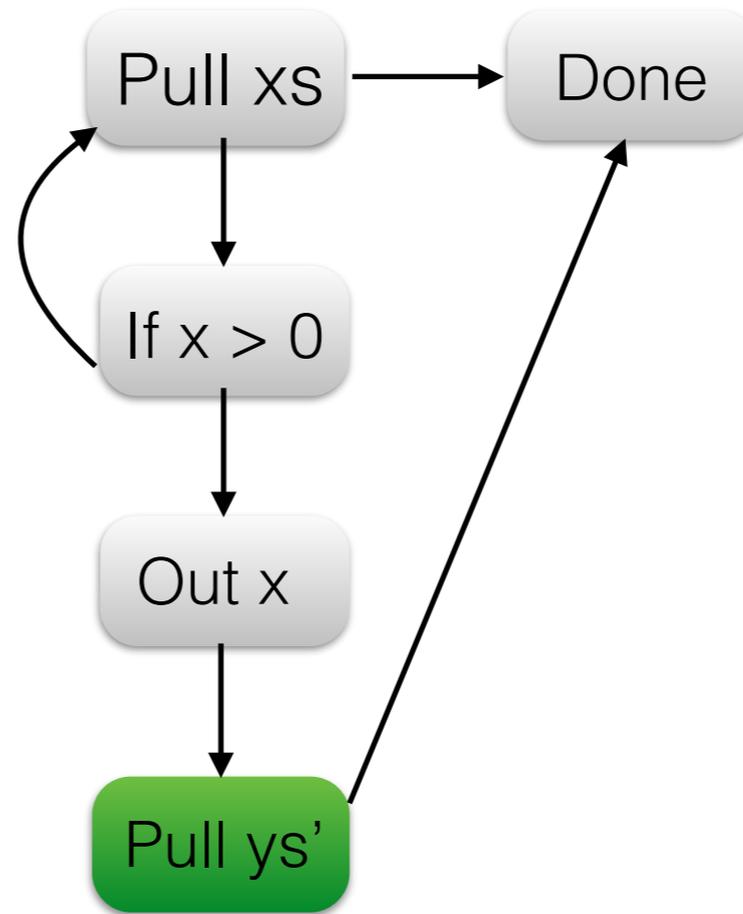
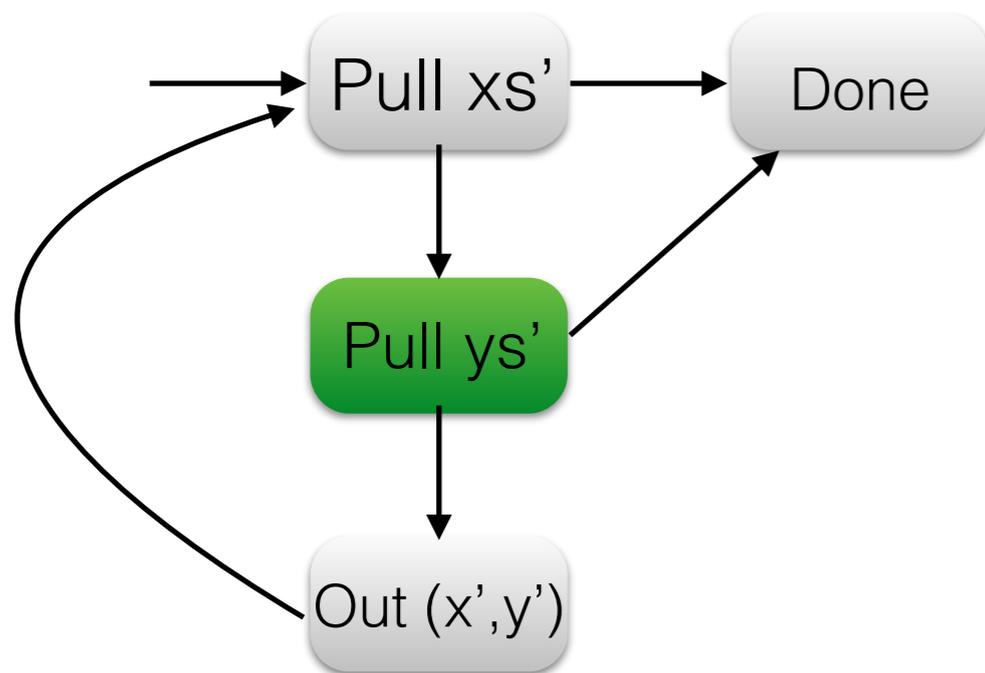
zip xs' ys'



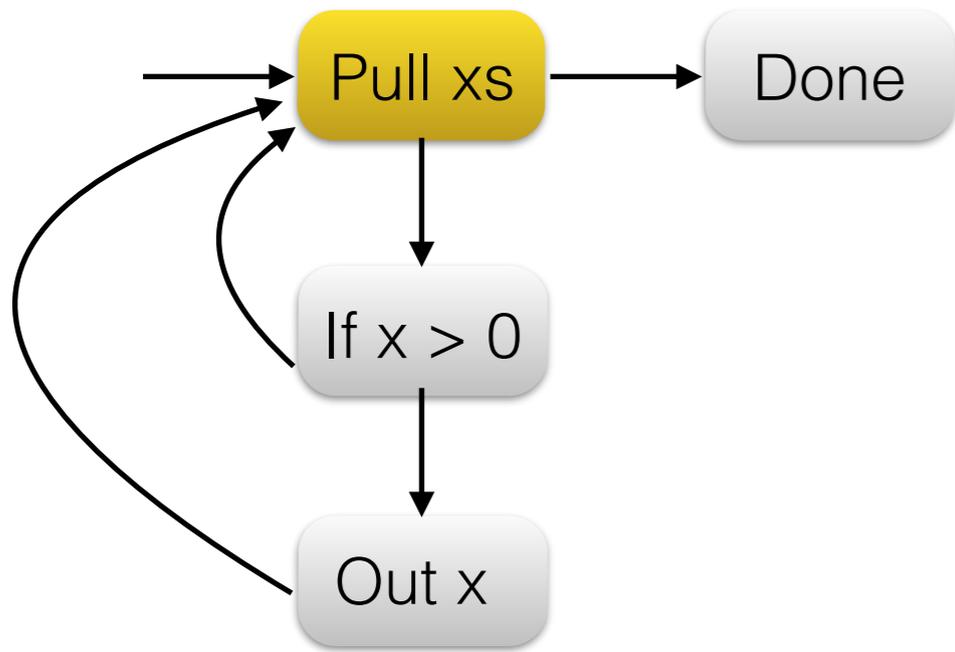
filter ( $>0$ ) xs



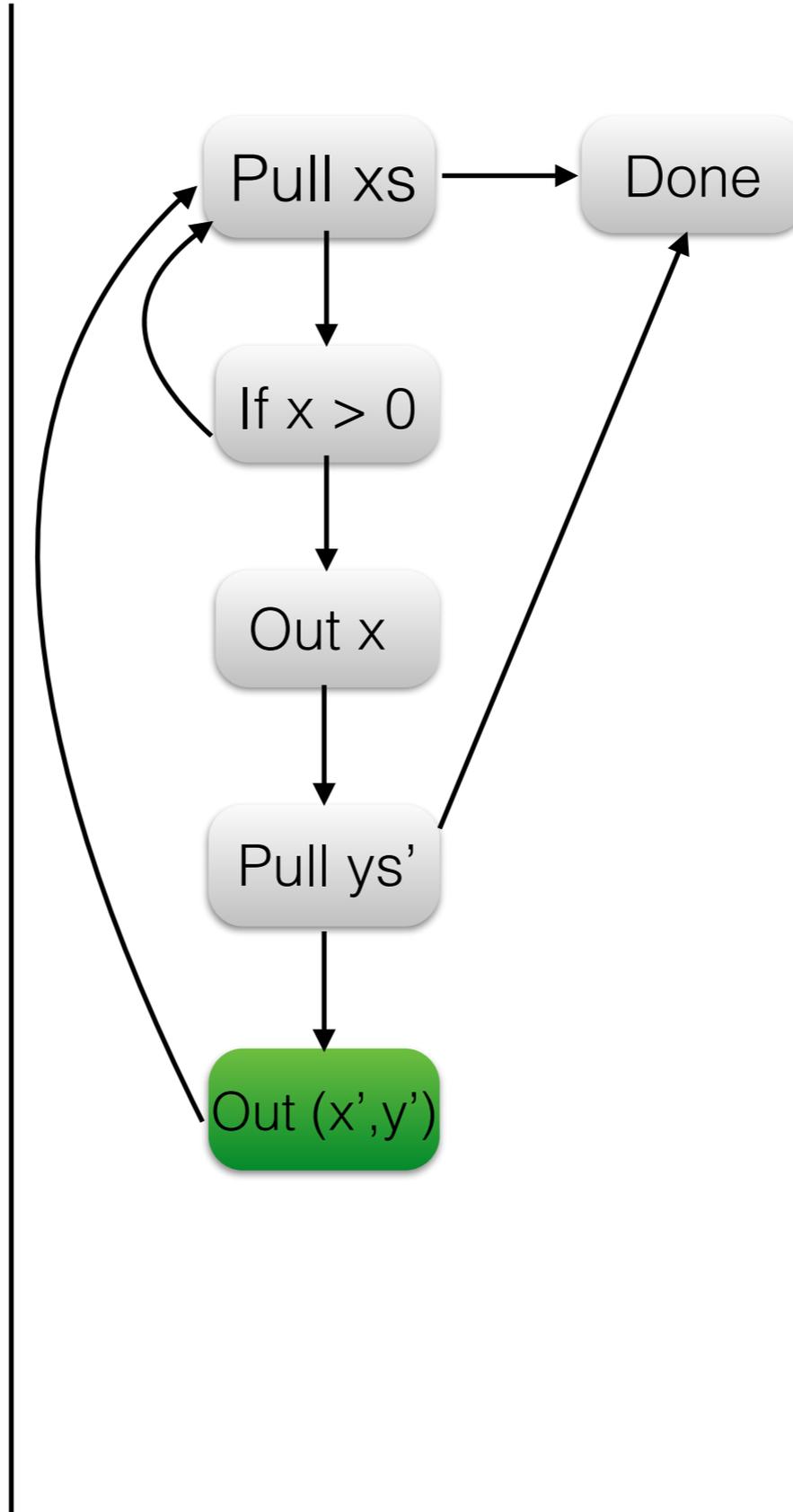
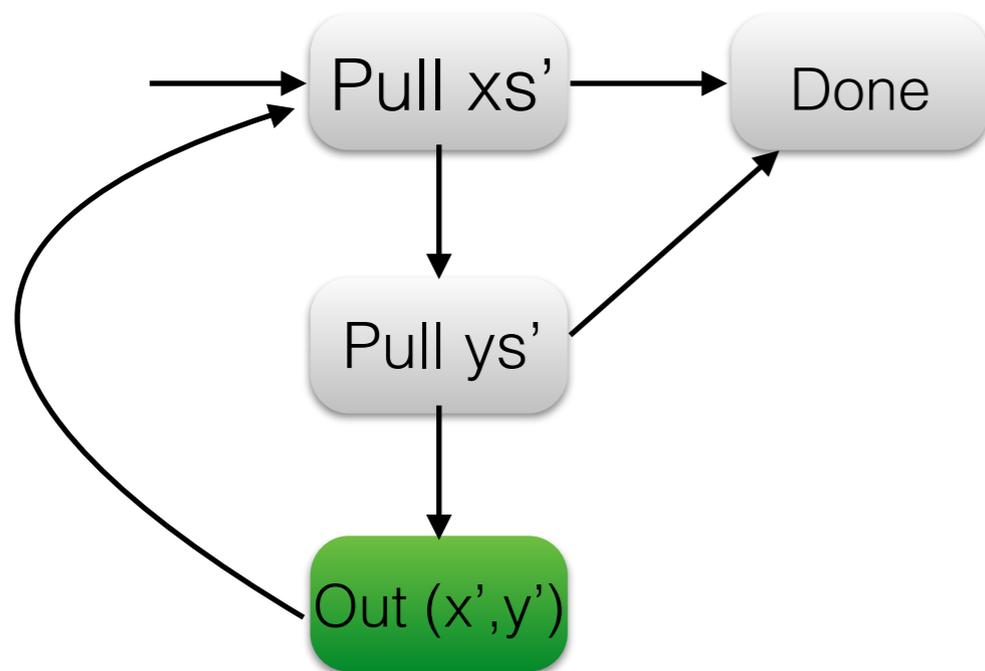
zip xs' ys'

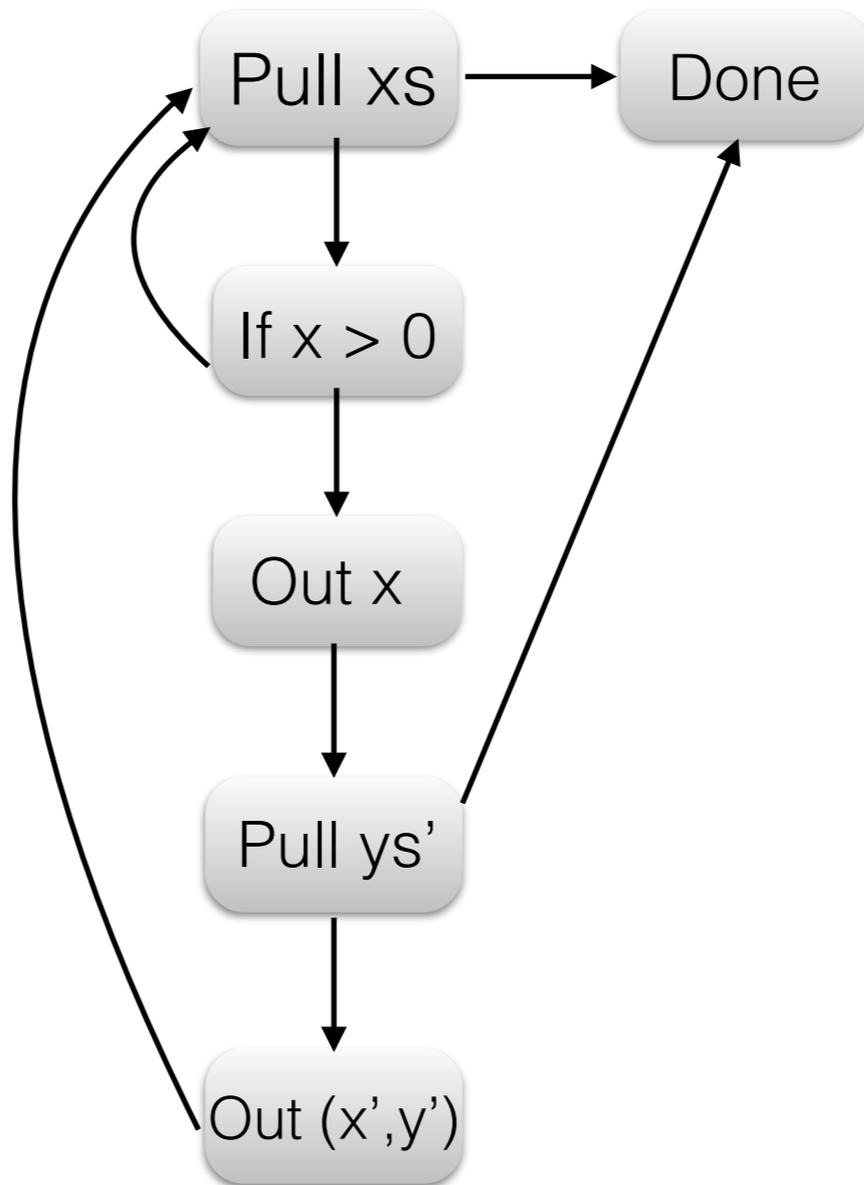


filter ( $>0$ ) xs

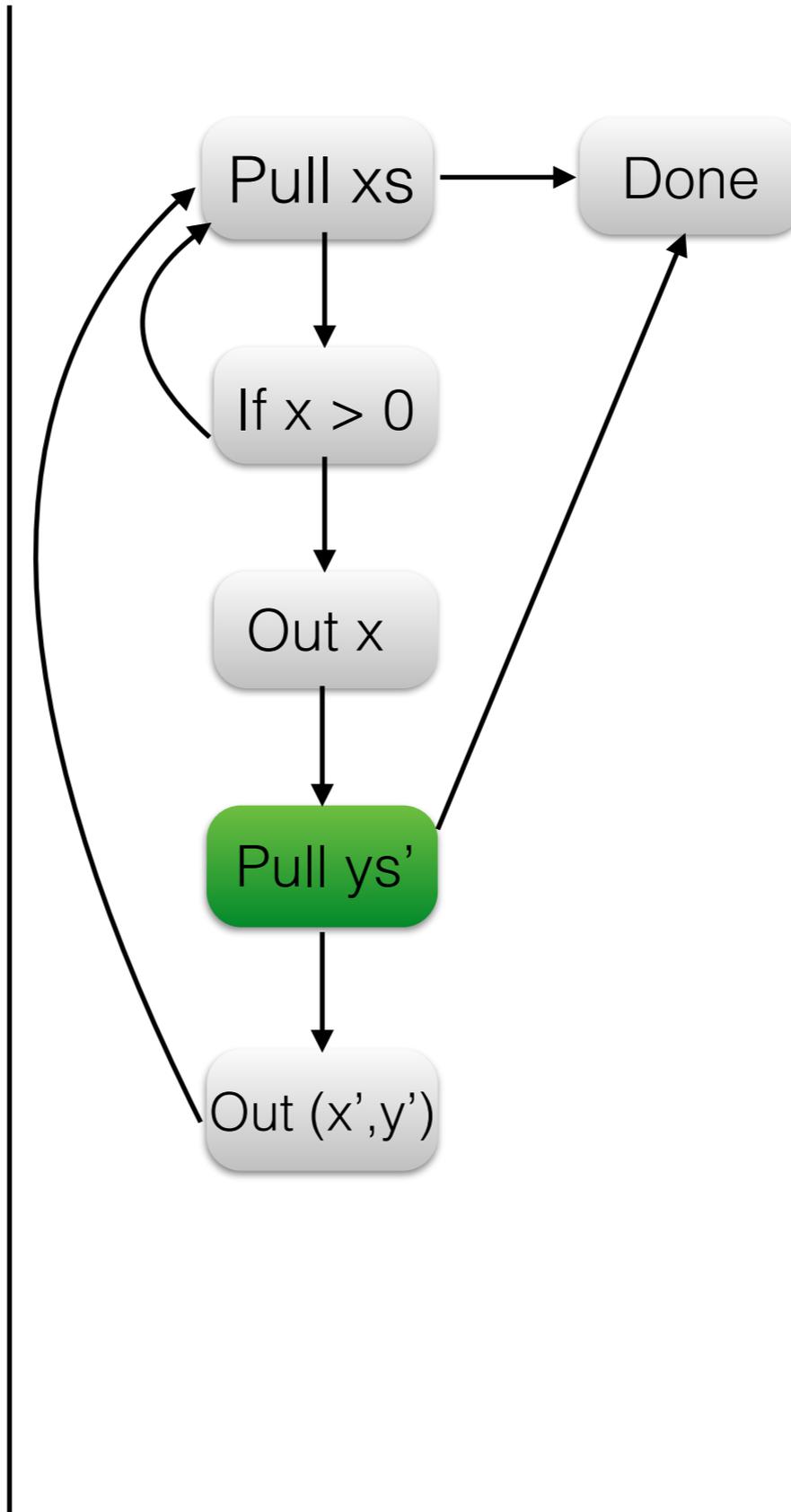
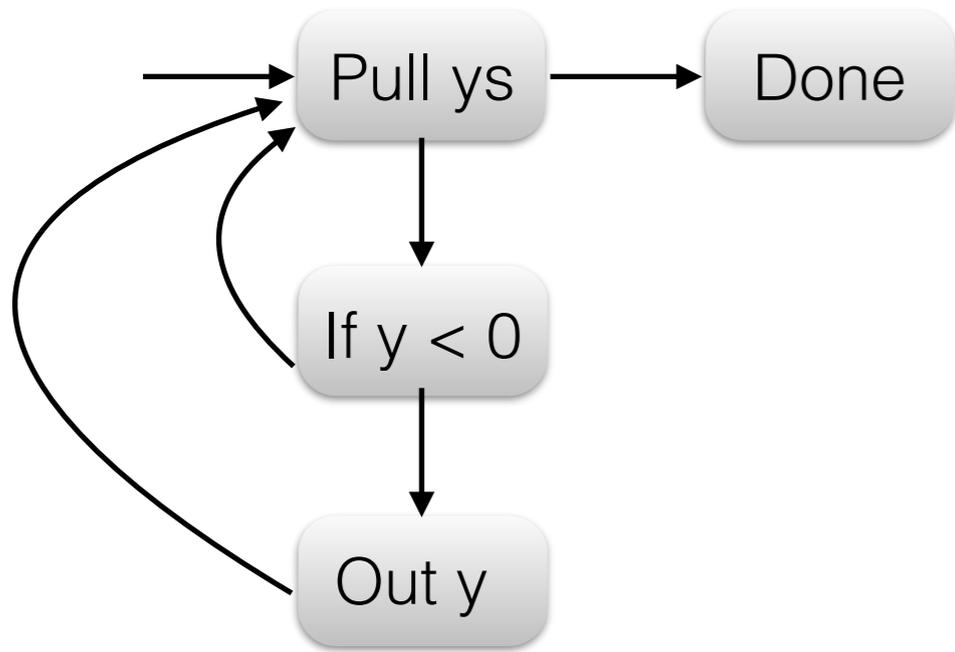


zip xs' ys'

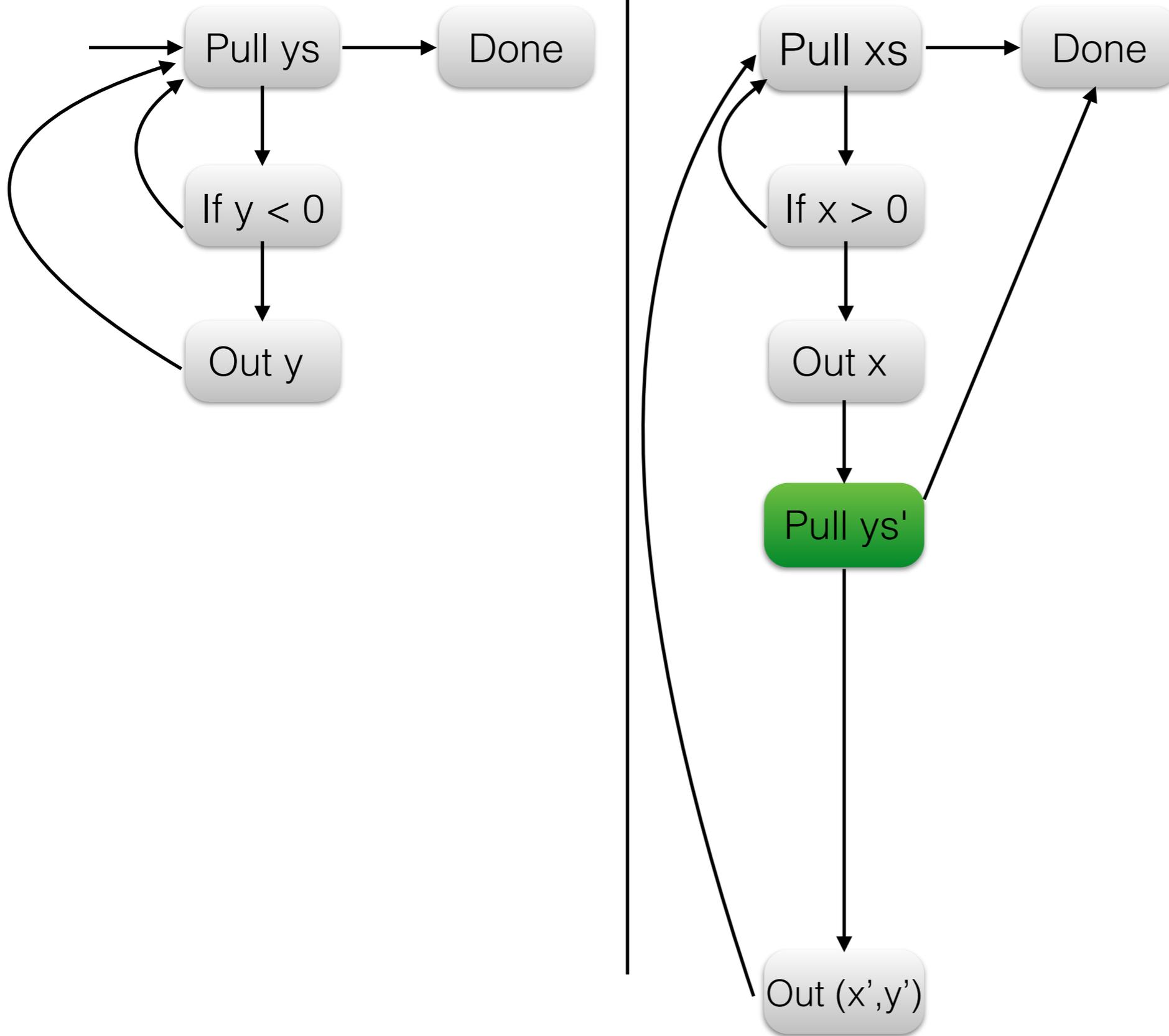




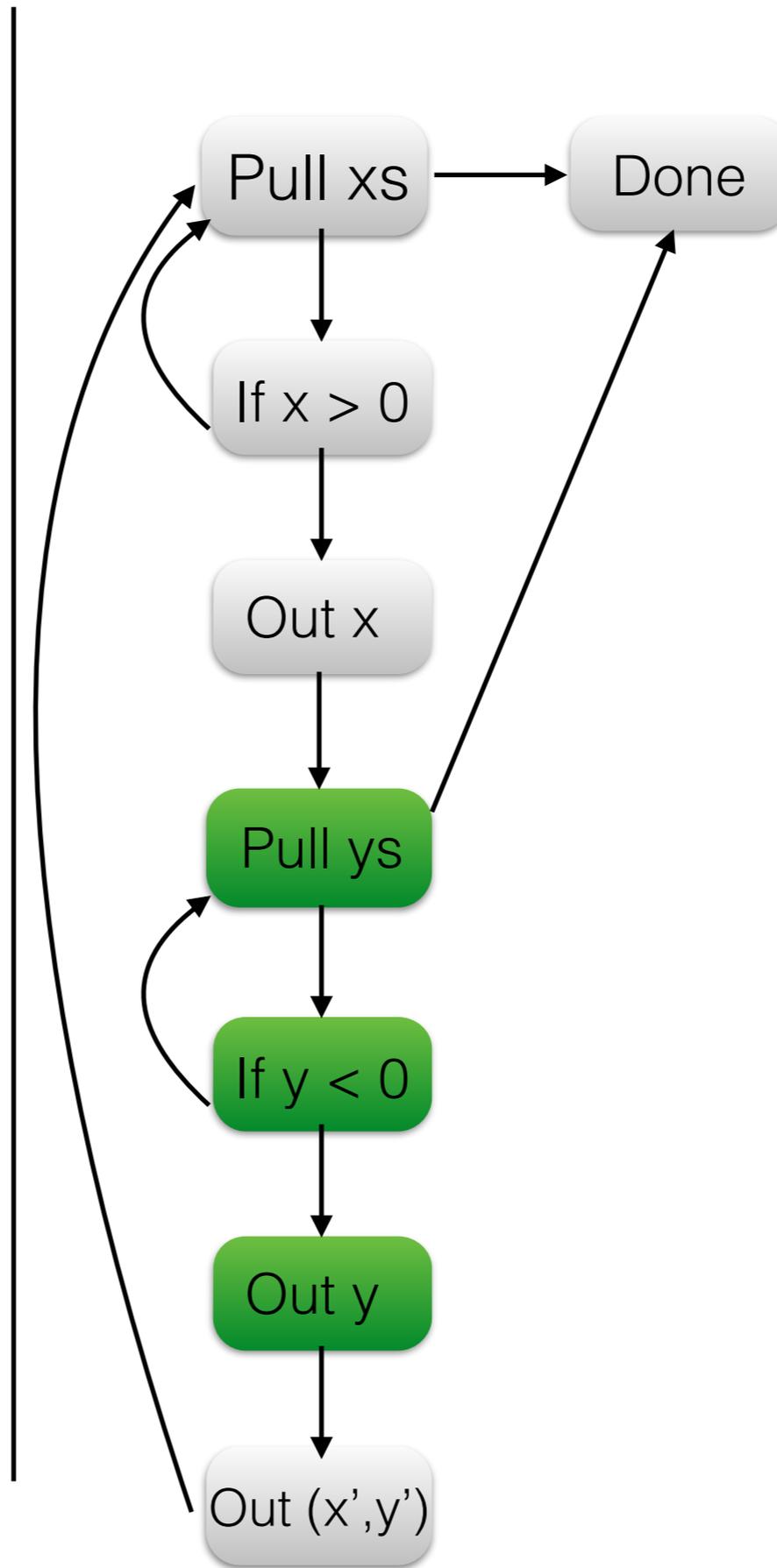
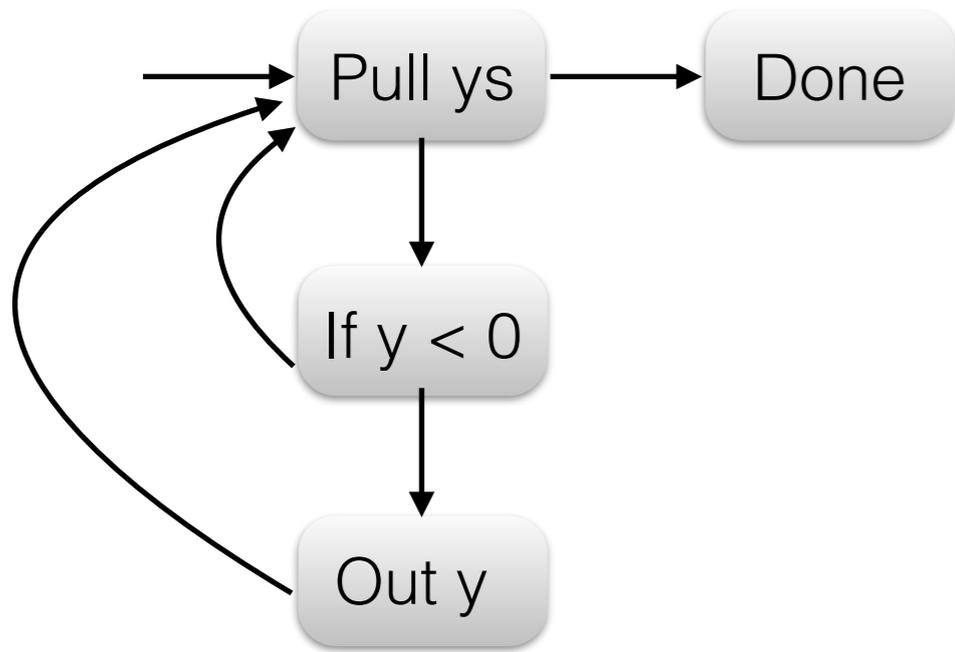
filter ( $<0$ ) ys

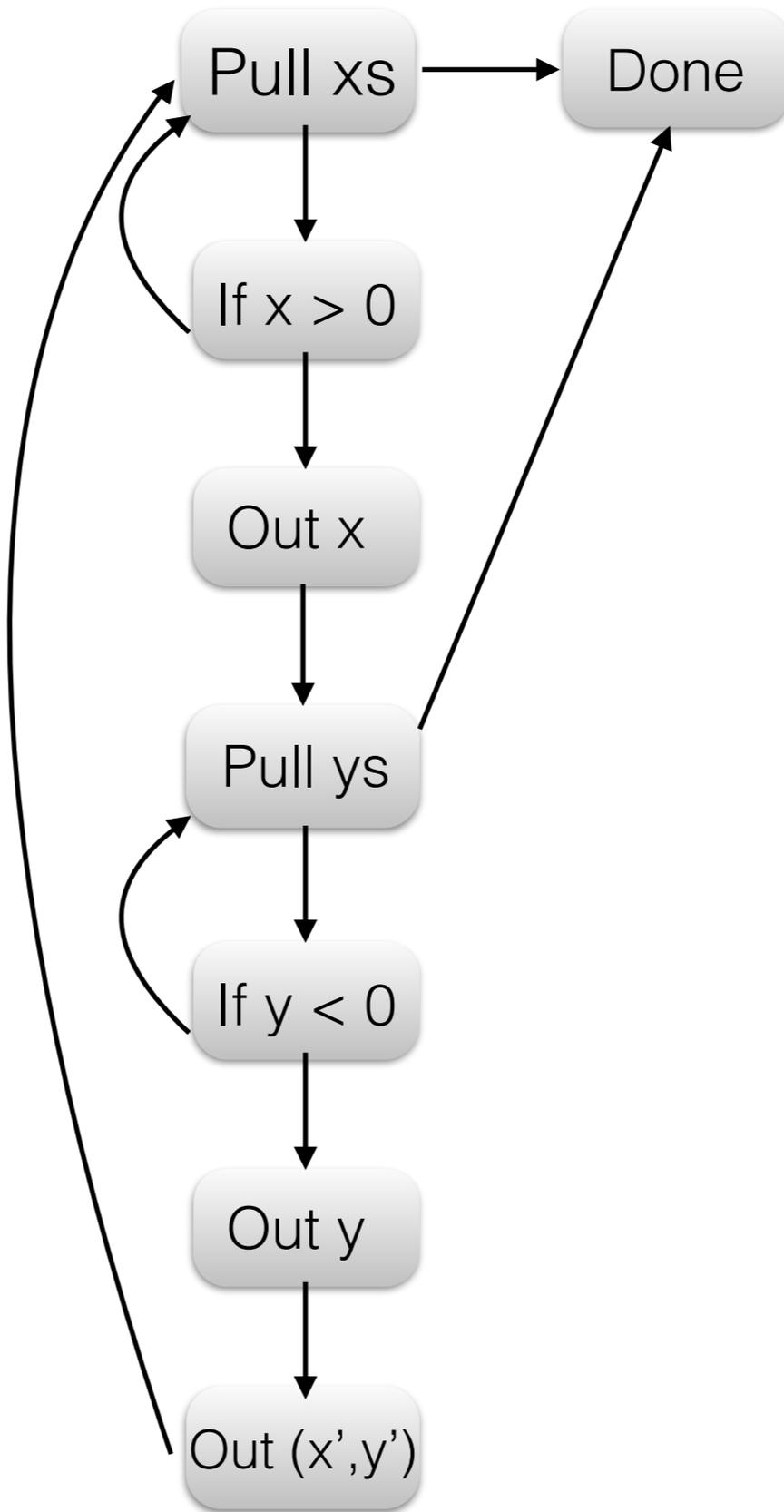


filter ( $<0$ ) ys

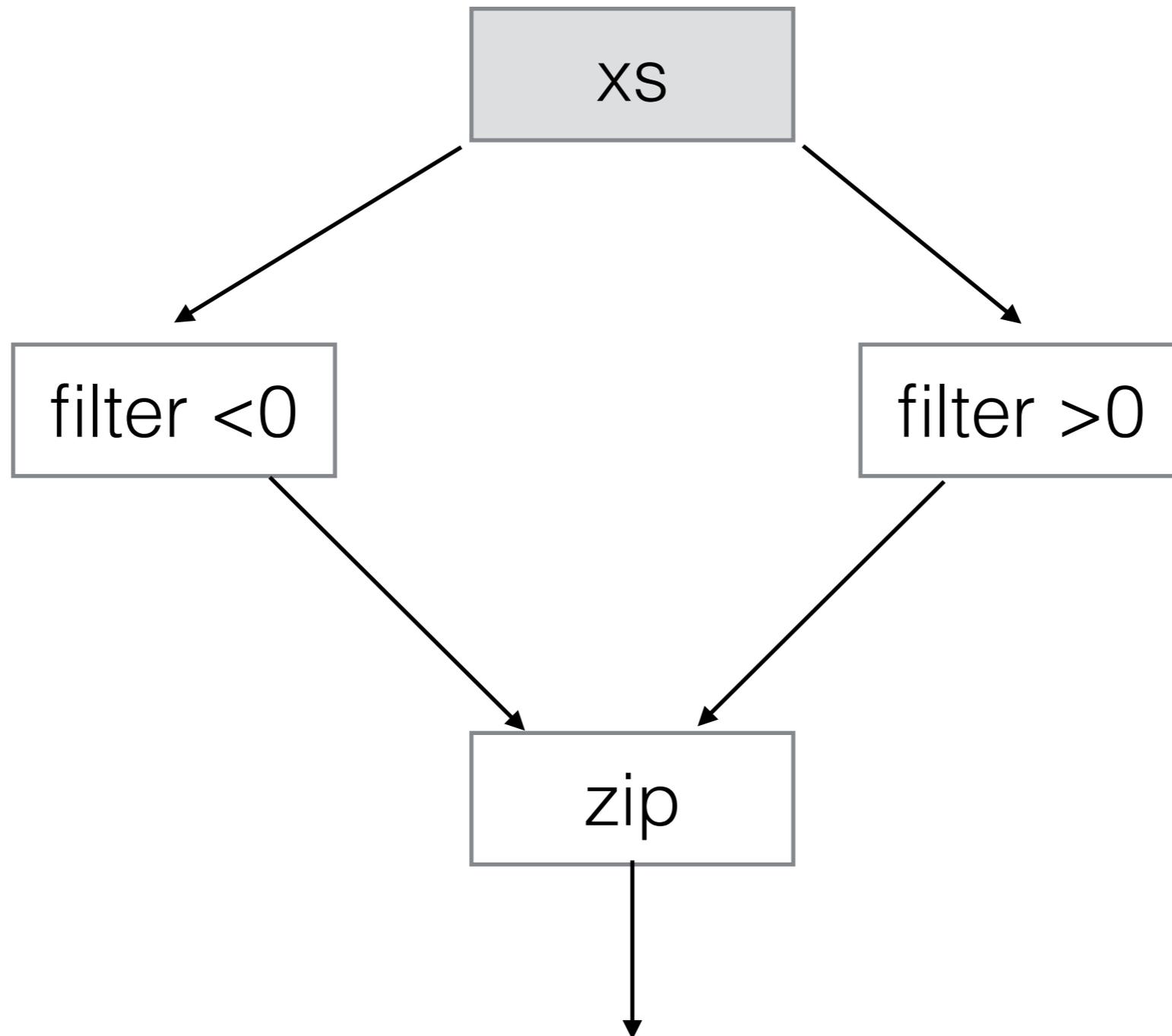


filter ( $<0$ ) ys

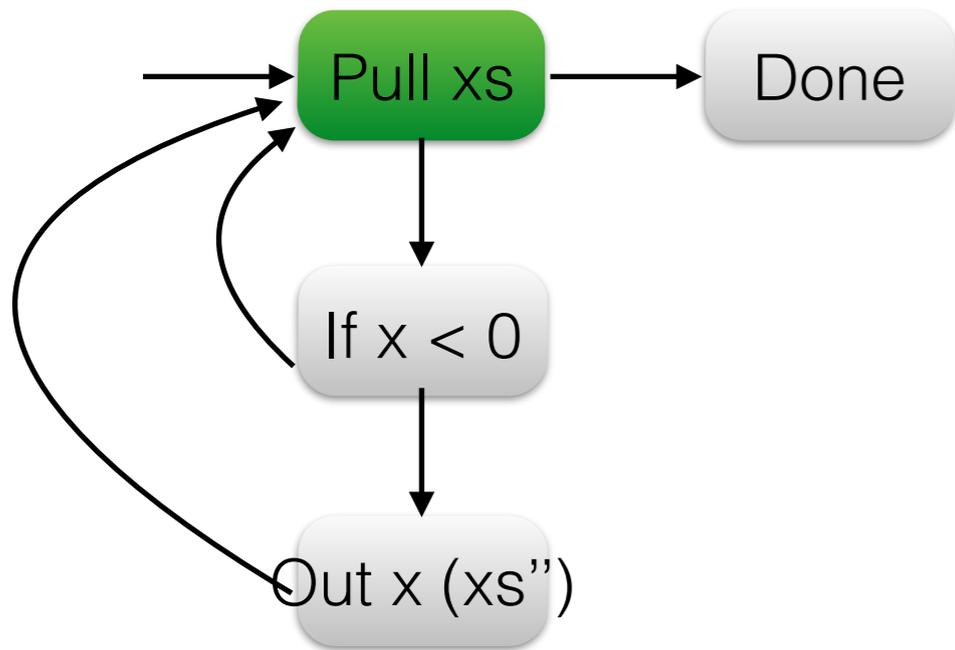




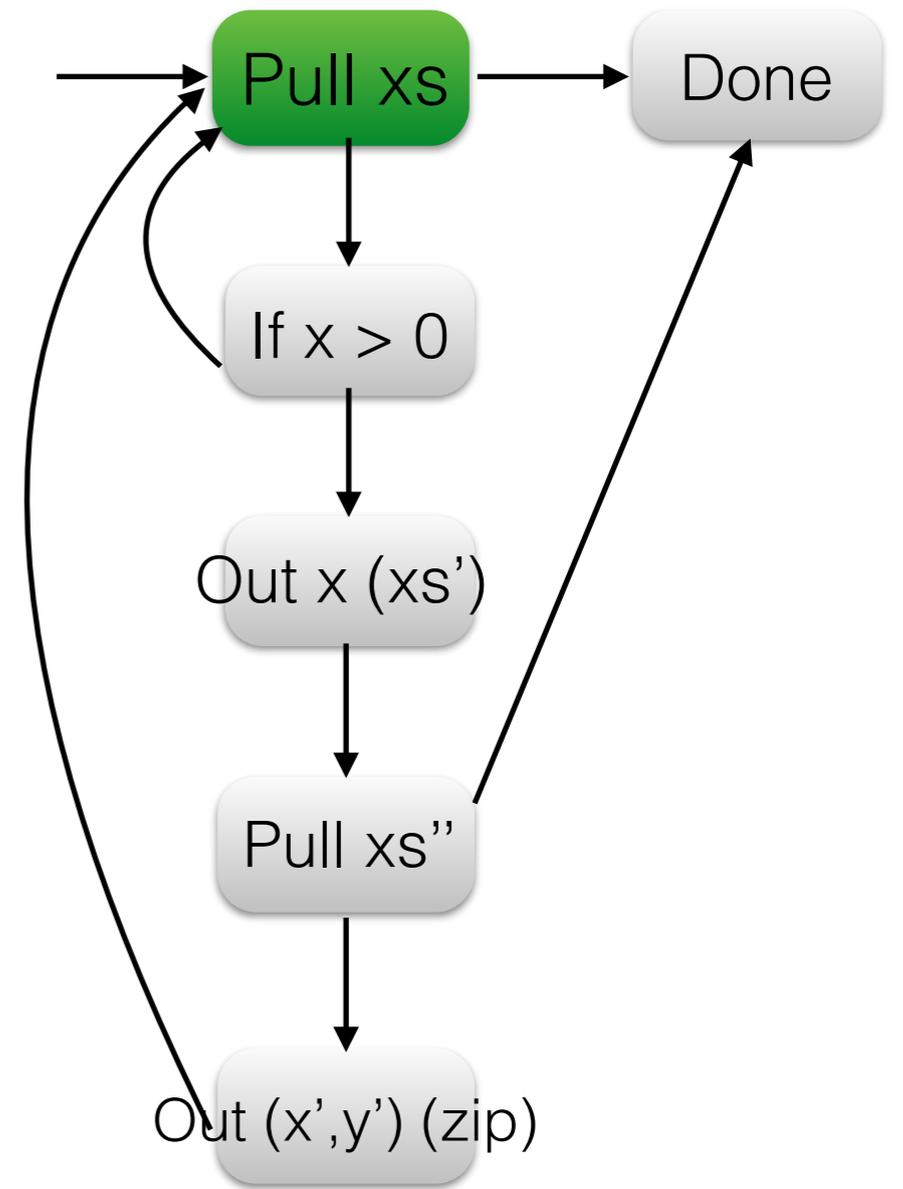
# bad again



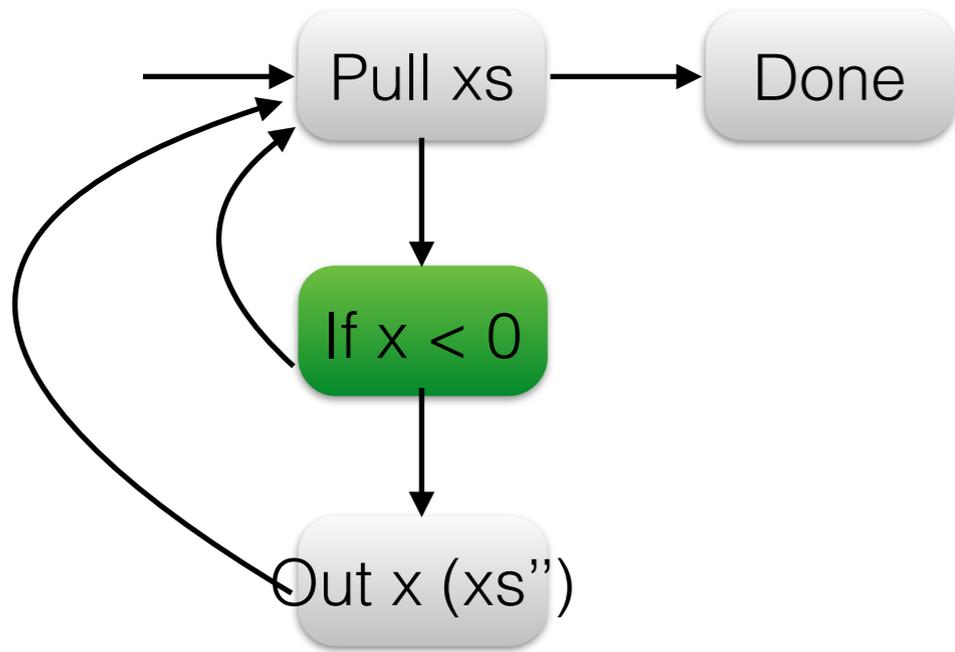
filter ( $<0$ ) xs



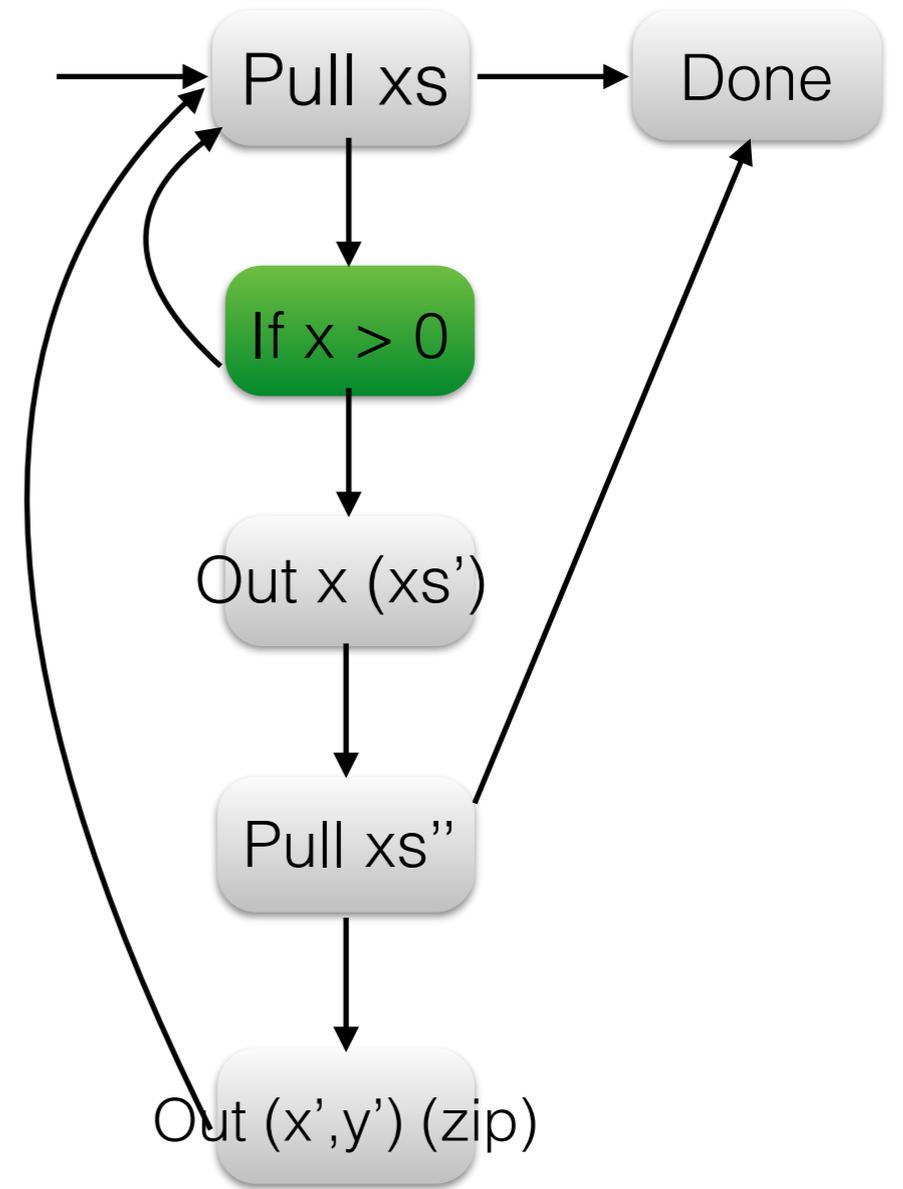
zip (filter ( $>0$ ) xs) xs''



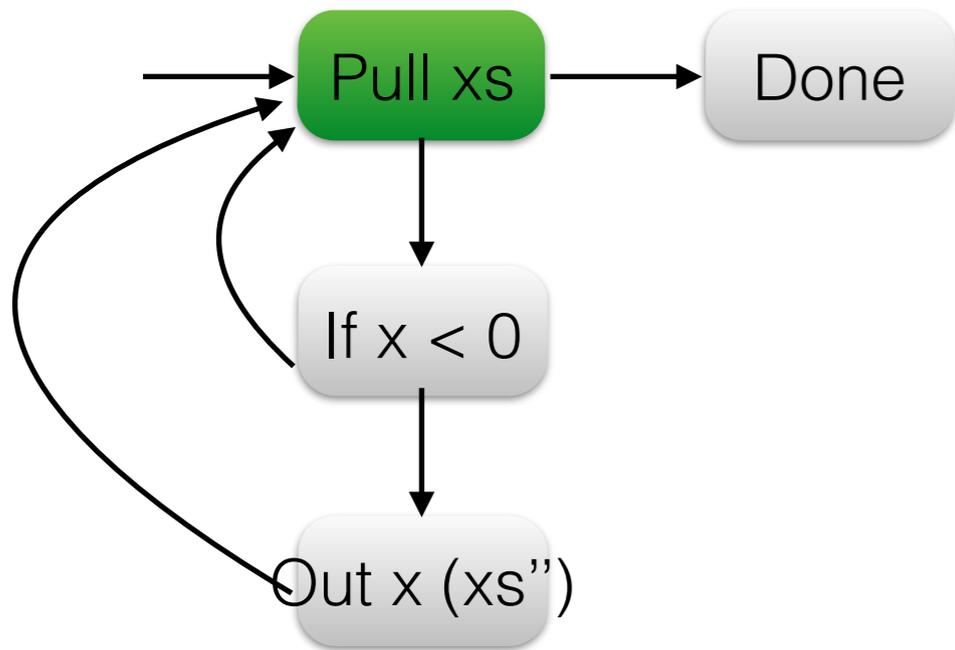
filter ( $<0$ ) xs



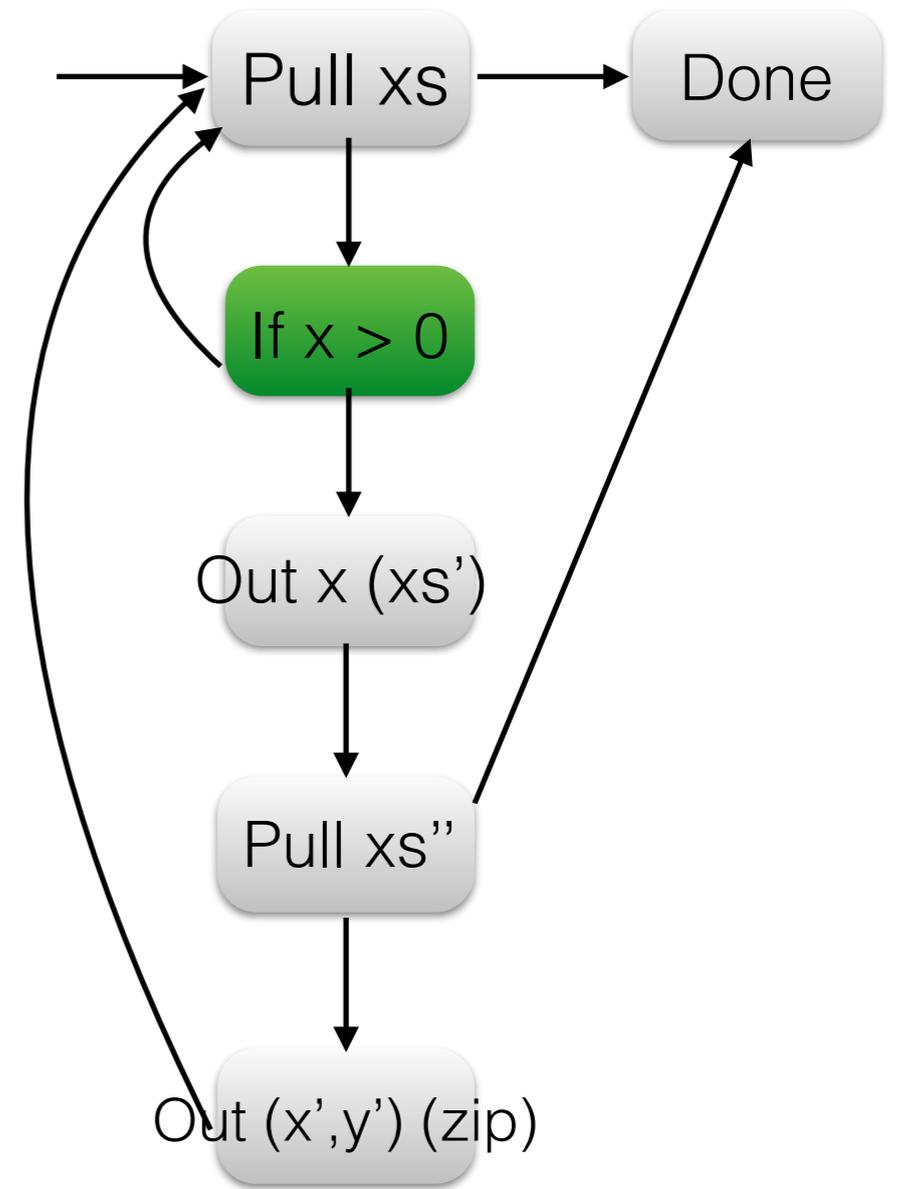
zip (filter ( $>0$ ) xs) xs''



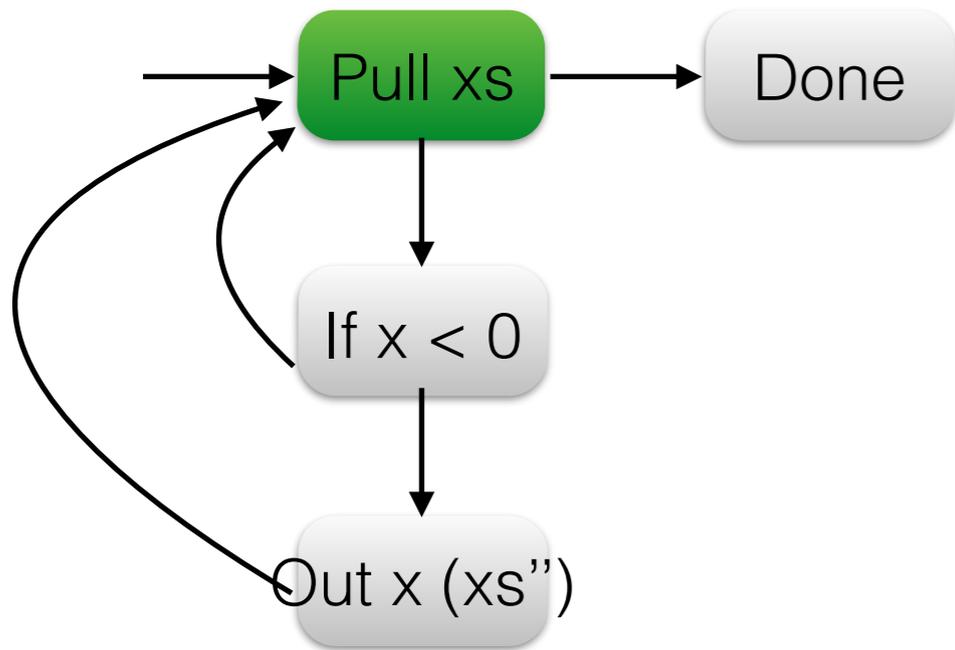
filter ( $<0$ ) xs



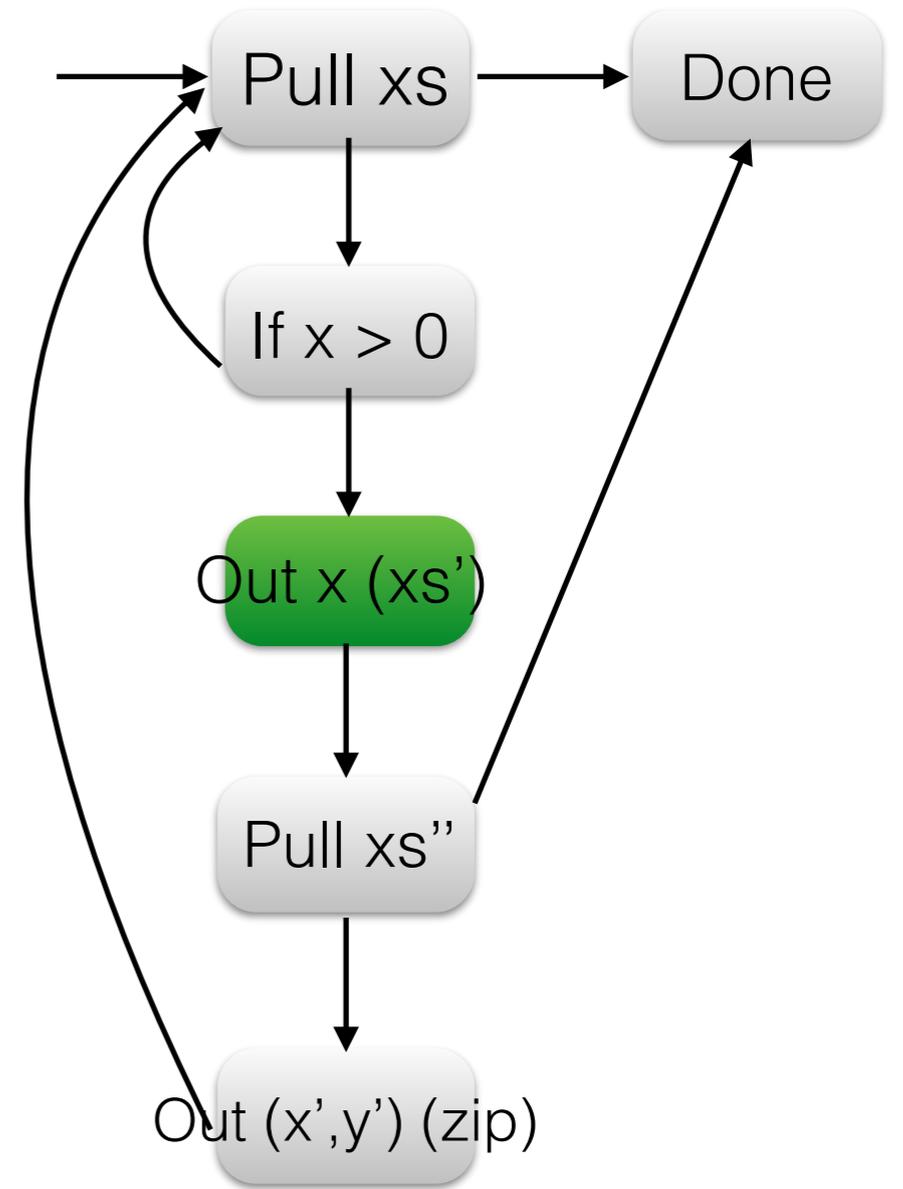
zip (filter ( $>0$ ) xs) xs''



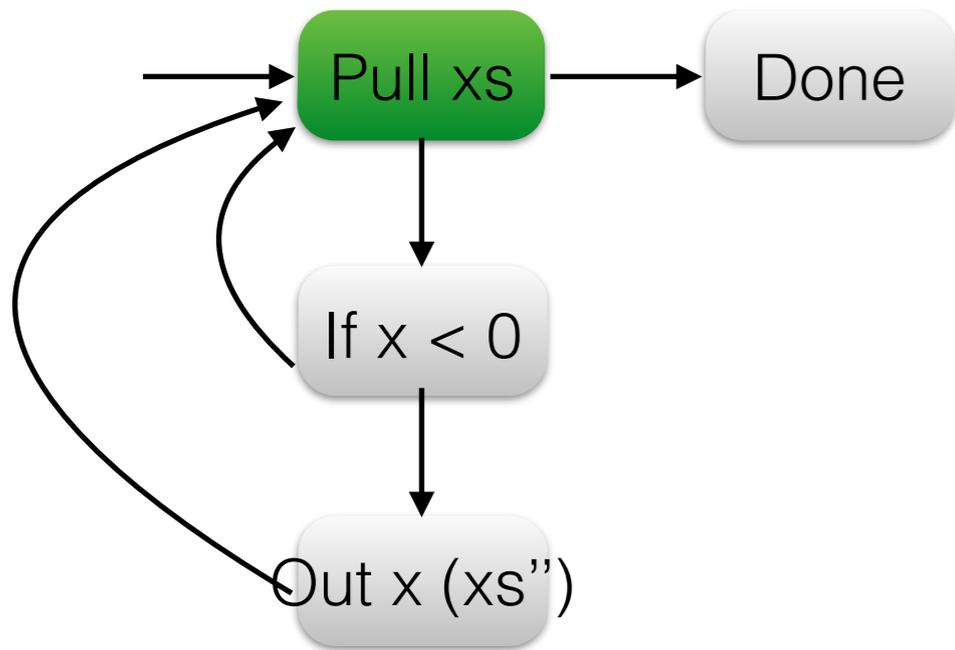
filter ( $<0$ ) xs



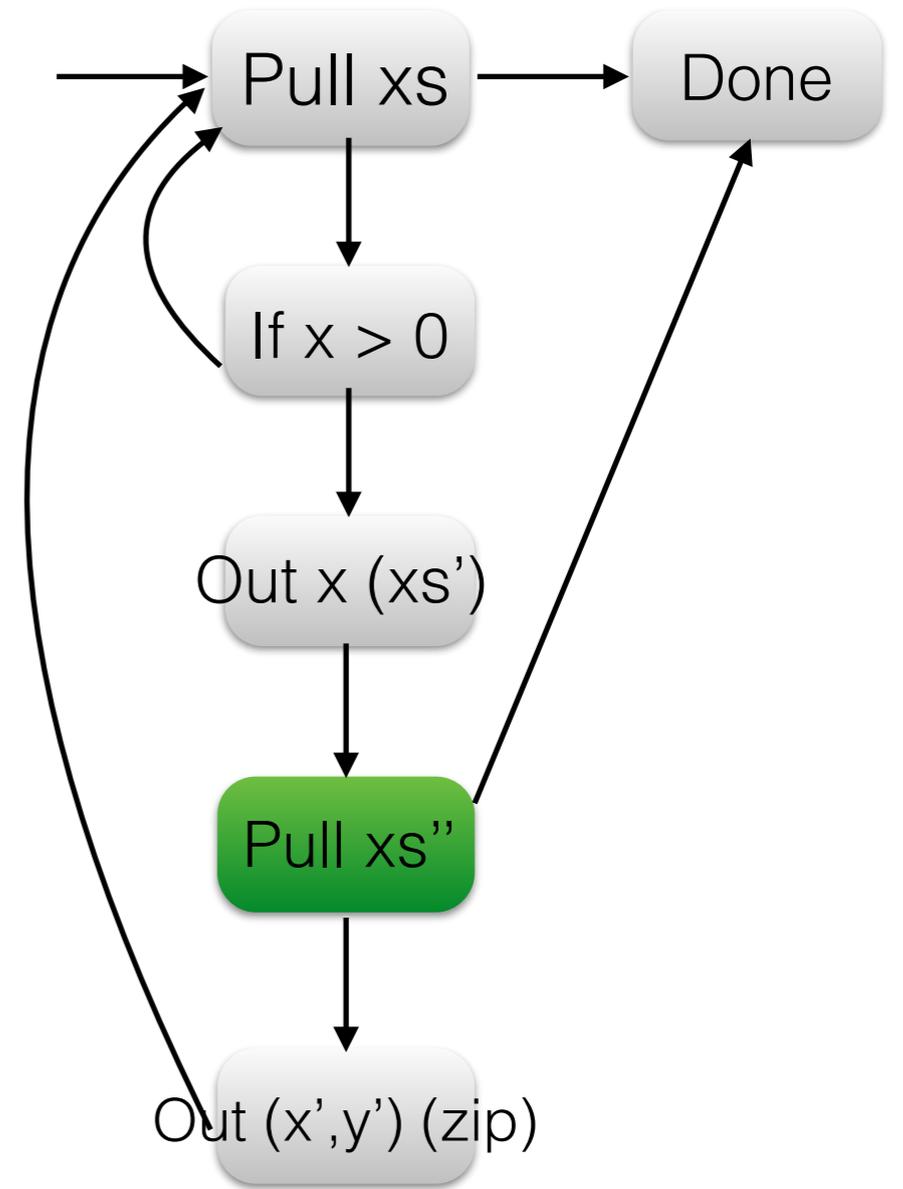
zip (filter ( $>0$ ) xs) xs''



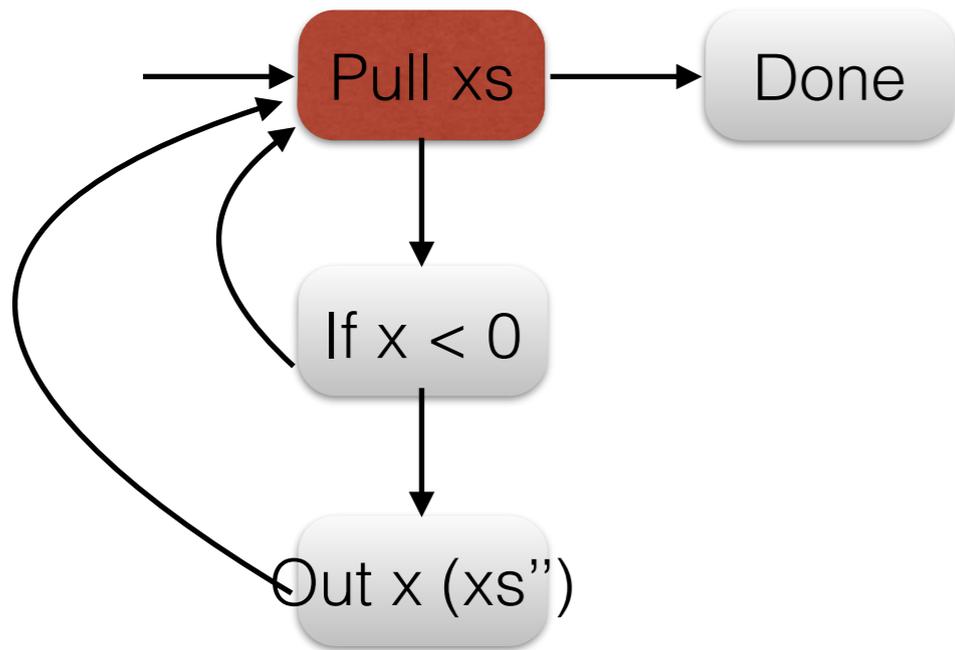
filter ( $<0$ ) xs



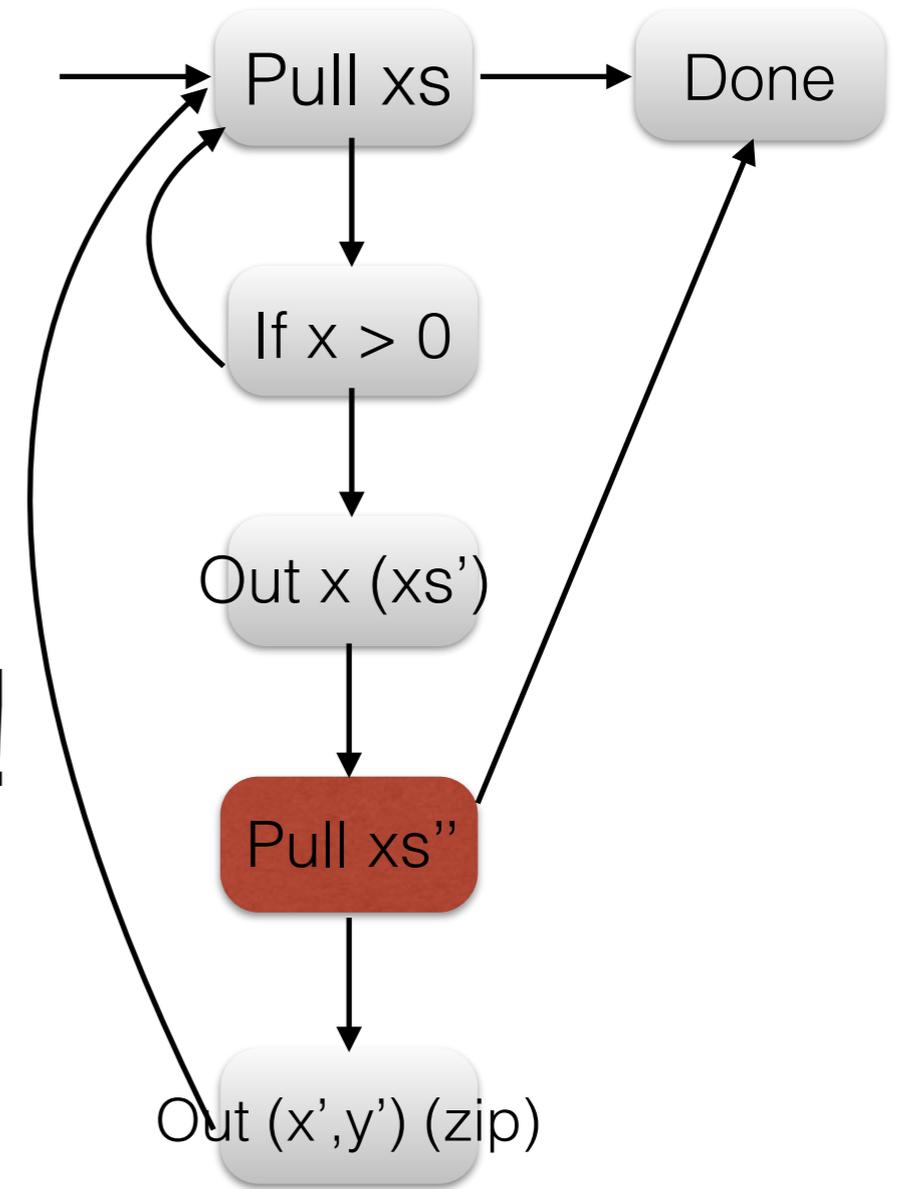
zip (filter ( $>0$ ) xs) xs''



filter ( $<0$ ) xs



zip (filter ( $>0$ ) xs) xs''



Deadlock!