MCC092
Postlab lab 3 &
prelab lab 4

2017-09-28

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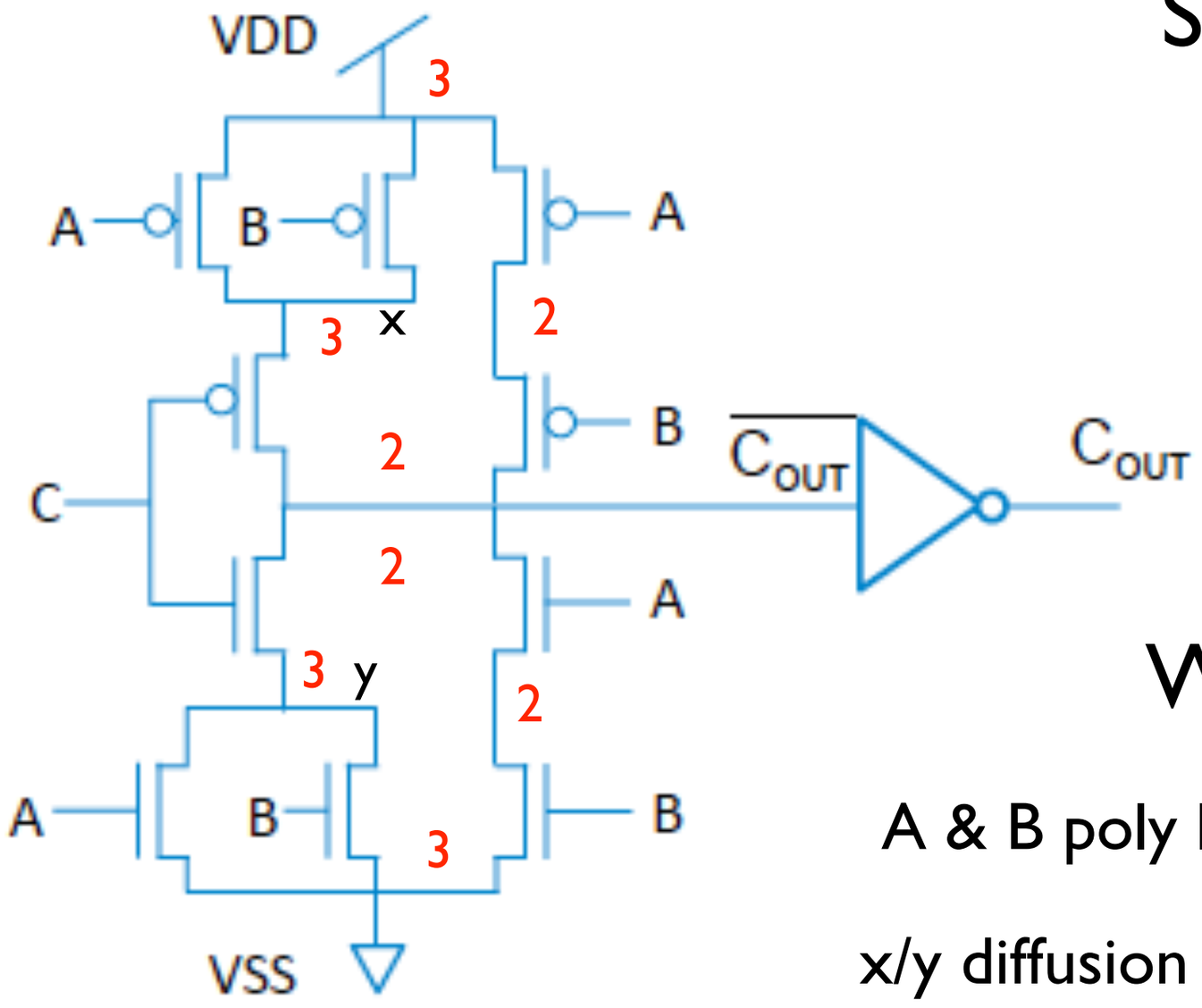
Lab 3

- Do your design on paper first.
- Euler analysis is good - but there may be multiple solutions
- Stick diagrams help.
    - If you must revise your solution do that on paper first!

Euler path



Same topology in n-net and p-net.

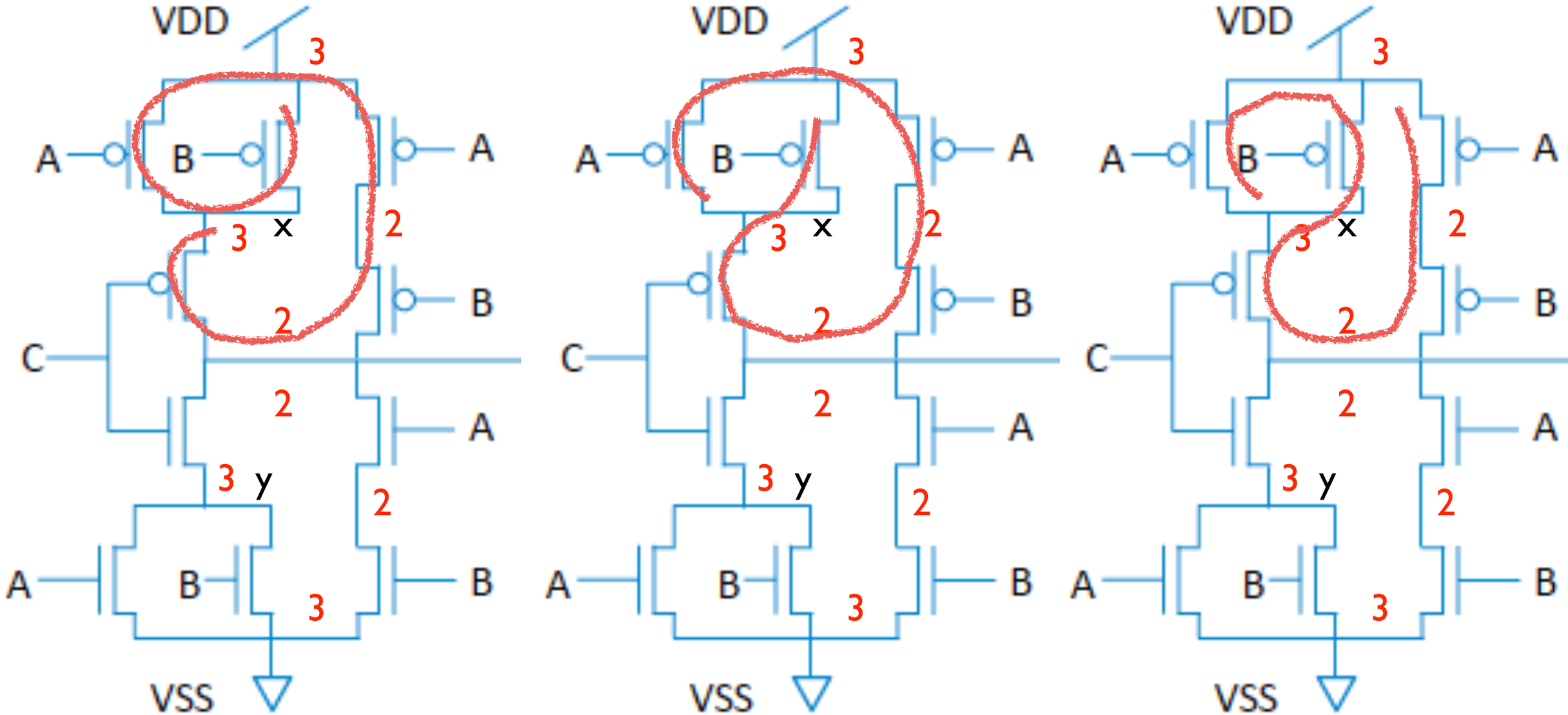
Odd order nodes: Start/end in x/y and VDD/VSS

Which one too choose?

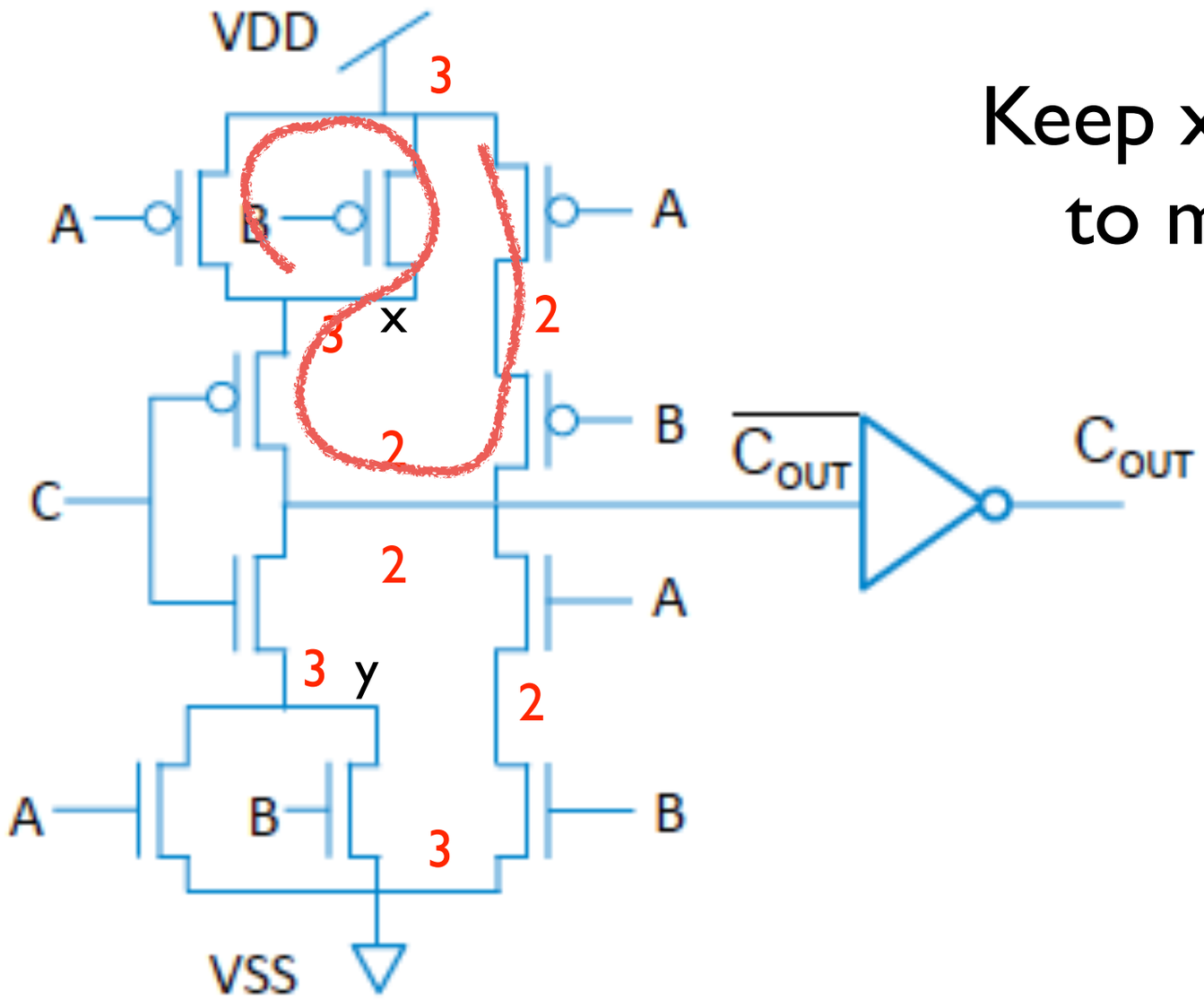
A & B poly lines must be connected

x/y diffusion areas must be connected with metal-1 wire since their node order is > 2

Three Euler paths



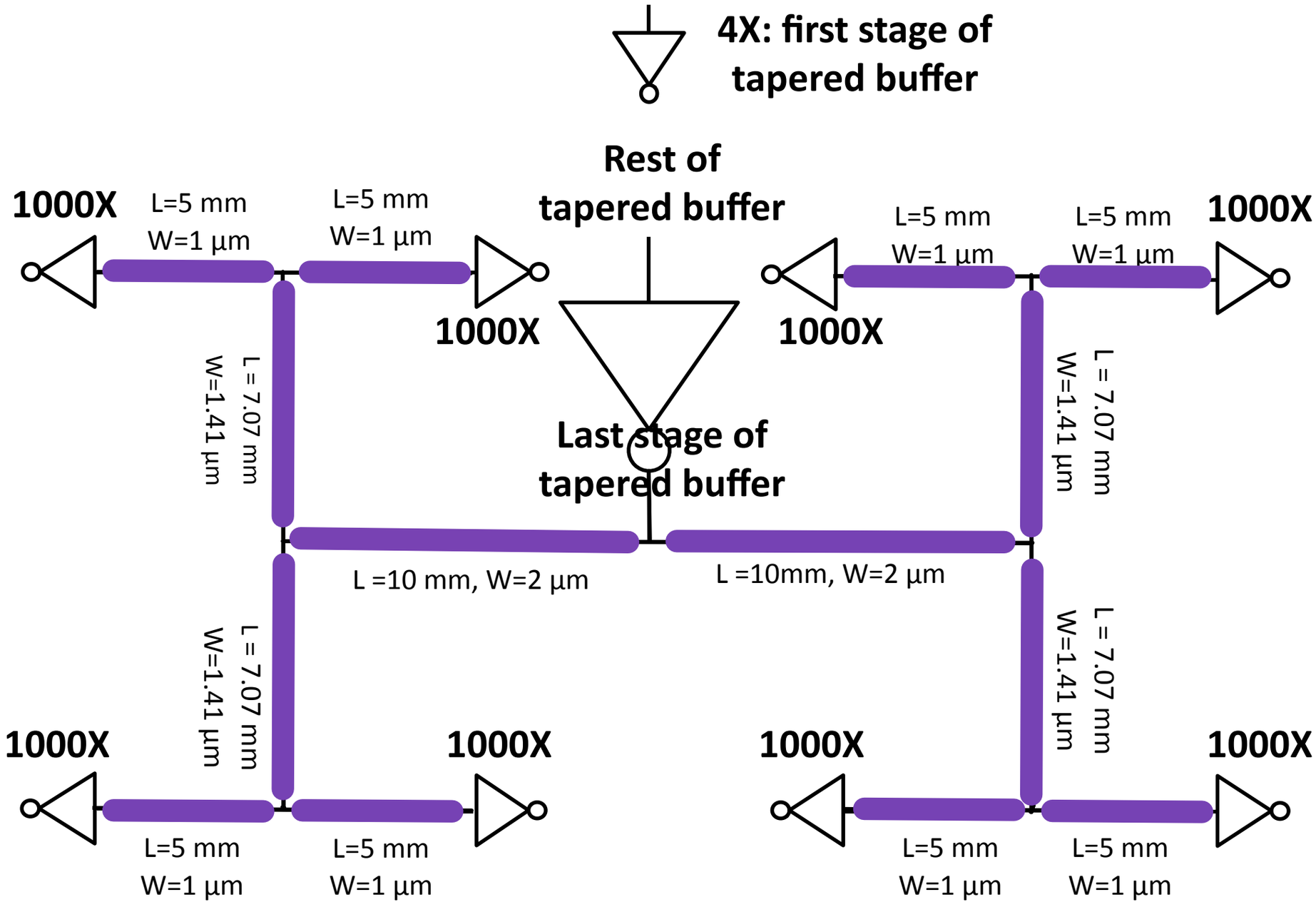
Best Euler path



Best solution(s):
Keep x/y diffusion areas close
to minimize wire lengths

Thus best solution(s):
A B C B A
A B C A B

Prelab 4


4X: first stage of tapered buffer
Rest of tapered buffer
Last stage of tapered buffer
1000X
L=5 mm
W=1 µm
L = 7.07 mm
W=1.41 µm
L =10 mm, W=2 µm
L =10mm, W=2 µm

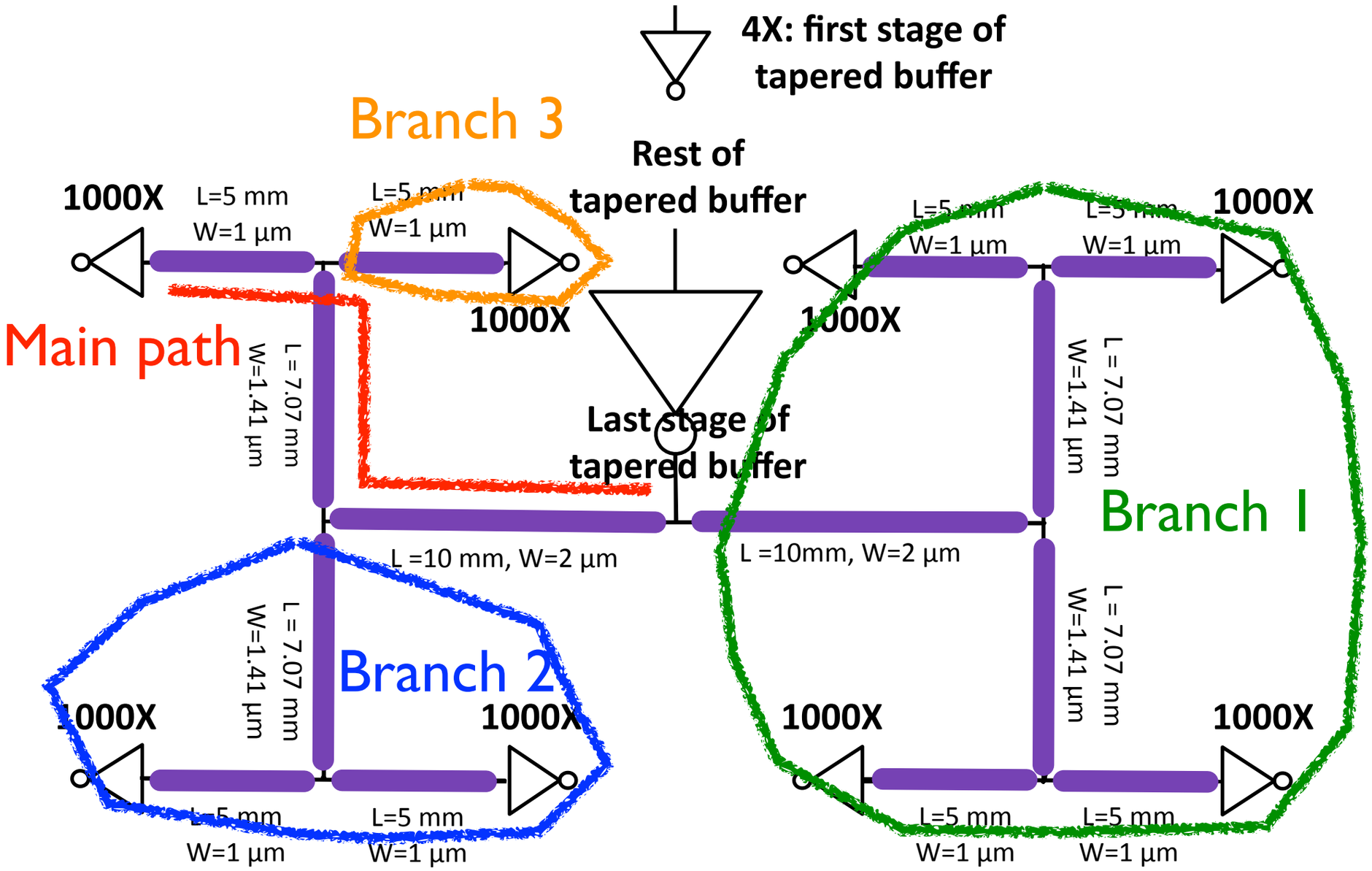
Prelab 4, calculations part 1

- Each wire segment = one pi link
- First, R_{SH}=0, that is whole tree is one big capacitance
- Design a tapered buffer to drive this huge capacitance

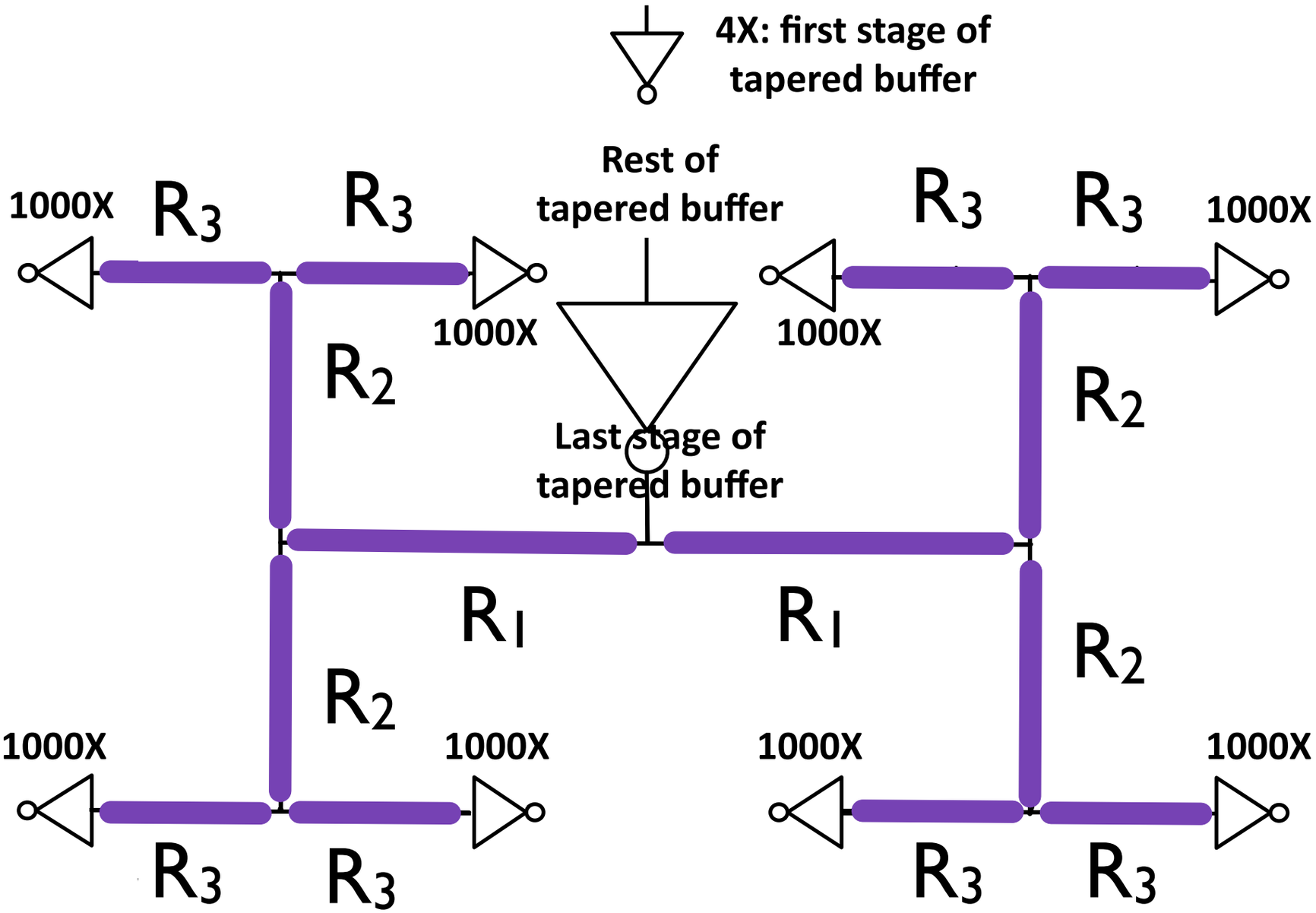
Prelab 4, calculations part 2

- Assume $R_{SH} \neq 0$
- Calculate delay to leaves using Elmore model
- Collapsed tree helps!

H-tree branching

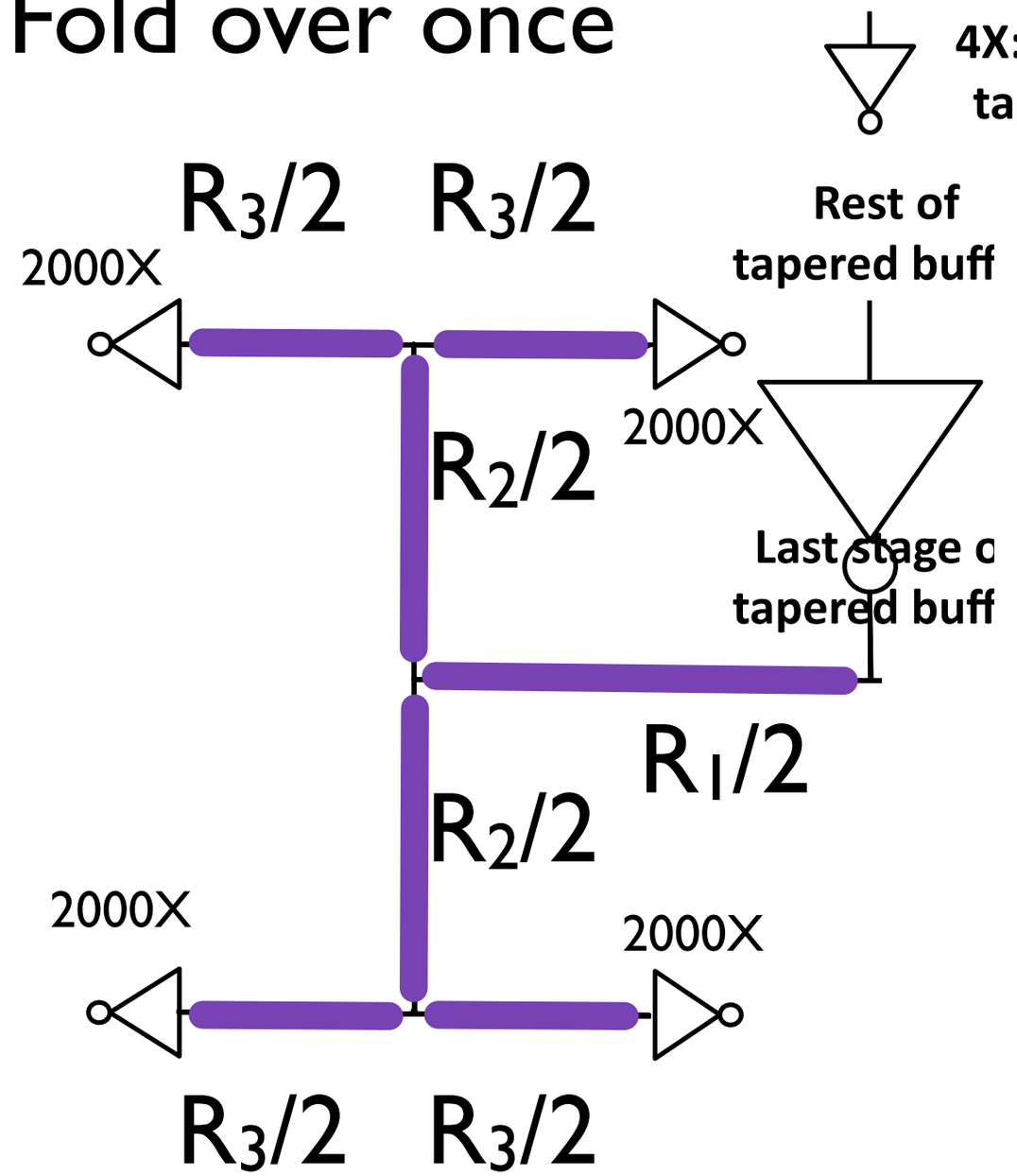


H-tree collapsing



H-tree collapsing

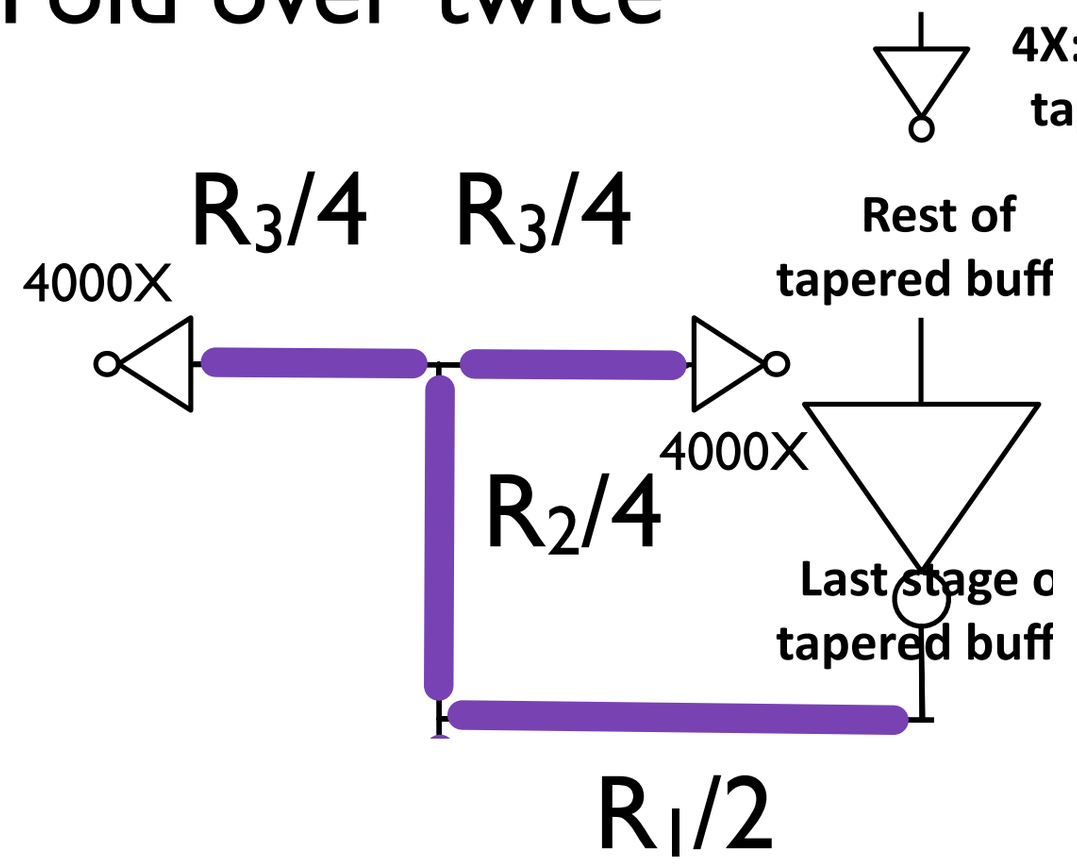
Fold over once



And wire capacitances are added

H-tree collapsing

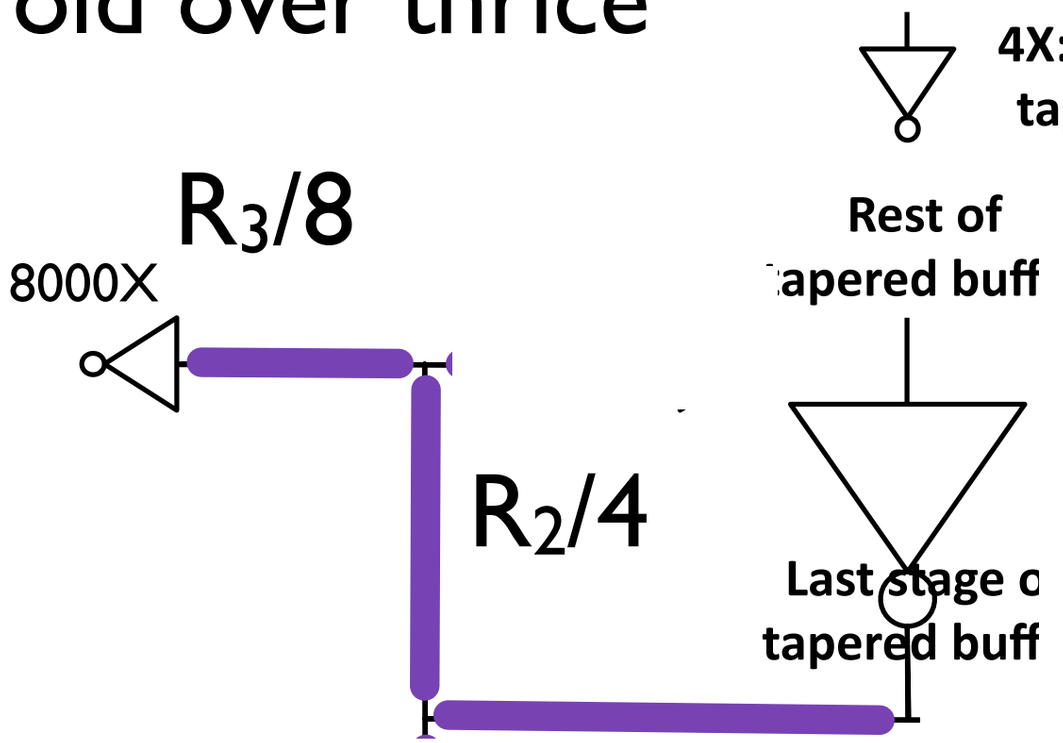
Fold over twice



And wire capacitances are added again

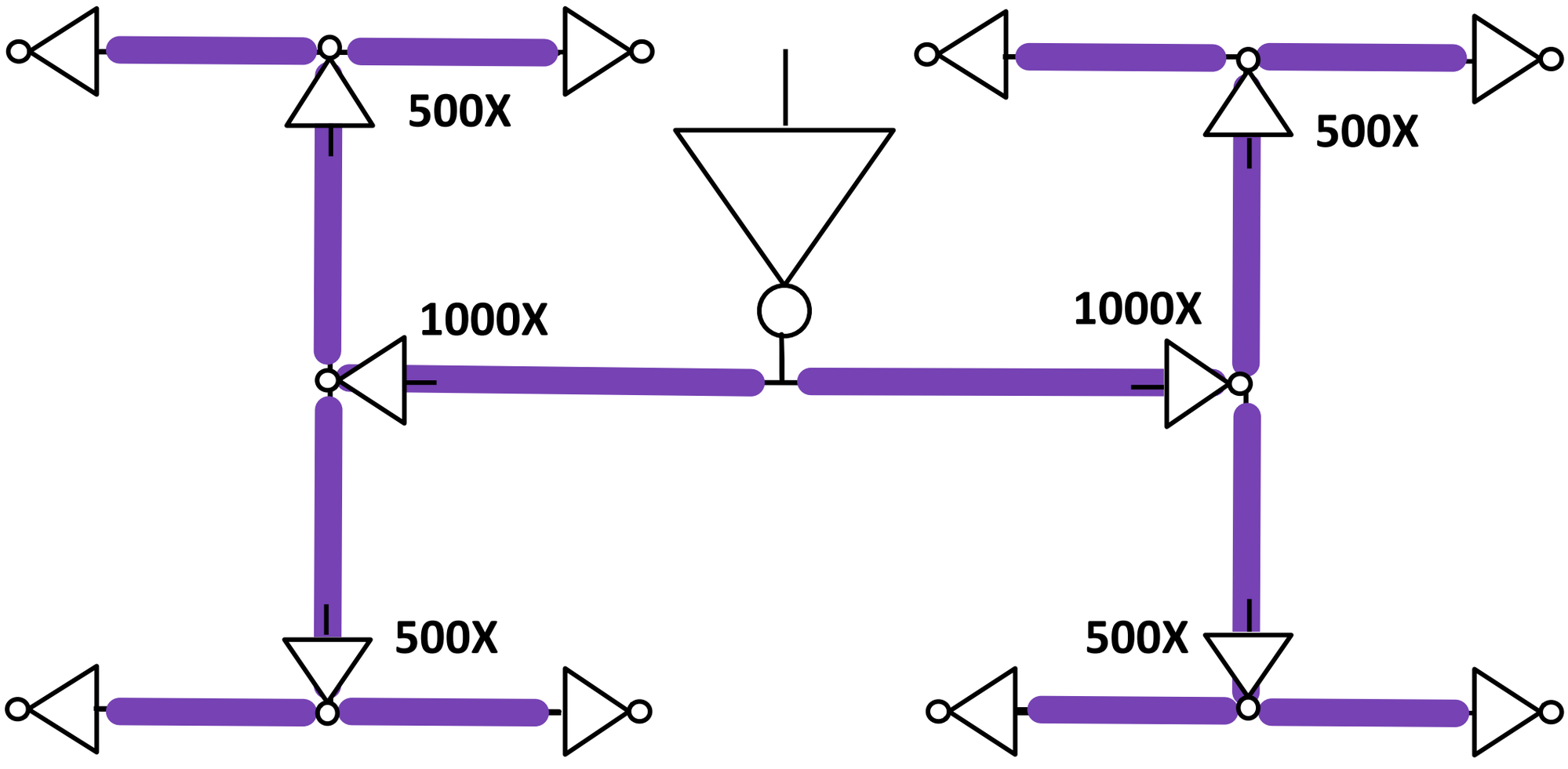
H-tree collapsing

Fold over thrice



And wire capacitances are added again

Prelab 4, calculations part 3



Prelab 4

- Write the input file properly!
- Otherwise you have to spend valuable lab time doing that!