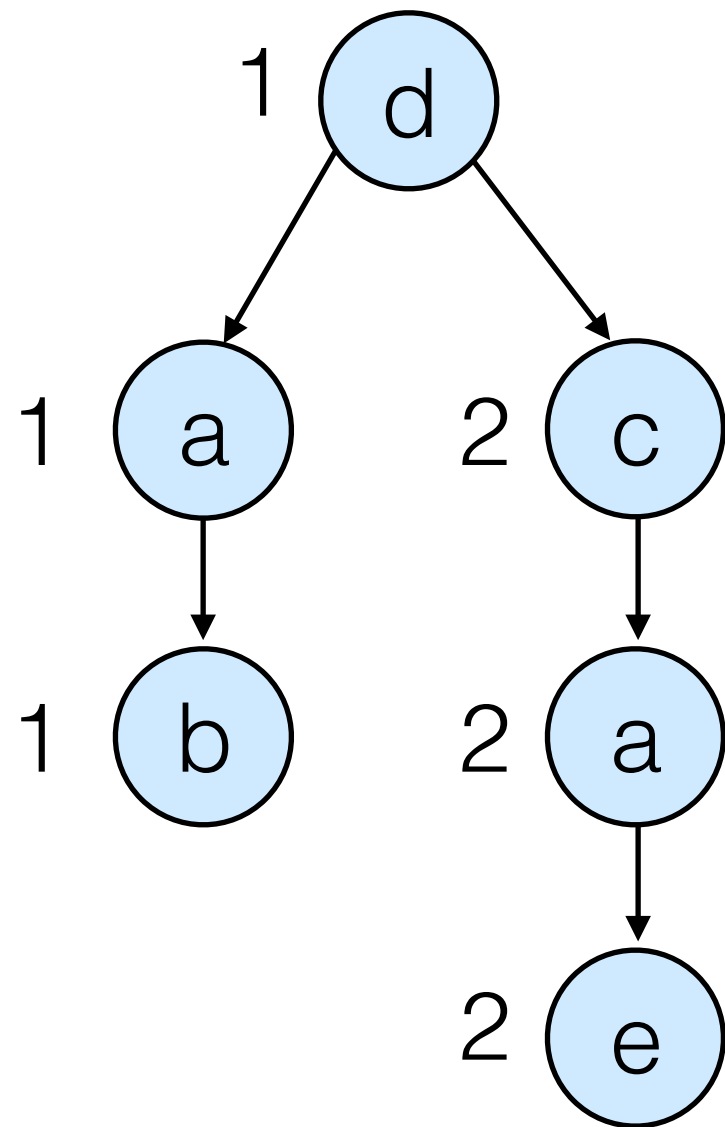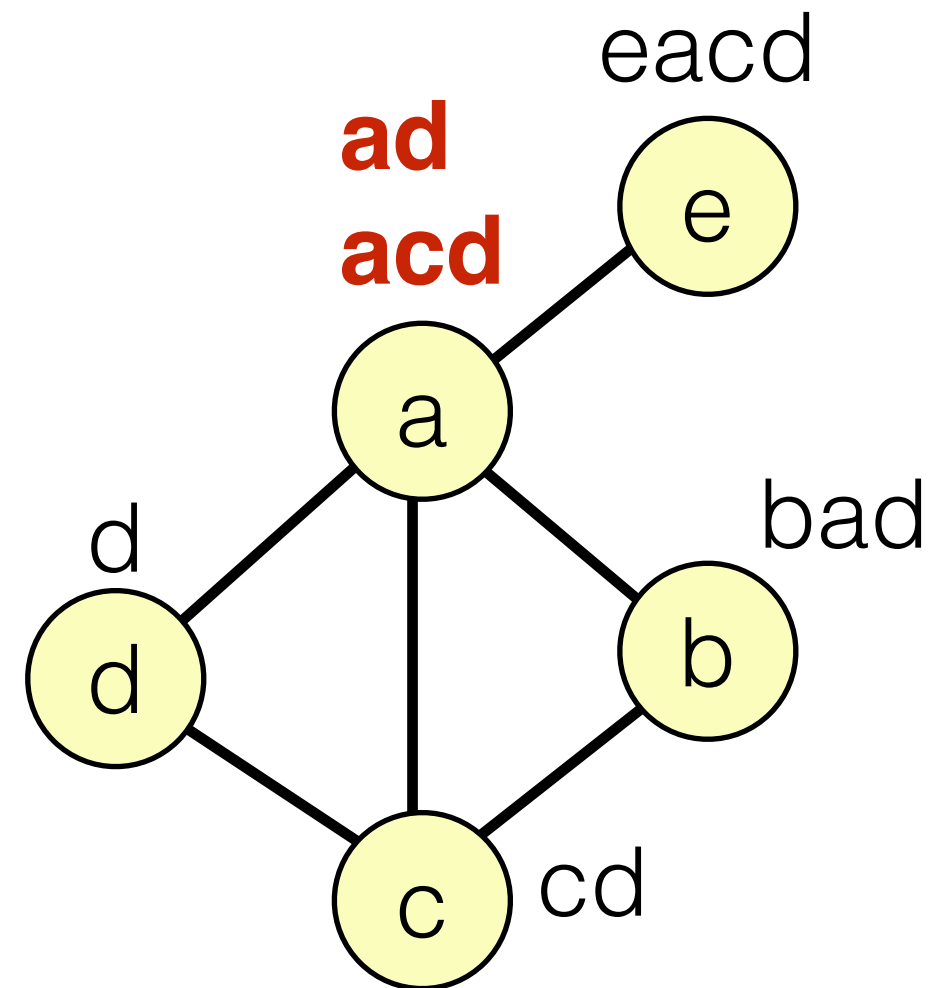# Product Graph

Topology w/Preferences

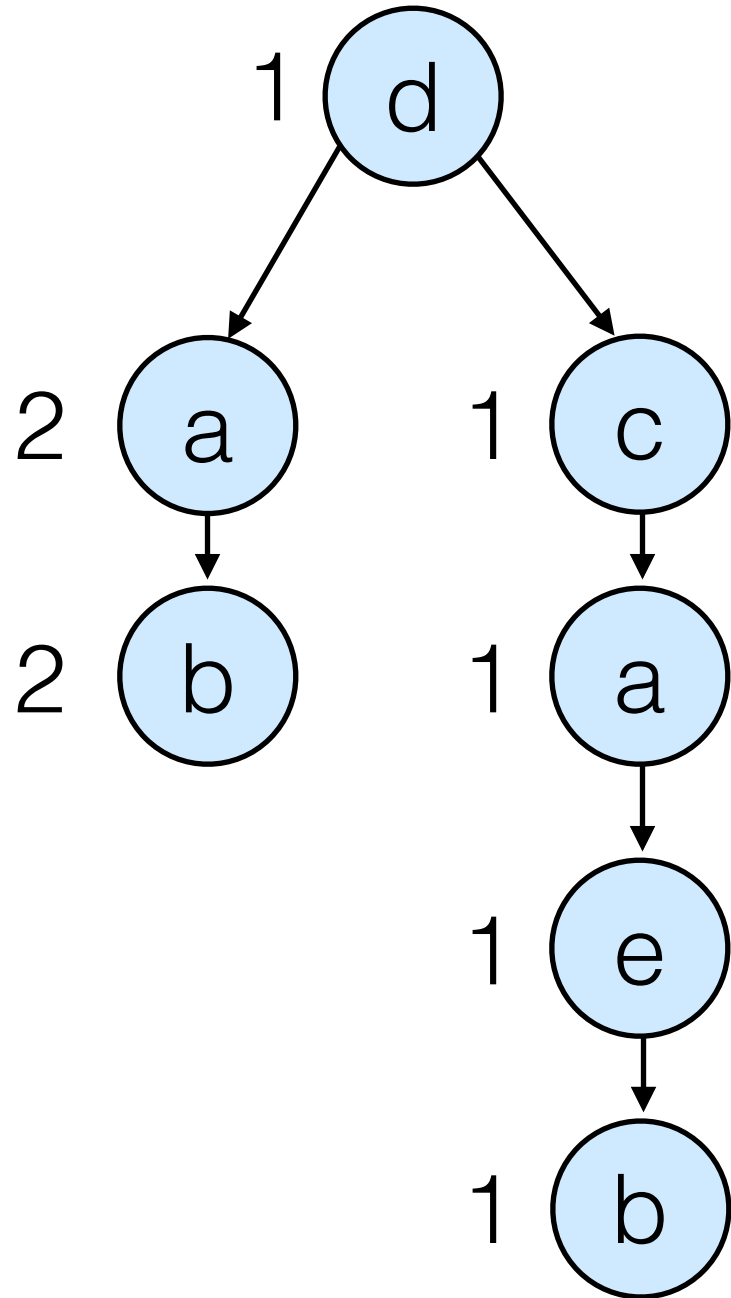inferred preferences

If router **a** prefers **d** then there is no path to **e**
If router **a** prefers **c** then there is no path to **b**
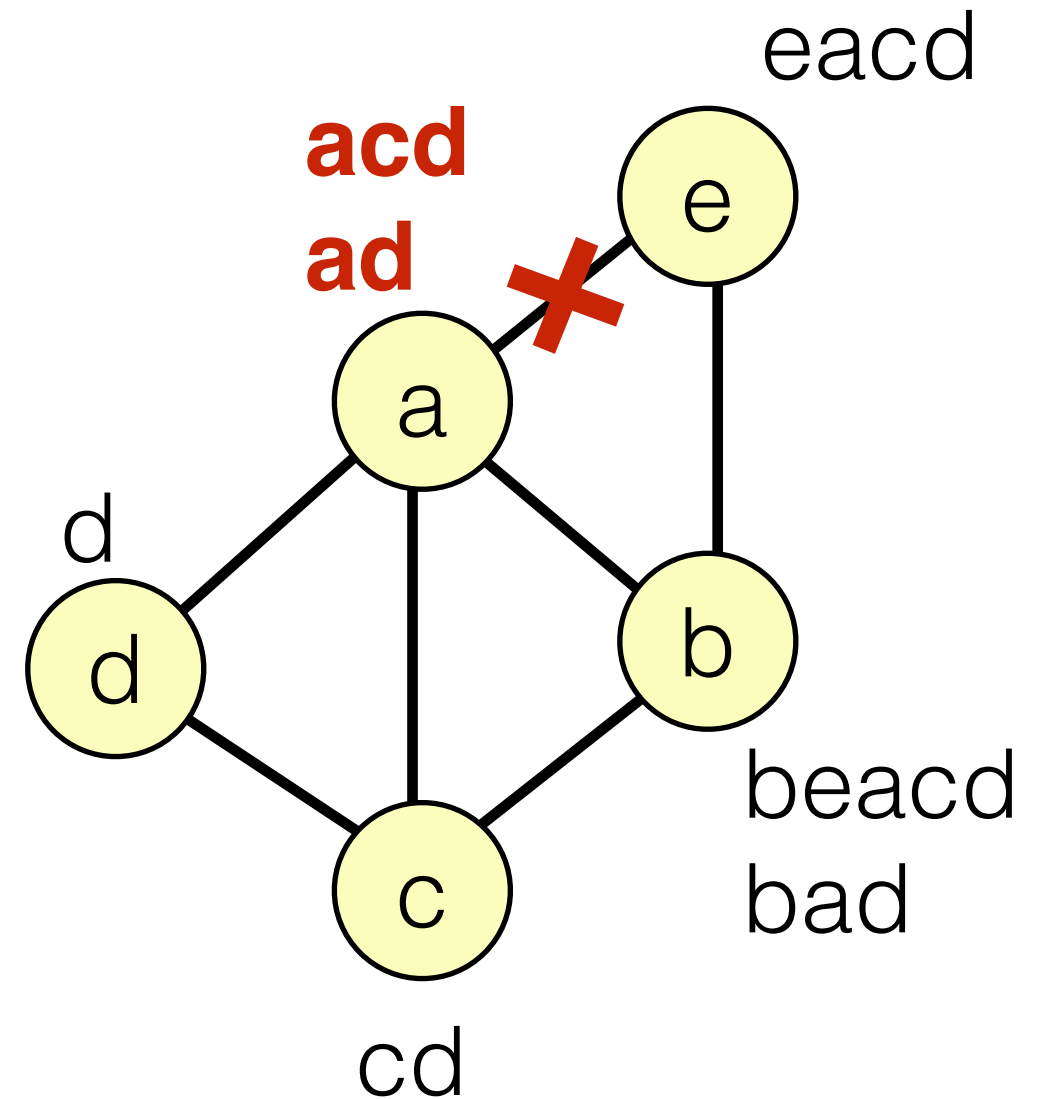even though such paths are available

Product Graph

1 d
2 a   1 c
2 b   1 a
          1 e
          1 b

Topology w/Preferences

inferred preferences

eacd

acd
ad

e
a
d
d
b
c

beacd
bad
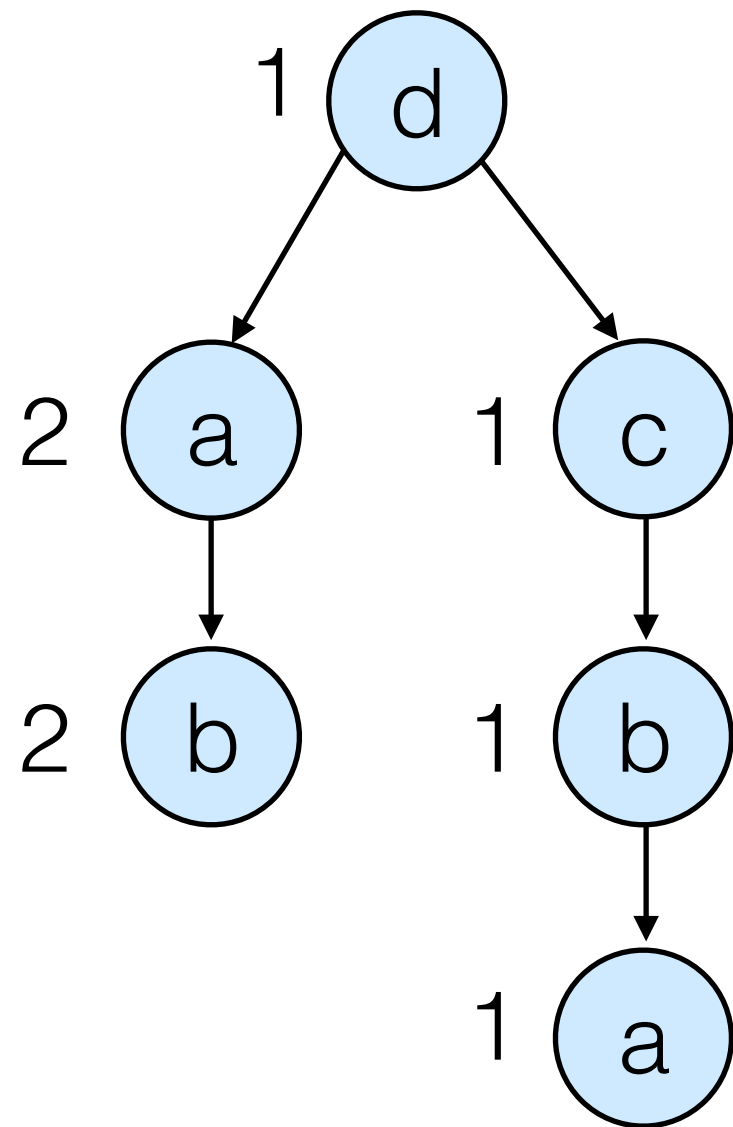
cd

router **a** cannot safely prefer **c** over **d** since the **a—e** link might be failed, so **b** will not be reachable even though **bad** is available
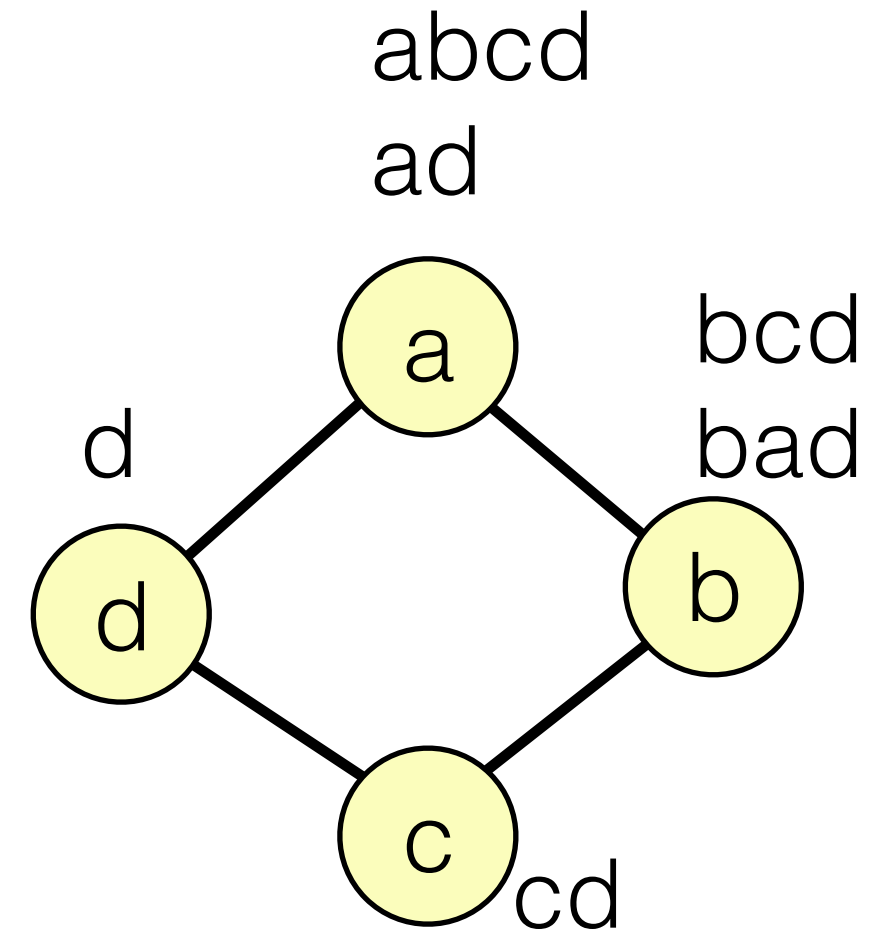
Product Graph

Topology w/Preferences

1 d

2 a 1 c

2 b 1 b

1 a

inferred
preferences

abcd
ad

a

bcd
bad

d

b

d

c

cd

Since **b** dominates **a**, there is no risk of **b** not having a (best) path to the destination if **a** prefers the path **abcd**