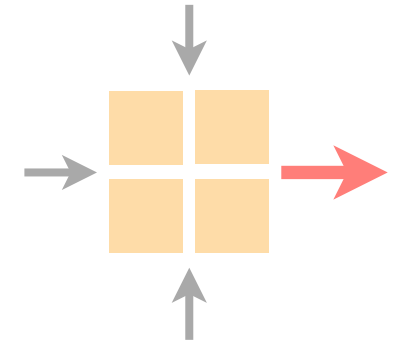


Communication Networks

Spring 2020



Rüdiger Birkner

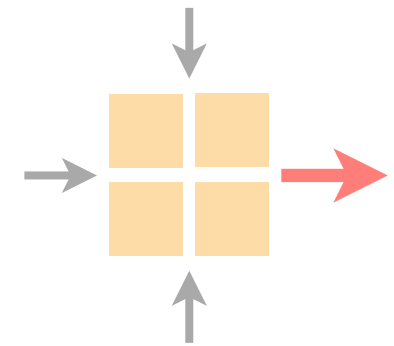
<https://comm-net.ethz.ch/>

ETH Zürich

March 12 2020

Communication Networks

Exercise 3



Internet Routing Project

Last weeks exercise

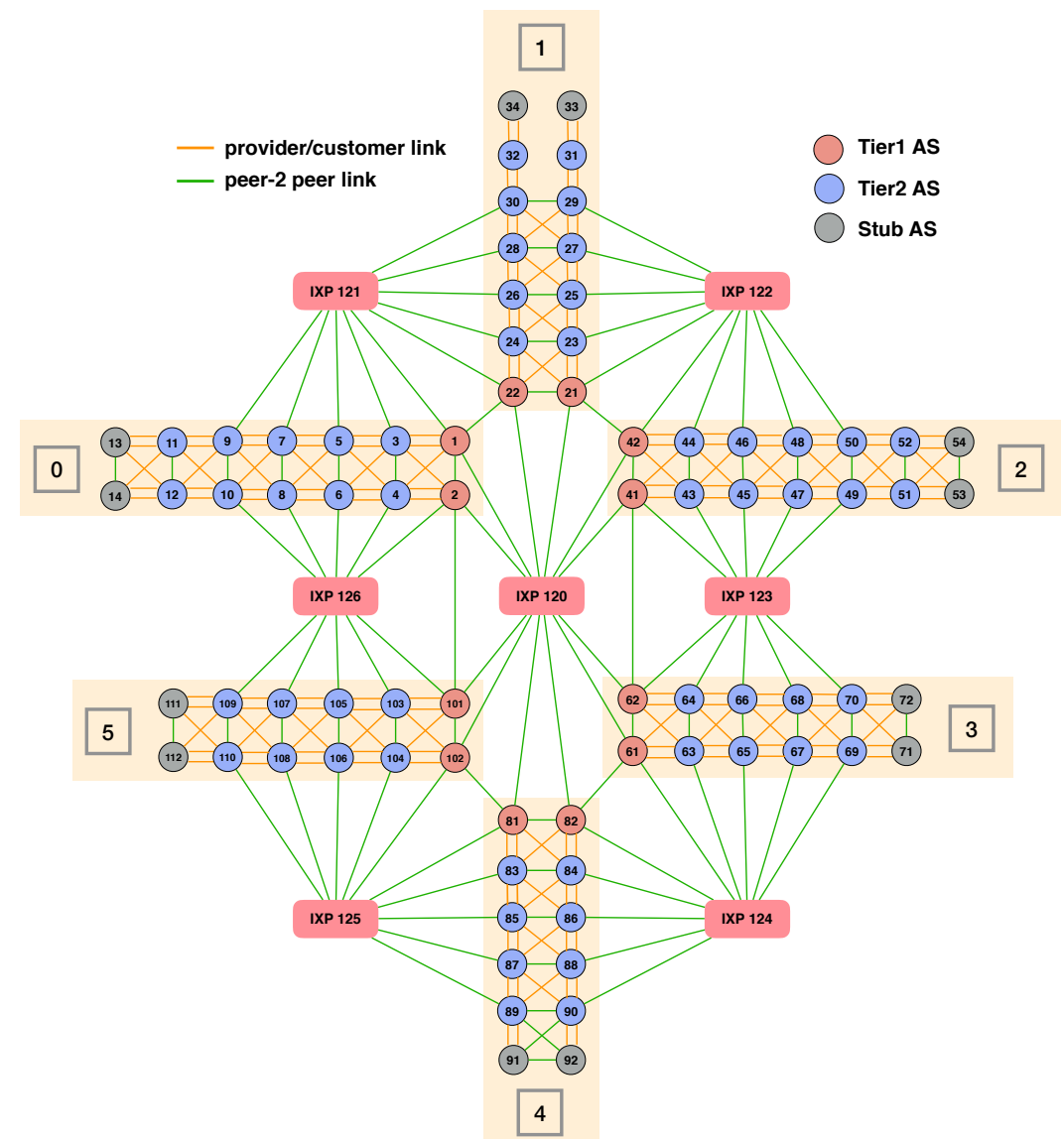
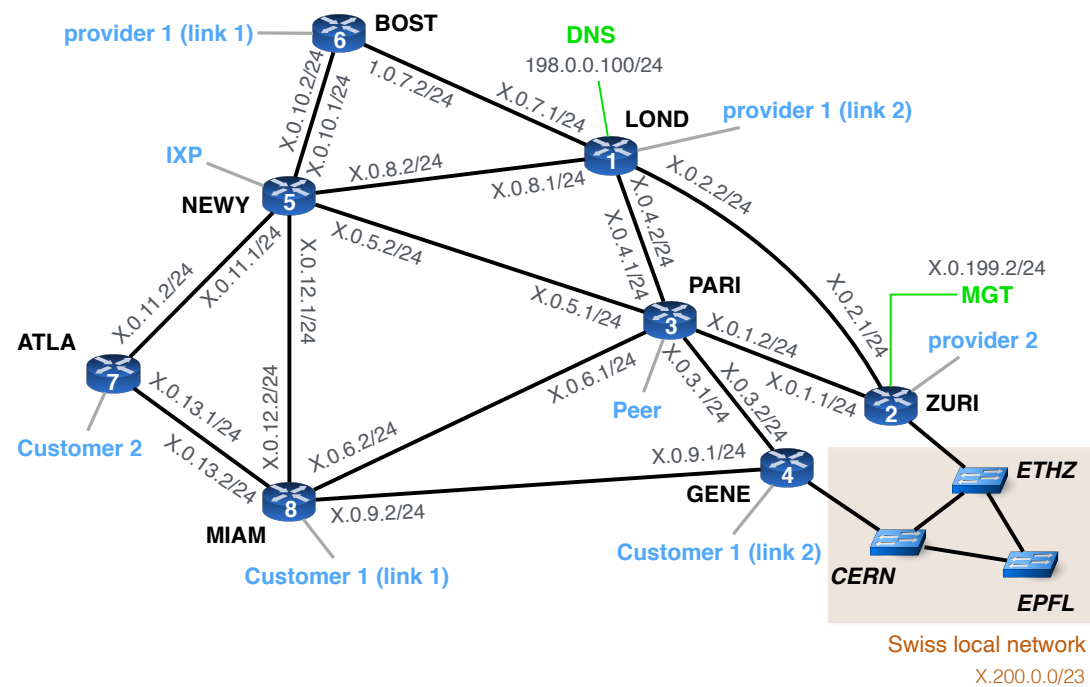
Current exercise

Questions?

Time for you to solve the tasks

Internet Routing Project

starts on Monday, March 16th



Group registration is open

Register on <https://comm-net.ethz.ch/registration>

Enter your nethz usernames

Please build groups of **three** students

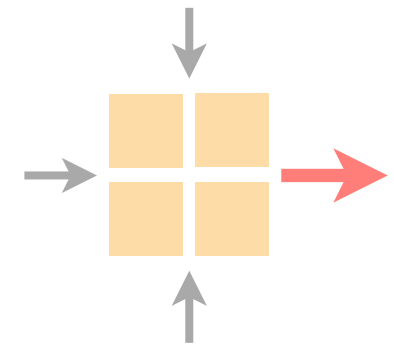
Join the *#group_search* Slack channel if you need more members

“Internet Hackathon” is cancelled
information on online alternative will follow



Communication Networks

Exercise 3



Internet Routing Project

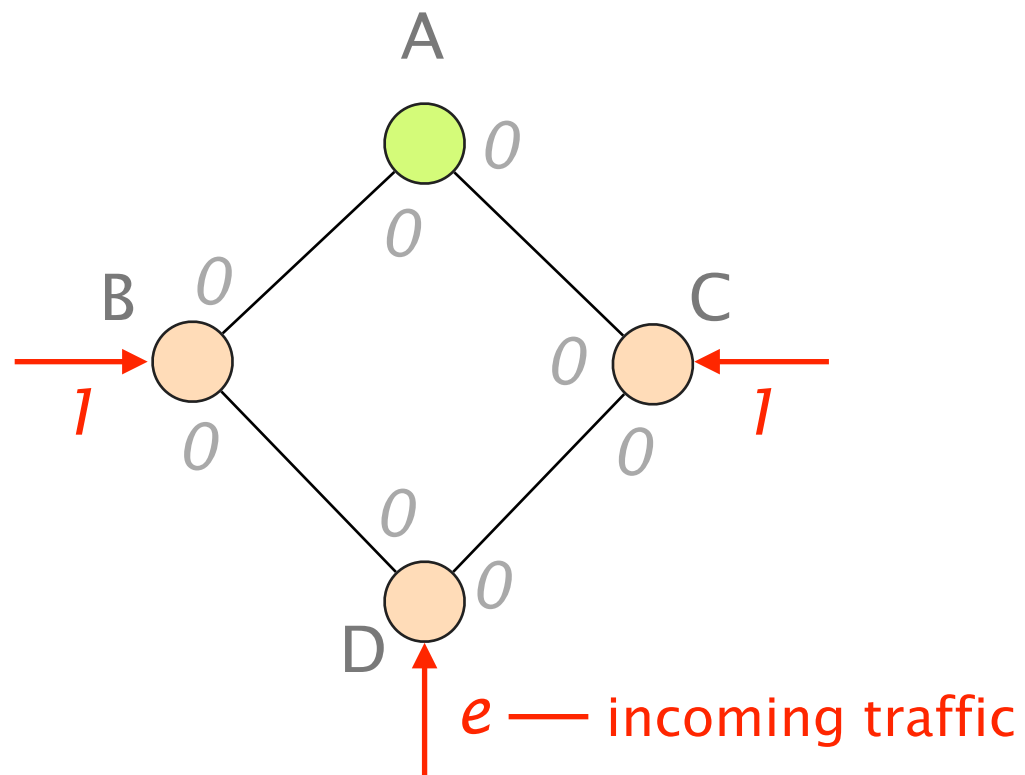
Last weeks exercise

Current exercise

Questions?

Time for you to solve the tasks

Task 2.2: Changing weights



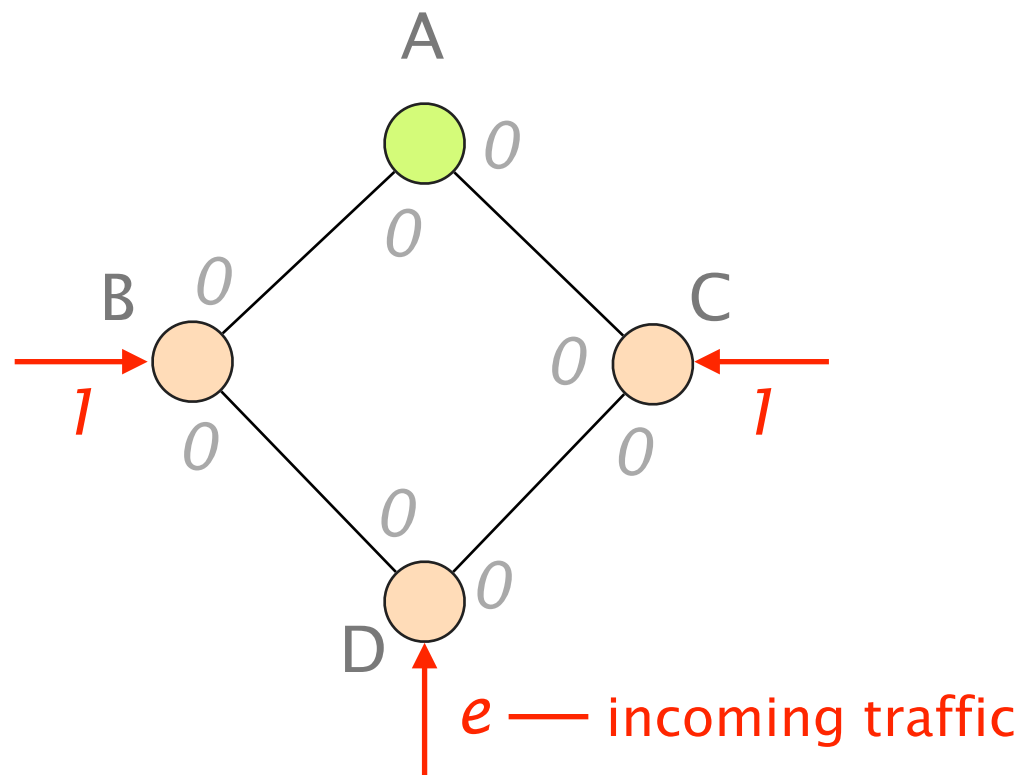
dynamic weights

weights correspond to link load

bidirectional weights

$\text{weight}(A \rightarrow B) \neq \text{weight}(B \rightarrow A)$

Task 2.2: Changing weights



round-based approach

#1

update link weights

#2

compute shortest paths

repeat

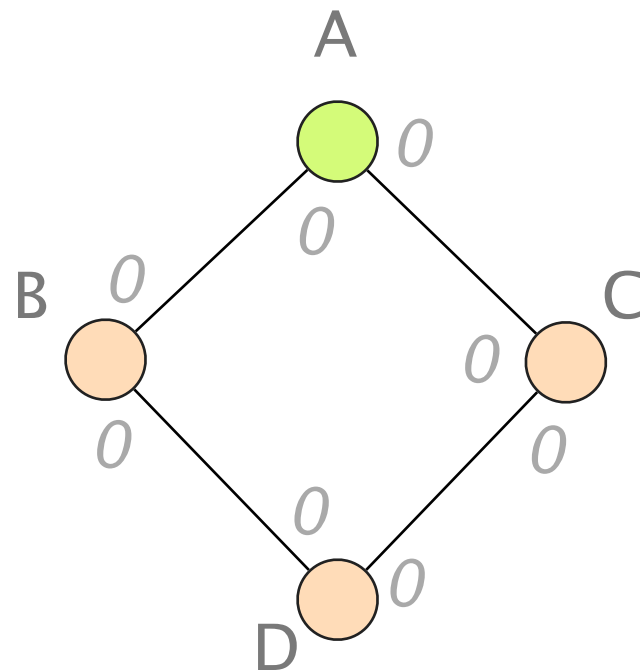
Task 2.2: Changing weights

round-based approach

#1 update link weights

#2 compute shortest paths

repeat



Link

Weight/Load

A->B

A->C

B->A

B->D

C->A

C->D

D->B

D->C

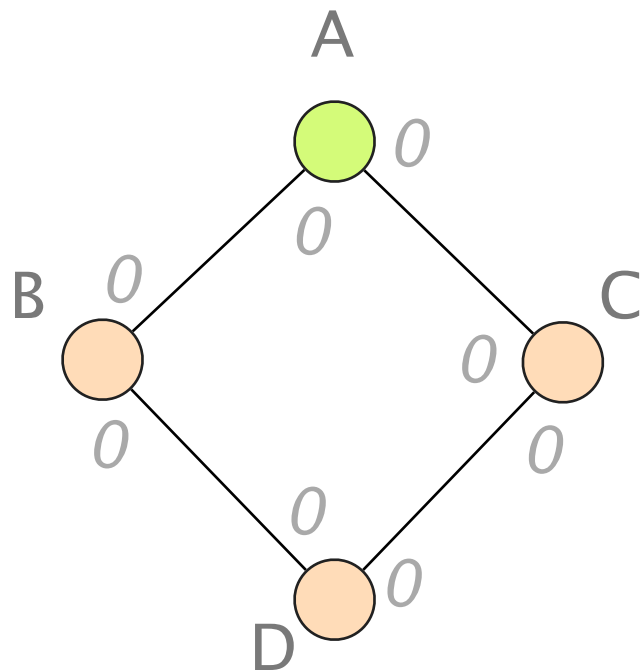
Task 2.2: Changing weights

round-based approach

#1 **update link weights**

#2 compute shortest paths

repeat



Link

Weight/Load

A->B 0

A->C 0

B->A 0

B->D 0

C->A 0

C->D 0

D->B 0

D->C 0

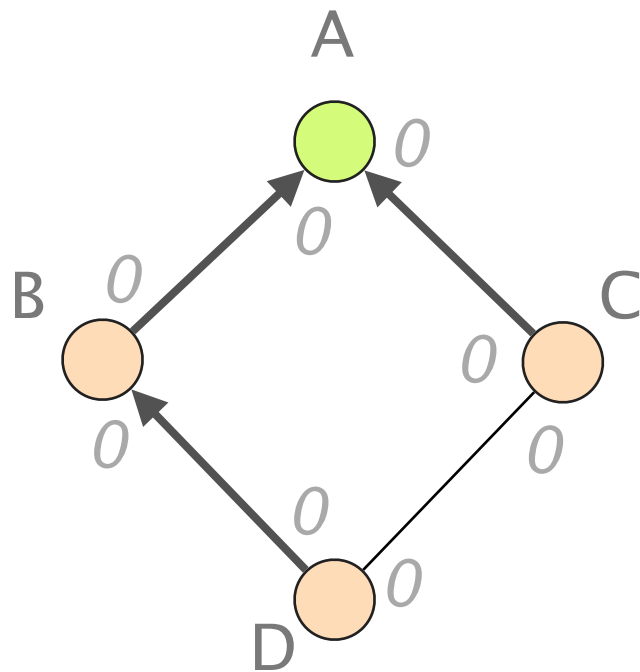
Task 2.2: Changing weights

round-based approach

#1 update link weights

#2 **compute shortest paths**

repeat



Link

Weight/Load

A->B 0

A->C 0

B->A 0

B->D 0

C->A 0

C->D 0

D->B 0

D->C 0

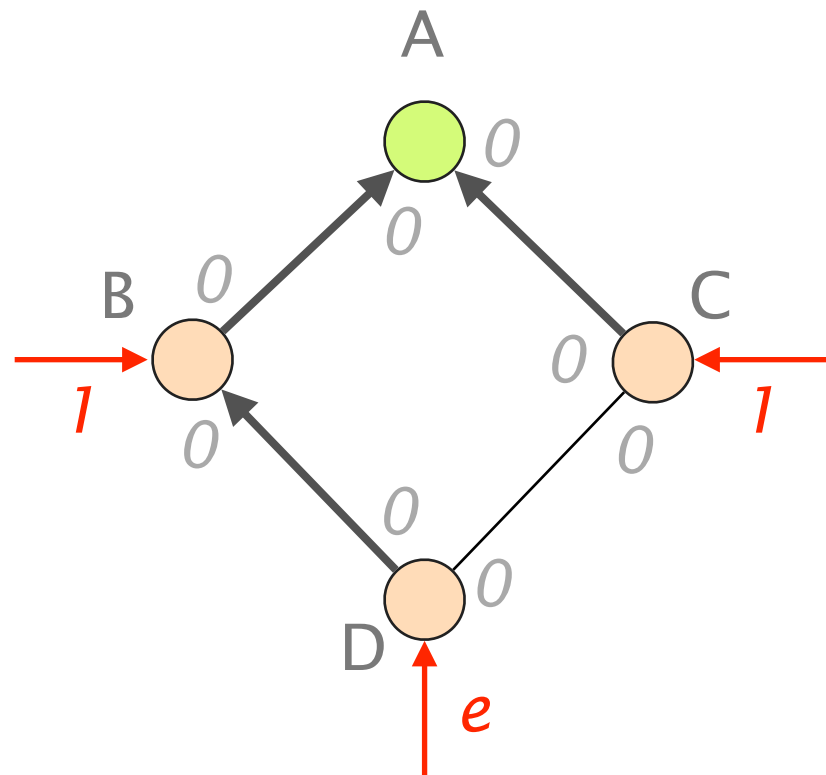
Task 2.2: Changing weights

round-based approach

#1 update link weights

#2 **compute shortest paths**

repeat



Link

Weight/Load

A->B 0

A->C 0

B->A 0

B->D 0

C->A 0

C->D 0

D->B 0

D->C 0

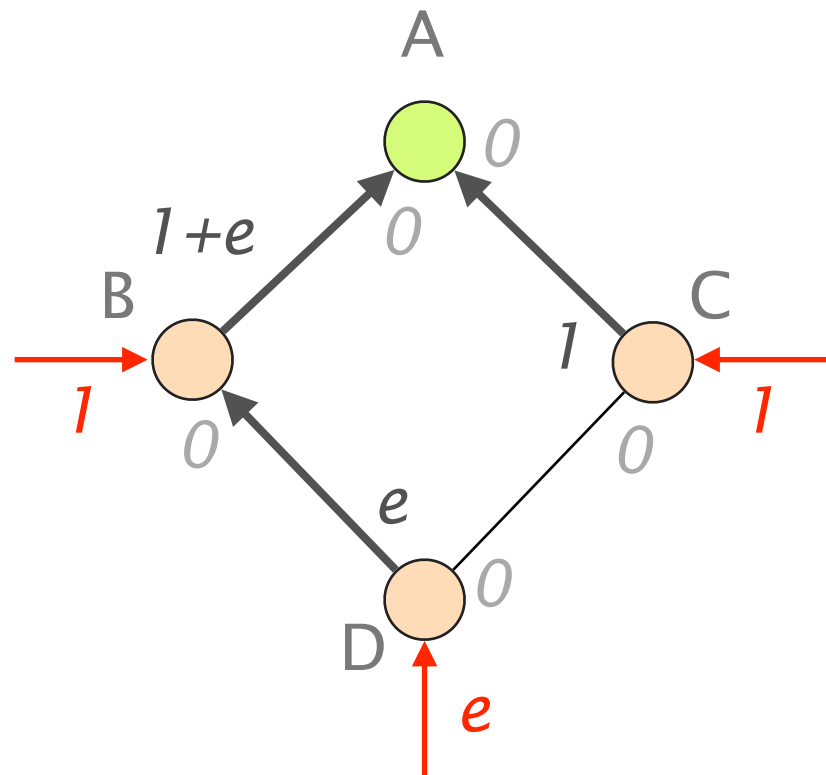
Task 2.2: Changing weights

round-based approach

#1 **update link weights**

#2 compute shortest paths

repeat



Link

Weight/Load

A->B

0

0

A->C

0

0

B->A

0

1+e

B->D

0

0

C->A

0

1

C->D

0

0

D->B

0

e

D->C

0

0

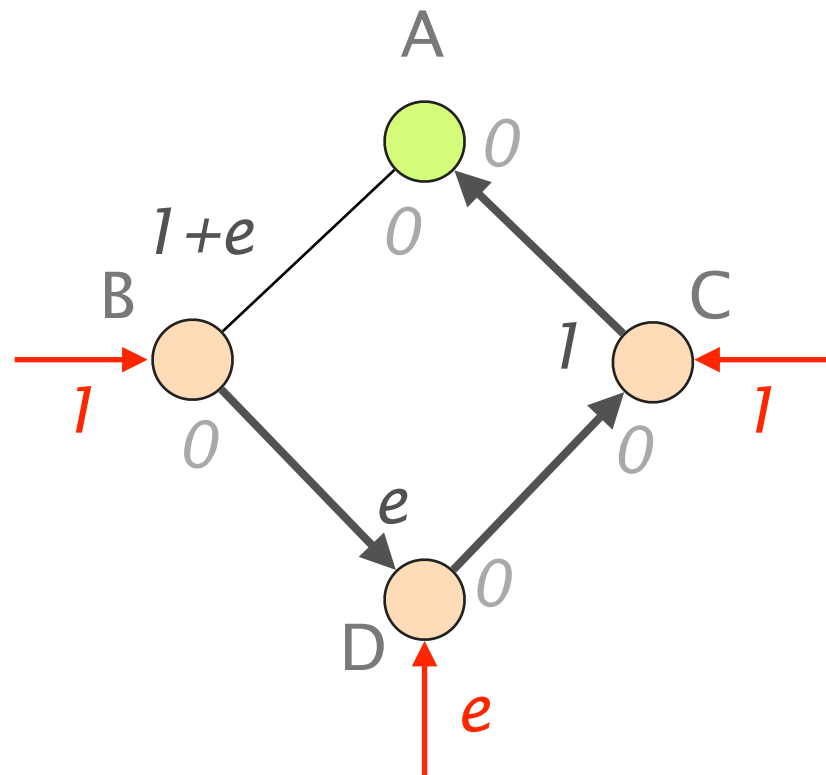
Task 2.2: Changing weights

round-based approach

#1 update link weights

#2 **compute shortest paths**

repeat



Link

Weight/Load

A->B

0

0

A->C

0

0

B->A

0

1+e

B->D

0

0

C->A

0

1

C->D

0

0

D->B

0

e

D->C

0

0

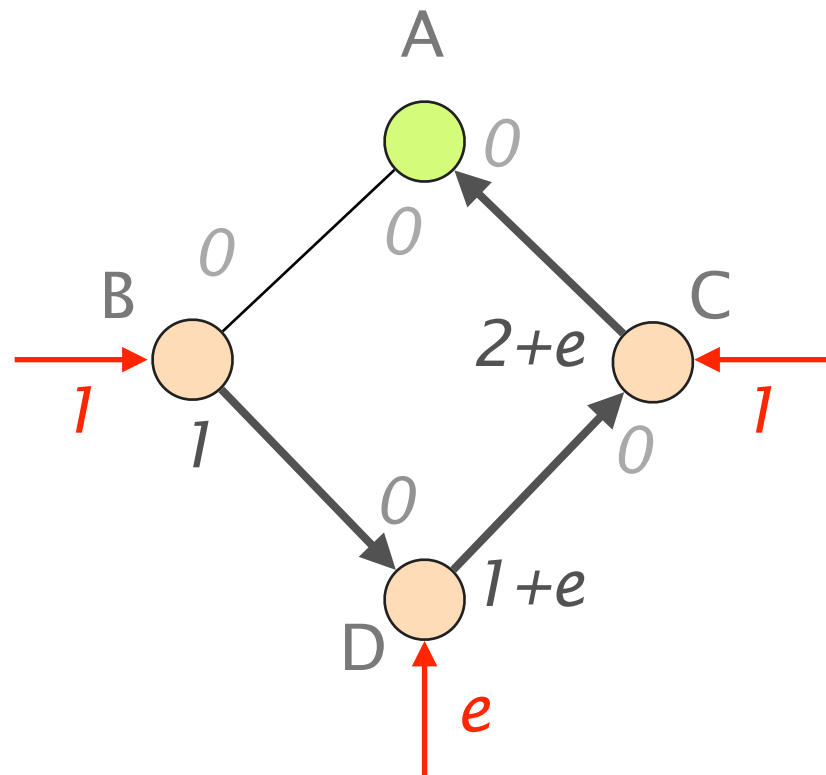
Task 2.2: Changing weights

round-based approach

#1 **update link weights**

#2 compute shortest paths

repeat



Link

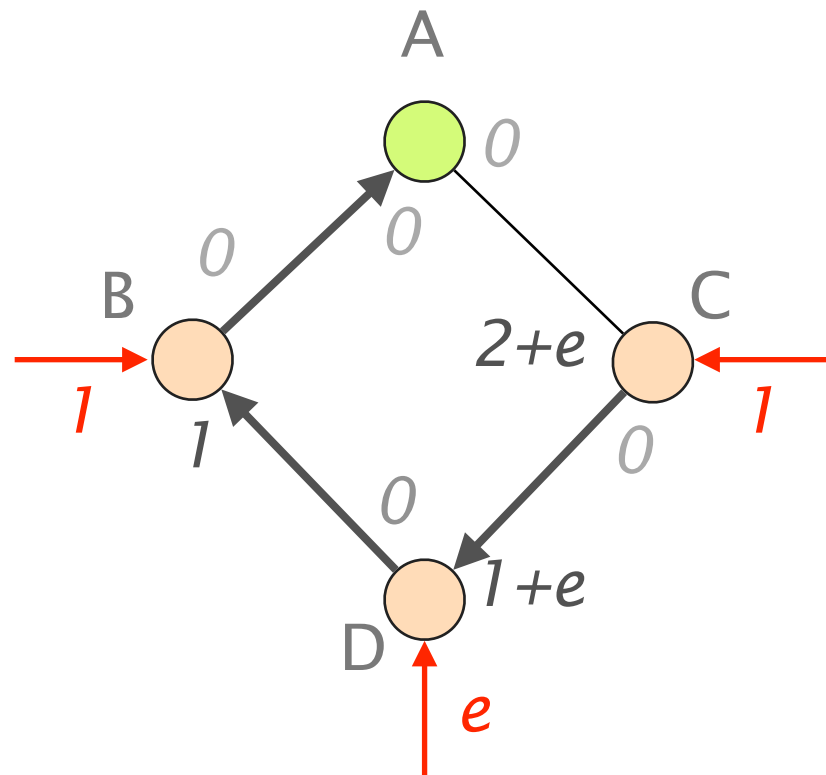
Weight/Load

A->B	0	0	0
A->C	0	0	0
B->A	0	1+e	0
B->D	0	0	1
C->A	0	1	2+e
C->D	0	0	0
D->B	0	e	0
D->C	0	0	1+e

Task 2.2: Changing weights

round-based approach

- #1 update link weights
- #2 **compute shortest paths**
- repeat



Link	Weight/Load		
A->B	0	0	0
A->C	0	0	0
B->A	0	$1+e$	0
B->D	0	0	1
C->A	0	1	$2+e$
C->D	0	0	0
D->B	0	e	0
D->C	0	0	$1+e$

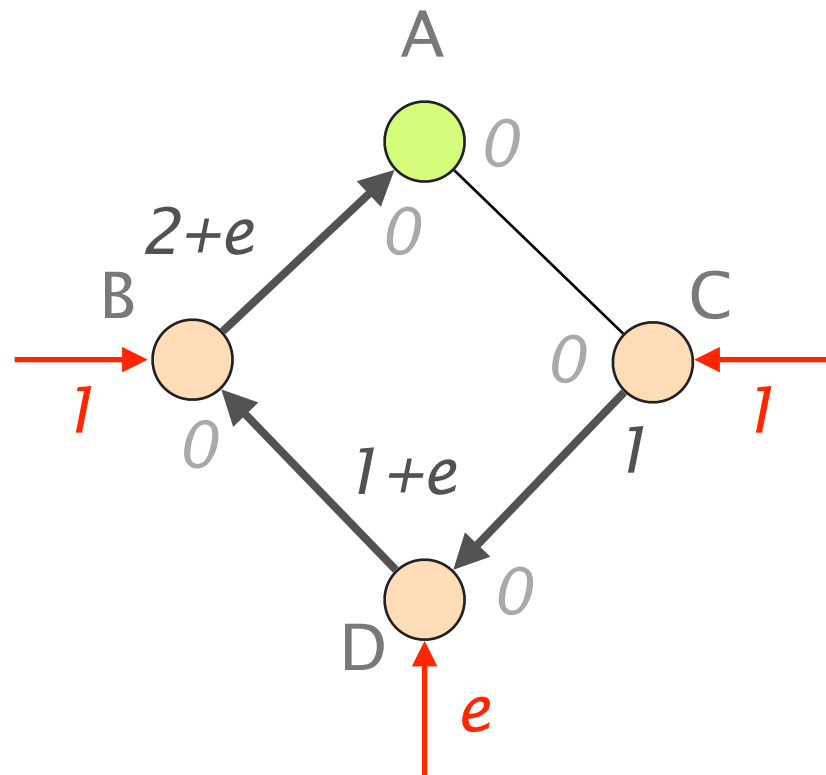
Task 2.2: Changing weights

round-based approach

#1 **update link weights**

#2 compute shortest paths

repeat



Link

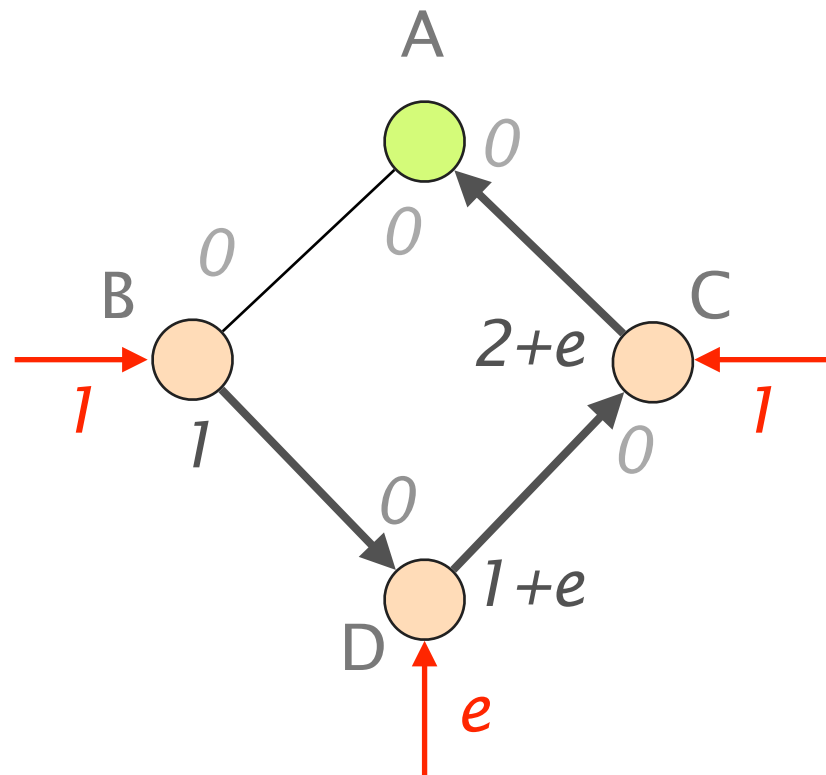
Weight/Load

A->B	0	0	0	0
A->C	0	0	0	0
B->A	0	1+e	0	2+e
B->D	0	0	1	1
C->A	0	1	2+e	0
C->D	0	0	0	1
D->B	0	e	0	1+e
D->C	0	0	1+e	0

Task 2.2: Changing weights

round-based approach

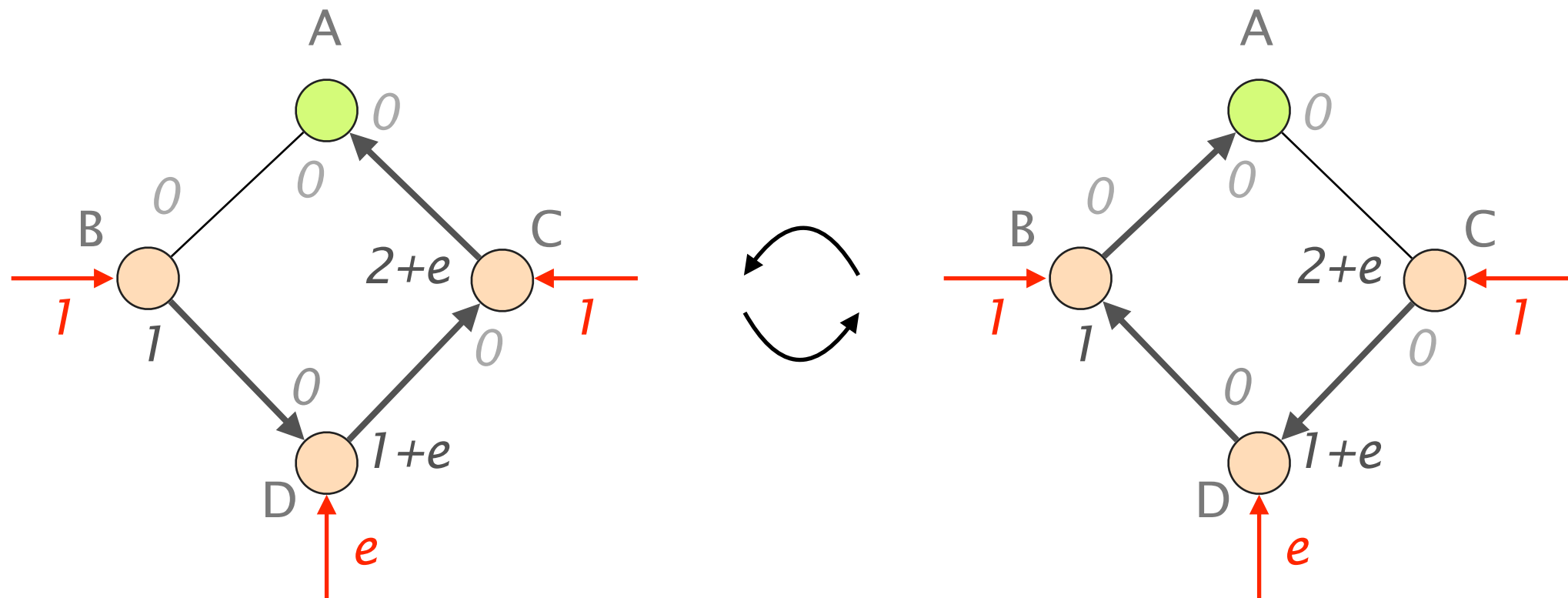
- #1 update link weights
- #2 **compute shortest paths**
- repeat



Link	Weight/Load			
A->B	0	0	0	0
A->C	0	0	0	0
B->A	0	1+e	0	2+e
B->D	0	0	1	1
C->A	0	1	2+e	0
C->D	0	0	0	1
D->B	0	e	0	1+e
D->C	0	0	1+e	0

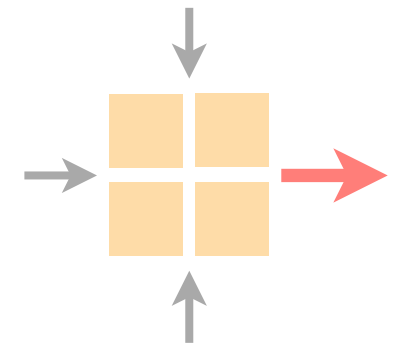
Task 2.2: Changing weights

dynamic weights lead to oscillations



Communication Networks

Exercise 3



Internet Routing Project

Last weeks exercise

Current exercise

Questions?

Time for you to solve the tasks

All about Transport Concepts

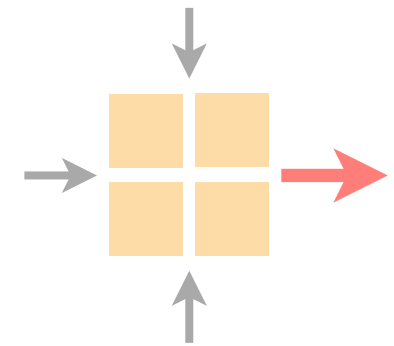
Task 3.1: Reliable vs. Unreliable Transport
compare their characteristics

Task 3.2: Negative Acknowledgements
an alternative approach

Task 3.3: Fairness
max-min fair allocation

Communication Networks

Exercise 3



Internet Routing Project

Last weeks exercise

Current exercise

Questions?

Time for you to solve the tasks