

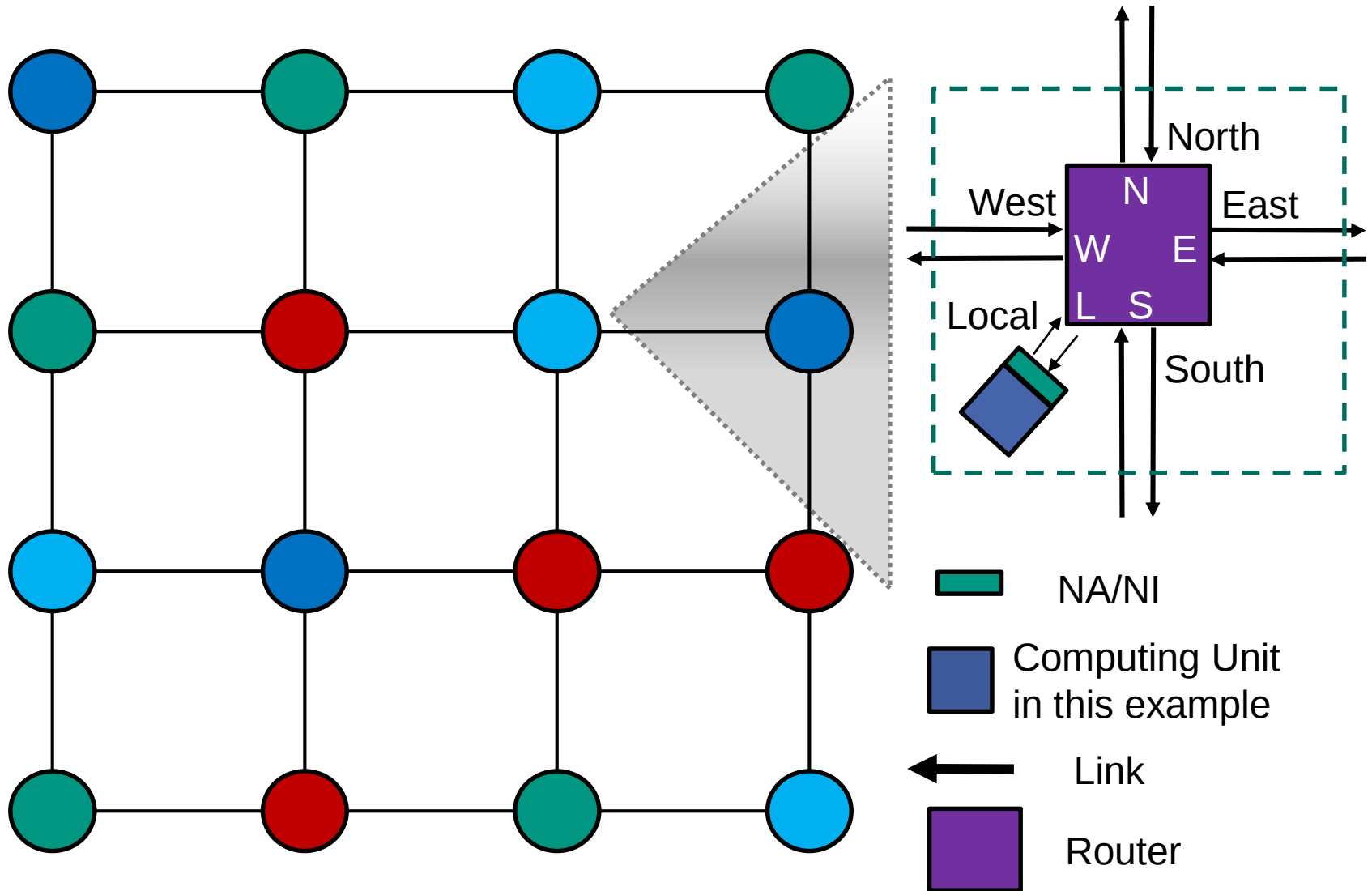
Dr.-Ing. Jens Becker (jens.becker@kit.edu) **M.Sc. Nidhi Anantharajaiah** (nidhi@kit.edu)

Institut für Technik der Informationsverarbeitung (ITIV)

Communication Systems and Protocols

Exercise 7

NoC : Basic Setup



Definitions

Loop

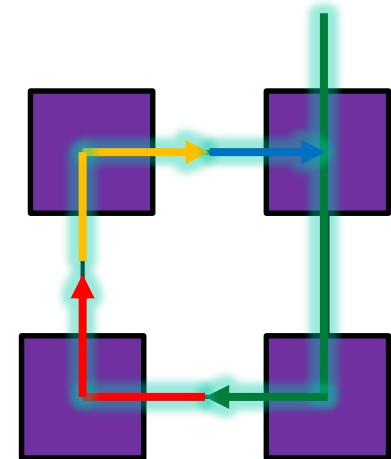
- A *Loop* is a path in a network that leads back to its starting point

Deadlock

- A situation where a link is blocked by one transmission that is waiting for the other transmission to finish is called a deadlock.
- No communication is possible in case of a deadlock

Livelock

- Data is forwarded through a network without reaching its destination
- Counterpart to deadlock



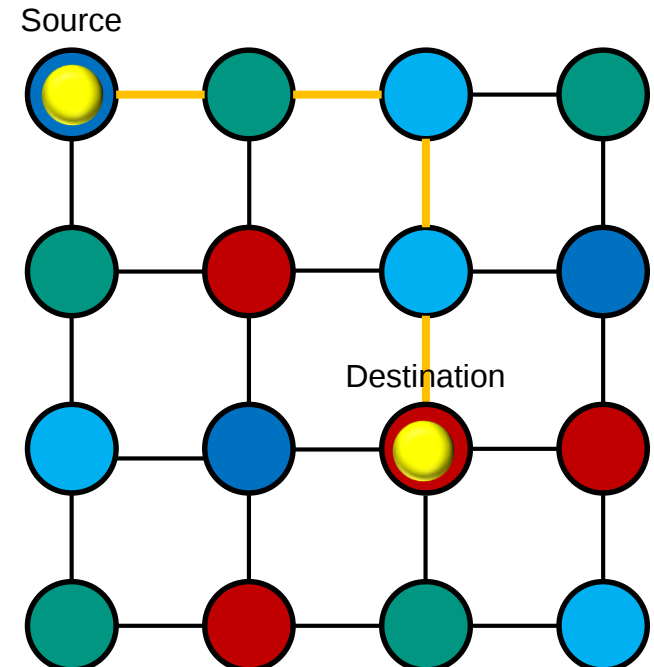
Routing Schemes

- Routing schemes can be classified into different categories.

- For example:
 - **Static (Deterministic) and Dynamic (Adaptive)**

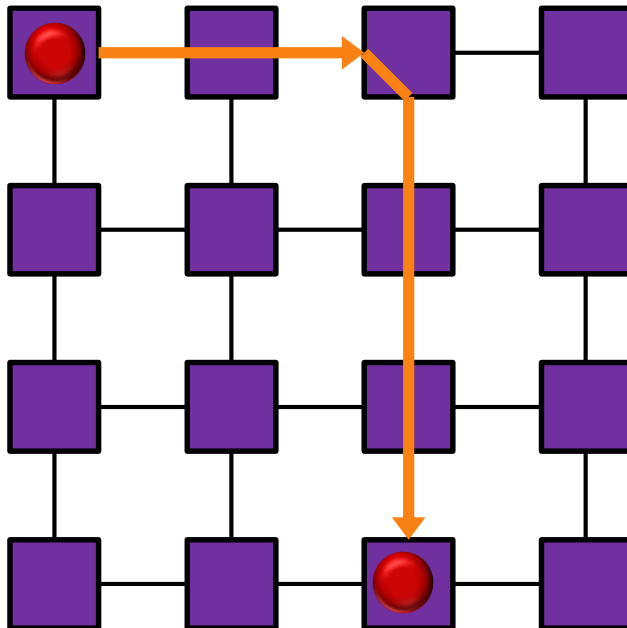
 - **Distributed and Source routing**

 - **Minimal Routing and Non-Minimal Routing**



X-Y Routing

- Only applicable for mesh based networks
- Routing always towards destination
- First in X direction, then in Y direction



- Nodes have to know their position within the network
- Address has to be map able to the location within the network (coordinates)
- + Simple and small algorithm
- + Deadlock free
- Only works for meshes (rectangular)

Task 1: Networks

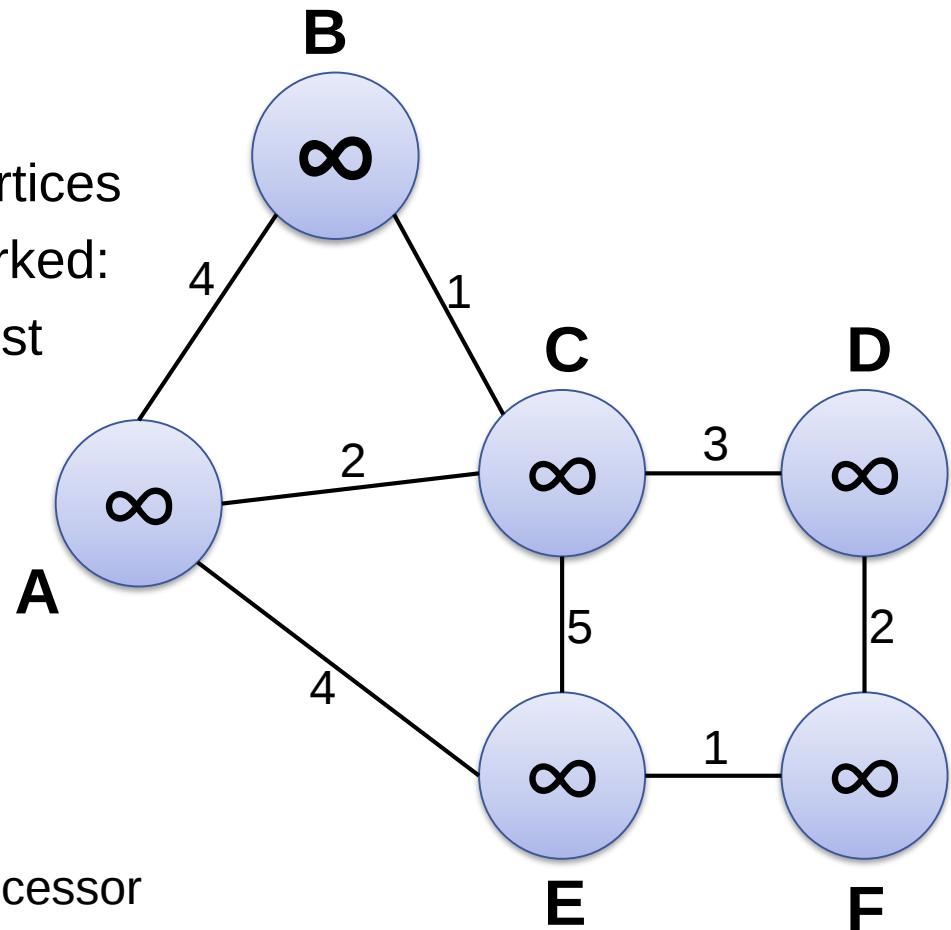
Time Allocated

15 min

Dijkstra-Algorithm

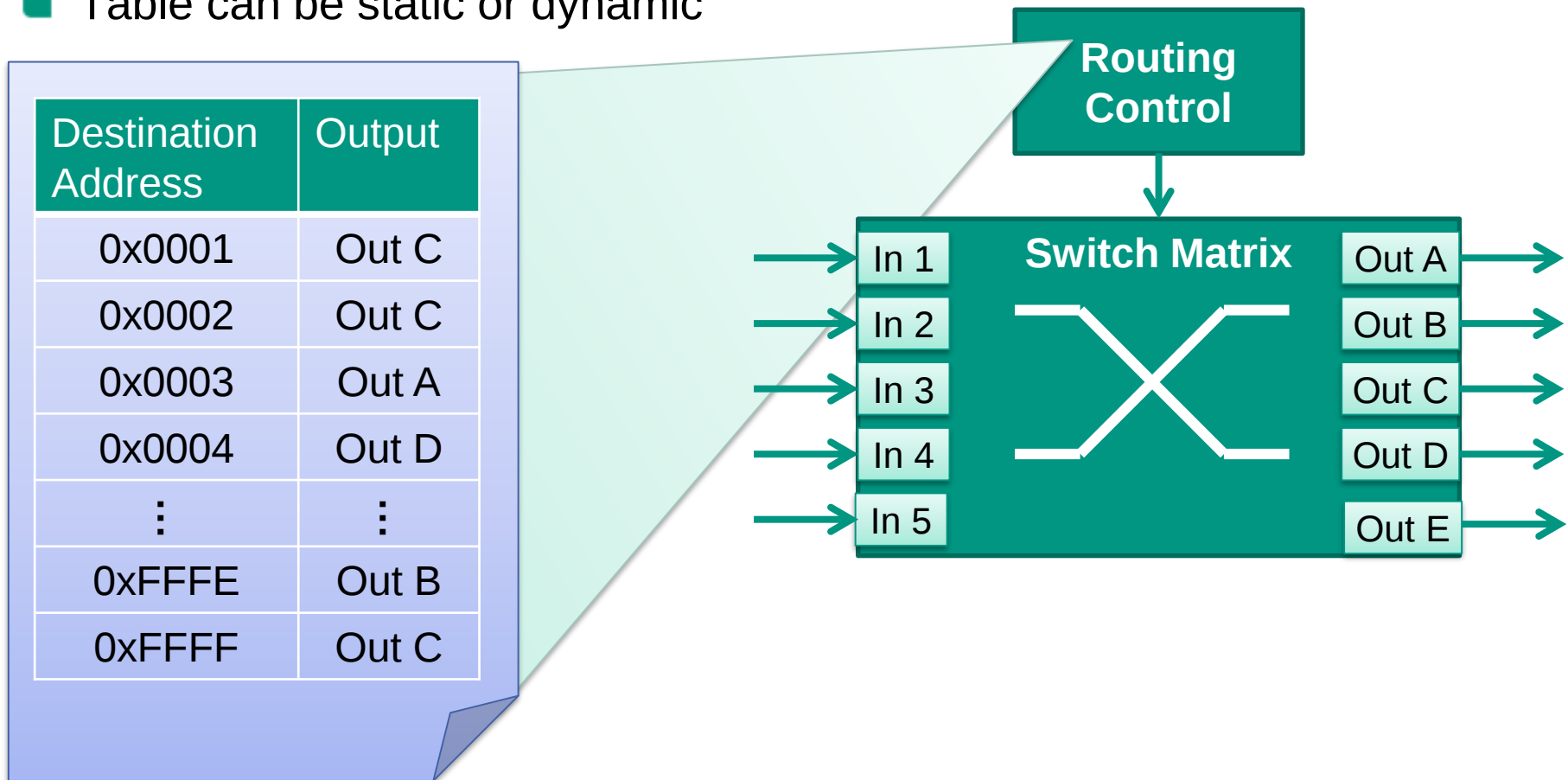
- Finds the shortest path from a starting node to all other nodes in a known topology

- A. Set distance to infinity for all vertices
- B. Repeat until all vertices are marked:
 1. Mark the vertex with smallest distance
 2. For all neighbors add current distance and edge weight
 3. If sum is smaller than current distance
 - update distance
 - set marked vertex as predecessor



Example for Routing Control – Routing Table

- One row per destination address
- Content stores output port for a given destination
- Table can be static or dynamic



Task 2: Dijkstra

Time Allocated

10 min