

SIMON FRASER UNIVERSITY
SCHOOL OF ENGINEERING SCIENCE

Spring 2018
ENSC 427: COMMUNICATION NETWORKS

Midterm No. 2
Monday, March 26, 2018

Duration: 110 minutes. Attempt all problems. Questions are not equally weighted. Closed book and closed notes. Simple calculators (with no graphing/programming functions) are permitted. PDAs, laptops, and wireless phones are not permitted. Please provide brief and concise answers and include diagrams, graphs, and tables, as needed. Expand all acronyms. Please write legibly. Illegible text will not be graded. Please use a pen (no pencils, please).

1. The Network Layer: Data Plane (20 points):

- (a) Describe the role and list two functions of the network layer.
- (b) Show a high-level router architecture.
- (c) List three types of scheduling policies.
- (d) What is DHCP? Show a DHCP client-server scenario?
- (e) Describe main differences between IPv4 and IPv6. What is "tunneling"?

2. The Network Layer: Control Plane (25 points):

- (a) List the pseudo code for Dijkstra algorithm.
- (b) Show a table with each step of the algorithm using the network shown in Fig. 1. Assume that node 6 is the destination node.
- (c) Draw the shortest path tree found by the algorithm.

3. The Link Layer and LANs (15 points):

- (a) Describe the Ethernet protocol and its history.
- (b) List two Ethernet physical topologies.
- (c) Show the Ethernet frame structure.

4. Case Study: Implementation of BGP in a network simulator (20 points):

- (a) What are eBGP and iBGP protocols?
- (b) List four types of BGP messages.
- (c) What are BGP peers and what is a BGP session?
- (d) Describe the goal of the study and the simulation scenario.

5. Riverbed Modeler Tutorial: Wireless LAN (20 points):

- (a) List the main steps in creating the LAN simulation scenario.
- (b) Briefly explain functions of the Profile and the Application Configuration.
- (c) List the applications simulated in the Wireless LAN tutorial.
- (d) List three types of statistics collected from the Riverbed Modeler LAN simulations.

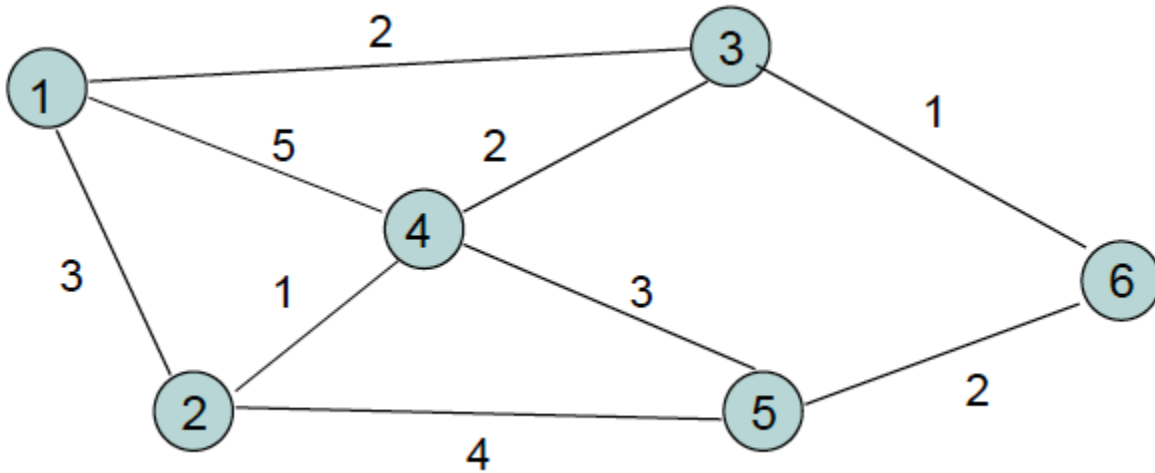


Figure 1: Apply Dijkstra algorithm to find the shortest path in this network with six nodes. Assume that node 6 is the destination node.