



Försättsblad Prov Original

Kurskod	Provkod	Tentamensdatum
D T O 9 2 G	T 1 0 1	2 0 1 8 - 0 4 - 0 5
Kursnamn	Datateknik GR (C), TCP/IP-nät	
Provnamn	Tentamen	
Ort	Sundsvall	
Termin	V18	
Ämne	Datateknik	

Final Exam

DT092G TCP/IP Internetworking

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Instructions

Carefully read the questions before you start answering them. Note the time limit of the exam and plan your answers accordingly. Only answer the question, do not write about subjects remotely related to the question. The questions are *not* sorted by difficulty. Clearly show which answer you are giving your solution to, *Always motivate your answers and show your calculations..*

Time 5 hours.

Exam Aids Non-programmable calculator.

Maximum points 30

Questions 10

Preliminary grades

The following grading criteria applies: E $\geq 13p$, D $\geq 16p$, C $\geq 18p$, B $\geq 21p$, A $\geq 24p$.

Covered ILO

This exam covers the following Intended Learning Outcomes (ILO)

- ILO: 1 – Analyze and differentiate networking protocols used in TCP/IP protocol suite
- ILO: 2 – Implement the concepts of naming and addressing to Internet IPv4 and their extension to IPv6
- ILO: 3 – Explain and compare three routing protocols used in the Internet
- ILO: 4 – Explain and exemplify multicast routing
- ILO: 5 – Categorize problems such as reliable transport, data delay, congestion and flow control and describe at least three congestion control schemes used in TCP
- ILO: 6 – Calculate and measure performance metrics related to throughput, delay, and jitter
- ILO: 8 – Explain the Internet best-effort type of service and its improvements
- ILO: 9 – Explain the principles of queuing theory related to QoS and switching
- ILO: 10 – Explain the principles of multimedia networking and related protocols

Questions

The questions below are not given in any particular order.

- (3p) 1. (*ILO: 1*) Which network transport protocol service (TCP or UDP) would you use if you had to develop an online multiplayer game and why?
- (3p) 2. (*ILO: 10*) Elaborate on the abbreviation *RTP*. What does it stand for? What is it used for?
- (3p) 3. (*ILO: 2*) What does the abbreviation *NAT* stand for? What is it used for? How does it work? Explain, use illustrations if necessary.
- (3p) 4. (*ILO: 2*) Briefly explain the role of the following protocols: ARP, RARP and ICMP.
- (3p) 5. (*ILO: 3*) Explain the major differences between Distance Vector and Link-State Vector routing?
- (3p) 6. (*ILO: 4*) What is IGMP and for what purpose is it used?
- (3p) 7. (*ILO: 5*) Explain what flow control is used for.
- (3p) 8. (*ILO: 6*) Suppose there is a 10 Mbps microwave link between a geostationary satellite and its base station on Earth. Every minute the satellite takes a digital photo and sends it to the base station. Assume a propagation speed of $2.4 * 10^8$ meters/ sec. Recall geostationary satellite is 36,000 kilometers away from earth surface.
 - a) What is the propagation delay of the link?
 - b) What is the bandwidth-delay product, $R * d_{prop}$?
 - c) Let x denote the size of the photo. What is the minimum value of x for the microwave link to be continuously transmitting?
- (3p) 9. (*ILO: 8*) Explain the difference between flooding and controlled flooding.
- (3p) 10. (*ILO: 9*) In a small store customers arrive at the rate 40 per hour and they stay in average 4 minutes. What are the average number of customers in the store? (Use Little's Law)