

# CS 447: Networks and Data Communications

## Homework #01

**Assigned Date** : Thursday, January 29, 2015

**Due Date** : Thursday, February 12, 2015 @ 09:29:59 a.m.

### Instructions

- This is an individual assignment. **Do your own work.** Acts of academic misconduct (plagiarism, use of illicit solutions manuals, etc.) are subjected to university code of conduct.
- Produce your answers using an appropriate word processing application.
- Submit your solutions through Moodle. A dropbox will be available with 24 hours in advance of the deadline. Late policy is enforced per syllabus late policy. Your digital submission must be in PDF format. Grades and specific feedback will be communicated through Moodle.
  - You may, **in addition** to the digital submission, handover a printed, stapled copy of your answers to the instructor at the beginning of class, **if** you prefer to have explicit written feedback of your answers. This, however, is not required neither considered the primary submission option.
- **DO NOT** email your solutions to the instructor or the grader.
- Make proper arrangements, after consulting the instructor, to deliver your solutions **BEFORE** the due date, if you have a planned absence on the due date.
- Answer all questions
- Your solutions are due on **Thursday, February 12, 2015 @ 09:29:59 a.m.**
- Total points: **[UG: 214, MS: 364 points]**

### Questions

- Q1. **[30 points]** Read section 1.2.1 [pg. 12] and answer the following questions:
- Q1.1 **[5 points]** Explain the term access network
  - Q1.2 **[10 points]** Name and briefly explain (with examples) the two most prevalent types of residential access methods
  - Q1.3 **[5 points]** What does FTTH stand for? Explain.
  - Q1.4 **[10 points]** Name and briefly explain five types of physical media
- Q2. **[10 points]** Derive an equation for the the end-to-end delay  $d_{end-to-end}$  for a store-and-forward data transmission between two hosts separated by  $N$  links (hence,  $N - 1$  routers). Clearly state any assumptions you make in deriving your equation.
- Q3. **[10 points]** P8 on pg. 72 of KR6e

- Q4. [10 points] Compare and contrast (in a tabular form) the advantages and disadvantages of circuit switching over packet switching
- Q5. [10 points] Consider Figure 1.20(b) on pg. 46. What is the throughput of this network when:
- (a)  $\forall i \in R_{S_i}, R_{C_i} \lllll R$
  - (b)  $\forall i \in R_{S_i}, R_{C_i} \ggggg R$
- Q6. [20 points] R13 on pg. 68
- Q7. [10 points] R18 on pg. 69
- Q8. [15 points] R19 on pg. 69
- Q9. [25 points] P25 on pg. 76
- Q10. [50 points] Complete the Wireshark Lab 00 found at <http://www.cs.siu.edu/~tgamage/S15/CS447/A/WS00.pdf> and answer the questions listed under “What to Hand In” section.
- Q11. [24 points] Run the following commands on your computer and provide a screenshot as proof. Explain, in your own words, what each command does.
- (a) ping
  - (b) arp
  - (c) nslookup
  - (d) ifconfig
  - (e) host
  - (f) dig

## MS Requirements

- Q12. [150 points] Prepare a summary critique (between 3/4 - 1 page, single space, PDF format) for each of the graduate readings assigned to you on 01/20/2014. Formulate each critique based on your answers for the following questions.
- (a) Title, author(s), date of publication, and venue
  - (b) What is the primary contribution(s) (according to the authors) of this paper?
  - (c) What are the critical assumptions (if any) of this paper?
  - (d) Justify the applicability (or inapplicability) and the validity (or invalidity) of the original contributions to present day networking. *You must logically justify your arguments.*
  - (e) Propose at least 2 additional, preferably recent, (*within the last 8-10 years*) publications that a would be reader of this paper must read next.
  - (f) What is your impression of the primary contribution of this paper?

## Graduate Grading

- [25 × 3 points] Submit your critiques (3 individual PDFs) through the **Graduate Critique** forum in Moodle.
- [25 × 3 points] Select three critiques, preferably from three different colleagues, and *critique their paper critiques*. Post your comments as replies.