CSCI 3171: ASSIGNMENT-3

Given: March 7th, 2016
Due: March 21st, 2016

Objective:
With this assignment, you will start to get familiar with the concepts of the Transport Layer (L4) by studying the UDP and the TCP protocols of the Internet. So let's start ☺

Assignment:
Please read Chapter-3, "Transport Layer" from your course textbook and go over the lab materials on TCP and UDP in Teaching-Lab-5.

1. From the "Problems" section at the end of Chapter-3, please answer the following questions. Please note that you will only get full marks on a question if you explain what you do and why you do! Just writing a function and a result or just making a statement without explaining it, will not give you full marks for a given problem/question.
    - Problem 3 on page 288
    - Problem 17 on page 291
    - Problem 21 on page 292
    - Problem 22 on page 292
    - Problem 26 on page 293
    - Problem 31 on page 294
    - Problem 43 on page 297
    - Problem 51 on page 299
    - Problem 56 on page 300
2. In this part, you will use one of the tools such as *iperf* or *nttcp* (test TCP) for testing TCP and UDP performances. Please note that these two tools are installed in TL-5. To be able to perform the tests, create two scenarios (one for UDP and one for TCP). Show and discuss the performance differences of TCP and UDP using the tool you choose. Also, please discuss the tool and give screenshots of how you used it under the scenarios you created to support your discussions regarding the performance differences of TCP and UDP. *Please note that if you want to use another tool then contact me ASAP!*
3. Assume you have an IP network connection with the following characteristics:
    - 97% of packets reach their destination correctly in less than 50ms
    - 1% of packets reach their destination correctly in more than 50ms but less than 10,000ms.
    - 1% of packets are lost in transit
    - 1% of packets arrive at their destination in less than 50ms, but have one or two random single-bit errors.

    For each of the following applications, indicate whether it would be best to use TCP, or UDP with checksumming, or UDP without checksumming. Explain your decision in a few sentences:

    a) A live audio/video chat system like Skype
    b) A general purpose network file system like NFS
    c) Remote control of a bomb disposal robot (each packet contains an array of floating point numbers indicating the current desired location of the robot)

Please hand in a hardcopy of your answers to all of the above questions on the due date of the assignment in class.

Please **do not forget** to write your Name, B-Number and your e-mail address on the first page of the assignment answers you will hand in.

If you plan to use one (or more) of **your budget days** for this assignment, please read the "Late Policy" section on the Class Handout document and e-mail me (zincir@cs.dal.ca) accordingly! In this case, send your assignment as a PDF or Word document to my e-mail address.

Please note that late policy will be applied for each late day.

If you have any questions, please see me, or one of our TAs, preferably earlier than the day before the assignment is due ☺