

# PROJECT#1

[Report Required]

Due Date: \_\_\_\_\_ (4x100=400 points)

## CS 4/55201 COMPUTER NETWORKS

FALL 08, Department of Computer Science, Kent State University

Compute A and B by adding all the digits of your social security number, the last 4 digits of your social security number, respectively. Example: SS# =555-23-0891-> 5+5+5+2+3+0+8+9+1=38->3+8=11->1+1=2=A, 0+8+9+1=18->1+8=9=B. Computer X=10+A, Y=10+B. Keep these numbers secret.

In this assignment you will experiment with several versions of data link protocols. An example simulation software is given in the class web-site. The software contains six versions of data-like protocols. Your assignment will be to compare their performances. If you down load the simulation files you will find the simulator-readme.txt file. Take a printout of the file.

For EACH of the following assignments, in the report explain the (a) Experiment Setup including the commands used to obtain the data, (b) Graphs/ Plots/Tables, and (c) Explanation of major observations in the data and plots. (Note to grader: subtract: respectively 20%, 50%, and 30% if any of these are missing).

For EACH of the following assignments, in the report explain the (a) Experiment Setup including the commands used to obtain the data, (b) Graphs/ Plots/Tables, and (c) Explanation of Data. (Note to grader: subtract: respectively 20, 50, and 30% if any of these are missing). [add observation]

1. In this first assignment we will learn the performance of protocol-2. For protocol-2 plot the *payload rate* (delivered packet per unit of tick) delivered per second (y-axis) as a function of event duration (x-axis) by varying the event time from 10 to 200 ticks (i) with timeout value set to X with zero packet loss and no checksum error. (ii) If Y% packets are lost at the physical layer what happens to the network efficiency? (iii) If all packets are received but Y% of them face checksum error what happens to the network efficiency?
2. Compare the performance of protocol-3 (unidirectional communication with timeout based retransmission) with that of protocol-4 (bi-directional piggybacked stop-and-go, sliding window=1). Use event time = 20,000 ticks. Plot and compare the total *payload rate* delivered (y-axis) as a function of (i) *timeout interval* when there is no packet loss (ii) plot as a function of *packet loss* (assuming timeout interval = X ticks), and (iii) as a function of *garbled packets* (assuming timeout interval = Y ticks and no packet loss). You should provide three separate charts each with two plots. Explain the relationship between the payload rate and the three variables and how each of these protocols is affected.
3. Compare the performance of protocol-5 (bi-directional communication with n-sliding window) with that of protocol-6 (bi-directional communication with n-sliding window, with selective retransmission). Use event time = 20,000 ticks. Plot and compare the total payload delivered (y-axis) as a function of (i) timeout when there is no packet loss (ii) plot as a function of packet loss (assuming timeout interval = X ticks), and (iii) as a function of garbled

packets (assuming timeout interval = Y ticks and no packet loss). You should provide three separate charts each with two plots. Explain the relationship between the payload rate and the three variables and how each of these protocols is affected.

4. For protocol-6, investigate (plot a graph) payload delivered as a function of the Sliding window size. Use event time = 20,000. Assume timeout interval = 20 ticks, packet loss = 2\*Y%, garbled packet=2\*Y% and MAX\_SEQ=1,3,7,15, and 31. (Hint: You will need to modify the program).

**How to Submit:**

In this assignment you have created a set of program files \*.c and one project report.

On top of each file include your name, data and project number. Add:

/\*\*\*\*\*

Name:

Date:

Project/Question Number:

NET CS 5/5201, Fall 2008

Instructor: KHAN, KSU

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You now need to mail all of them into one package using the following procedure:

```
%shar *.c *.h Makefile report.doc > shar.project2
```

```
%elm -s "SUBMIT PROJECT#2 for type your name here" \(EMAIL ADDRESS OF TA\) < shar.project2
```

Check thoroughly before you submit. If you need to re-send, for any reason inform TA beforehand. Keep a copy of all the files including shar.project1 in your directory. Do not modify them afterward. If need arises, TA may want to check these files. Any modification afterward (reflected in the file date) will result in late submission penalty.

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**Grading:**

See notes to grader in the website.

**Cheating and Copy:**

Projects have to be done individually. If a copy is caught, all involved submissions (original as well as the copies) will be penalized. So it is your responsibility to guard your work. Secure the read/write access of your directories. Any copy will result in ZERO grade for the assignment for both party. Only exception is when you report the theft of your work in advance.