Experiment 7

A. Token Ring

Aim: To implement the token passing access in RING-LAN.

Procedure:
1. Click on the **TOKEN RING** icon on the desktop of both PC's.
2. Click **Configuration** button in the tool window in both the PC's.

Configuration Setting:

PC 1		PC 2	
Node Id	0 on config menu 1 1 on config menu 2	**Node Id**	0 on config menu 1 1 on config menu 2
Protocol	RING	**Protocol**	RING
Baud Rate	8 Kbps (at both config menu & NEU)	**Baud Rate**	8 Kbps (at both config menu & NEU)
Duration	100 Seconds	**Duration**	100 Seconds
Packet Length	1000 bytes	**Packet Length**	1000 bytes
My Address	0 on config menu 1 and 1 on menu 2	**My Address**	2 on config menu 1 and 3 on menu 2
Direction	Sender	**Direction**	Sender

   Note: All the nodes have to be configured as '**Senders**'. Set the topology as '**Ring**'.

3. Click **OK** button.
4. Download the driver to the NIU. Click **BOOT** tab on the tool window of PC 1 & PC 2 and click **OK** button.
5. Start running the experiment from the lowest priority node. While you do this, THT window pops up, enter the Token Holding Time (THT) (say 10000 ms) in all nodes and press the OK button first in the node, which has highest value of My Address (i.e., from My Address 3).

Calculations:

Practical Throughput ($X_{Practical}$) from the obtained readings:

$$X_{Practical} = \frac{Sum\ of\ successfully\ Txd\ packets\ in\ all\ nodes * Packet\ Length * 8}{Duration\ of\ experiment\ in\ mSec * Data\ rate}$$

Where, Sum of successfully transmitted packets is obtained from the statistics at the end of the simulation.

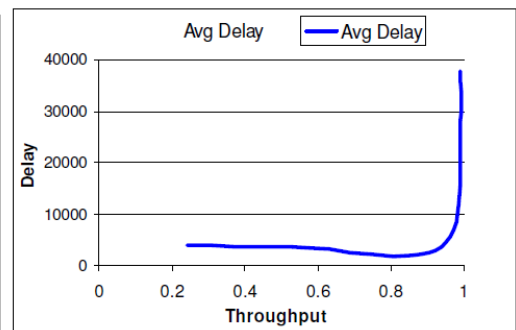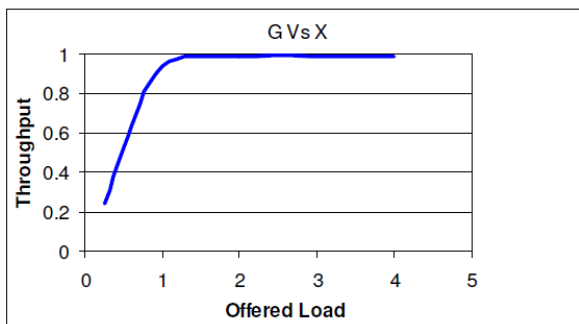## Practical Offered Load ($G_{Practical}$):

$$G_{Practical} = \frac{N * P * 8}{C * t_a}$$

G – Offered load, N – Number of nodes, P – Packet length in bytes
C – Data rate in bits/sec, t_a – Inter packet delay in milliseconds.

Result Tabulation:

IPD(mSec)	Tx1	Tx2	Tx3	Tx4	$G_{Practical}$	$X_{Practical}$	Average Delay
16000							
8000							
4000							
2000							
1000							
100							
40							

Expected Graph:

Exercise:

1. Repeat the experiment for various values of Packet length, Node, Data rate.
2. Repeat the experiment by setting the BER to 10^{-2} in the NEU and also try to stop one of the nodes and observe the behaviour.

B. STOP and WAIT Protocol

Aim: To provide reliable data transfer between two nodes over an unreliable network using the **stop-and-wait** protocol.

Procedure:

1. Click on the **Stop & Wait** icon from the desktop on both PCs.
2. Click the **Configuration** button in the window in both the PC's.

Configuration Setting:

PC 1		PC 2	
Node ID	0	**Node ID**	0
Protocol	CSMA/CD	**Protocol**	CSMA/CD
Inter Packet Delay	400	**Inter Packet Delay**	400
Baud Rate	8 Kbps (At both the configuration menu and NEU)	**Baud Rate**	8 Kbps (At both the configuration menu and NEU)
Duration	100s	**Duration**	100s
Packet Length	1000 bytes	**Packet Length**	1000 bytes
Bit Delay	0 (at NEU)	**Bit Delay**	0 (at NEU)
Direction	Sender	**Direction**	Receiver

3. Click **OK** button and download the driver to the NIU using the **BOOT** button command. Booting from any one of the applications in enough.
4. Run the experiments: Click **RUN**, then **Start** from each application.
5. Set the timeout value to 1000 ms.
6. Note down the no. of successfully Transmitted Packets.
7. Repeat the above steps for various time out values and plot the graph between timeout value & throughput. Find the optimum timeout value from the plot.
8. Explain why the throughput is less compared to CSMA/CD protocol.

Practical Throughput ($X_{Practical}$) from the obtained readings:

$$X_{Practical} = \frac{Sum\ of\ successfully\ Txd\ packets * Packet\ Length * 8}{Duration\ of\ experiment\ in\ msec * Data\ rate}$$

Result Tabulation:

Timeout value in ms	Successfully Tx packets	Practical Throughput
1000		
1500		
2000		
3000		
4000		

C. STOP and WAIT with BER

Aim: To provide reliable data transfer between two nodes over an error network using the stop-and-wait protocol.
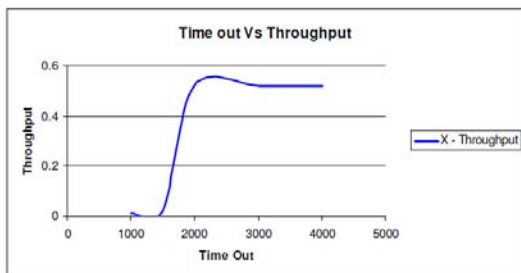
Procedure:

1. Set the error rate to 10^{-2} in NEU.
2. Follow the **Stop-and-Wait** experiment procedure for running the experiment.
3. Set the timeout value as 3000 ms in the sender window.
4. From the Statistics window note down the number of successfully transmitted packets and calculate the throughput. (Calculation of throughput is same as explained in the previous exp.)
5. Repeated the experiment by setting different BER in the NEU.
6. Use the values to plot the graph between BER Vs Throughput.

Result Tabulation:

BER	Successfully Txd Packets	Theoretical Throughput	Practical Throughput
10^{-2}			
10^{-3}			
10^{-4}			
10^{-5}			
10^{-6}			

Expected Graph:

Stop and Wait

Stop and Wait with BER