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Note : Remove "Table of Content" before including in CP Book

17ECL68 : COMPUTER COMMUNICATION NETWORK LAB

A. LABORATORY INFORMATION

1. Lab Overview

Degree:	BE	Program:	EC
Year / Semester :	3/6	Academic Year:	2019-20
Course Title:	Computer Communication Network Lab	Course Code:	17ECL68
Credit / L-T-P:	4 / 4-0-0	SEE Duration:	180 Minutes
Total Contact Hours:	62 Hrs	SEE Marks:	80 Marks
CIA Marks:	20	Assignment	
Course Plan Author:	Kiranmayi , N S MYTHREYE,	Sign	Dt :
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2	Lab	Content
<u> </u>	Lab	Contone

Unit	Title of the Experiments	Lab Hours	Concept	Blooms Level
1	Implimentation of Point to Point network with 4 nodes	3	Point to Point network with 4 nodes	L4
2	Implimentation of Point to Point network appling TCP & UDP agent	3	Point to Point network appling TCP & UDP agent	L4
3	Implimentation of Ethernet LAN to compare error rate & data rate	3	Ethernet LAN to compare error rate & data rate	L4
4	Implimentation of Ethernet LAN to Obtain congestion window	3	Ethernet LAN to Obtain congestion window	L4
5	Implimentation of Wireless LAN	3	Wireless LAN	L4
6	Implimentation of Link state routing algorithm	3	Link state routing algorithm	L4
7	HDLC frame to perform Bit stuffing	3	Bit stuffing	L4
8	Distance vector algorithm to find suitable path for transmission	3	Shortest path algorithm	L4
9	Dijkstra's Algorithm to compute shortest path	3	Dijkstra's Algorithm	L4
10	Using CRC-CCITT polynomial to obtain CRC code	3	CRC-CCITT polynomial	L4
11	Implementation of Stop & Wait protocol	3	Stop & Wait protocol	L4
12	Congesion control using Leakg bucket algorithm	3	Leaky bucket	

3. Lab Material

Unit	Details	Available
1	Text books	
	Data Communications and Networking , Forouzan, 5th Edition, McGraw Hill, 2016 ISBN: 1-25-906475-3	In Lib
2	Reference books	
	1. Computer Networks, James J Kurose, Keith W Ross, Pearson Education, 2013, ISBN: 0-273-76896-4	In dept
	2. Introduction to Data Communication and Networking, Wayarles Tomasi, Pearson Education, 2007, ISBN:0130138282	
3	Others (Web, Video, Simulation, Notes etc.)	
		Not Available

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4. Lab Prerequisites:

-	-	Base Course:		-	-
SNo	Course	Course Name	Topic / Description	Sem	Remarks
	Code				
1	17EC61	Digital	Knowledge on Multiplexing	6	
		communication			
2	17EC61	Digital	Knowledge on Digital modulation	6	
		communication	techniques		
3	17EC71	Microwaves and	Knowledge on microwave active and	7	Plan Gap Course
		Antennas	passive components and antennas		
4	17EC82	Fiber Optics and	Knowledge on optical fibers and antennas	8	Plan Gap Course
		Networks			
5	17EC61	Digital	Knowledge NRZ, RZ binary polar signalling	6	
		communication			

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

5. General Instructions

SNo	Instructions	Remarks
1	Observation book and Lab record are compulsory.	
2	Students should report to the concerned lab as per the time table.	
3	After completion of the program, certification of the concerned staff in-charge in	
	the observation book is necessary.	
4	Student should bring a notebook of 100 pages and should enter the readings	
	observations into the notebook while performing the experiment.	
5	The record of observations along with the detailed experimental procedure of	
	the experiment in the Immediate last session should be submitted and certified	
	staff member in-charge.	
6	Should attempt all problems / assignments given in the list session wise.	
7	It is responsibility to conduct the experiment individually.	
8	When the experiment is completed, the student should disconnect the setup	
	made by them, and should return all the components/instruments taken for the	
	purpose.	
9	Any damage of the equipment or burn-out components will be viewed seriously	
	either by putting penalty or by dismissing the total group of students from the	
	lab for the semester/year	
10	Completed lab assignments should be submitted in the form of a Lab Record in	
	which you have to write the Aim, components required, theory, procedure,	
	circuit diagram and design along with graphs/ waveform and results for given	
	design values	

6. Lab Specific Instructions

SNo	Specific Instructions	Remarks
1	Rules established in lecture/lab regarding protection, working with exposed	
	high voltage, horseplay, etc. apply to all individuals working in the lab area.	
2	Working alone in the lab will not be permitted where exposed voltages	
	exceeding 25 volts are present.	
3	Carry out the experiments in such a way that the equipment will not be	
	damaged or destroyed.	

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4	4 Follow all written and verbal instructions carefully. If you do not understand the									

	instructions, the handouts and the procedures, ask the instructor or teaching assistant	
5	The workplace has to be tidy before, during and after the experiment.	
6	Read the handout and procedures before starting the experiments	
7	Turn off all test equipment, return equipment, tools, and test leads to their	
	proper storage area	

B. OBE PARAMETERS

1. Lab / Course Outcomes

#	COs	Teach.	Concept	Instr	Assessment	Blooms'
		Hours		Method	Method	Level
1	Choose suitable tool to model a network	9	Point to	Simulation	Assignment	L4
	and understand the protocols at various		point		and Slip	
	OSI reference levels.		network		Test	
2	Design a suitable network and simulate	9	LAN and	Simulation	Assignment	L4
	using a Network simulator tool.		link state		and Slip	
			algorithm		Test	
3	Simulate the networking concepts and	9	Framing	Simulation	Assignment	L4
	protocols using C/C++.		and routing		and Slip	
					Test	
4	Model the networks for different	9	Coding and	Simulation	Assignment	L4
	configuration and analyze the results.		congestion		and Slip	
			control		Test	
-	Total	36	-	-	-	-

Note: Identify a max of 2 Concepts per unit. Write 1 CO per concept.

2. Lab Applications

SNo	Application Area	CO	Level
1	Evaluate time and space complexity and calculate performance	CO1	L4
2	Understanding searching and sorting	CO2	L4
3	Use AND / OR graph, spanning trees	CO3	L4
4	Use Backtracking technique for searching a set of solutions or for searching an	CO4	L4
	optimal solution		
5	Apply Greedy method for finding optimal solution	CO5	L4
6	Apply Dynamic Programming to find a sequence of decisions	CO6	L4
7	Evaluate traveling sales man problem by using dynamic programming	C07	L4
8	Apply Branch and Bound for solving combinatorial optimization problems	CO8	L2
9	Able to differentiate NP – Hard and NP – Complete Problems	CO9	L2

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

-		Course Outcomes					Program Outcomes												
#		COs				PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	Level	
							1	2	3	4	5	6	7	8	9	10	11	12	
17ECL68.1	Choose	suitable	tool	to	mode	l a	3	3	3	3	-	-	-	-	3	-	-	-	L4
	network	and	unde	ersta	ind	the													

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											U U			
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	protocols at various OSI reference													
	levels.													
17ECL68.2	Design a suitable network and	3	3	3	3	-	-	-	-	3	-	-	-	L4
	simulate using a Network simulator	-												
	tool.													
17ECL68.3	Simulate the networking concepts	3	3	3	3	-	-	-	-	3	-	-	-	L4
	and protocols using C/C++.													
17ECL68.4	Model the networks for different	3	3	3	3	-	-	-	-	3	-	-	-	L4
	configuration and analyze the													
	results.													
17ECL68	Average	3	3	3	3	-	-	-	-	3	-	-	-	

Note: Mention the mapping strength as 1, 2, or 3

4. Mapping Justification

Маррі	ng	Mapping	Justification
	1	Level	
СО	PO	-	-
CO1	PO1		The experiment has the application of mathematics, science and engineering fundamentals
CO1	PO2		The conduction of this experiment includes the identification, formulation and analysis, reaching the substantiated conclusions
CO1	PO3		Design and development of the circuit is involved in this experiment
CO1	PO4		The problems faced during the design and conduction of the experiment is investigated and resolved
CO1	PO5		Modern tool NS2 and NSG2.1 are used in the simulation process
CO1	PO9		The experiments are conducted in multidisciplinary functional teams
CO2	PO1		The experiment has the application of mathematics, science and engineering fundamentals
CO2	PO2		The conduction of this experiment includes the identification, formulation and analysis, reaching the substantiated conclusions
CO2	PO3		Design and development of the circuit is involved in this experiment
CO2	PO4		The problems faced during the design and conduction of the experiment is investigated and resolved
CO1	PO5		Modern tool NS2 and NSG2.1 are used in the simulation process
CO2	PO9		The experiments are conducted in multidisciplinary functional teams
CO3	PO1		The experiment has the application of mathematics, science and engineering fundamentals
CO3	PO2		The conduction of this experiment includes the identification, formulation and analysis, reaching the substantiated conclusions
CO3	PO3		Design and development of the circuit is involved in this experiment
CO3	PO4		The problems faced during the design and conduction of the experiment is investigated and resolved
CO3	PO9		The experiments are conducted in multidisciplinary functional teams
CO4	PO1		The experiment has the application of mathematics, science and engineering fundamentals
CO4	PO2		The conduction of this experiment includes the identification, formulation and analysis, reaching the substantiated conclusions
CO4	PO3		Design and development of the circuit is involved in this experiment
CO4	PO4		The problems faced during the design and conduction of the experiment is

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			investigated and resolved										
CO4	PO9		The experiments are conducted in multidisciplinary fu	The experiments are conducted in multidisciplinary functional teams									

CO4	PO9	The experiments are conducted in multidisciplinary functional teams

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1	Computer	Theoritical		Self	
	communication networks	introduction in the			
		class and			
		demonstration in			
		lab			

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Unit	Title	Teachi		No. of question in Exam					CO	Levels	
		ng	CIA-1	CIA-2	CIA-3	Asg-1	Asg-2	Asg-3	SEE		
		Hours									
1	Implement a point to point network	3	1	-	-	-	-	-	1	CO1	L4
	with four nodes and duplex links										
	between them. Analyze the network										
	performance by setting the queue										
	size and varying bandwidth										
2	Implement a four node point to point	3	1	-	-	-	-	-	1	CO1	L4
	network with link n0-n2, n1-n2 and										
	n2-n3. Apply Tcp agent between n0-										
	n3 and UDP between n1-n3. Apply										
	relevant applications over TCP and										
	UDP agents changing the										
	parameters and determine the										
	number of packets sent by										
	TCP/UDP										
3	Implement Ethernet LAN using n (6-	3	-	1	-	-	-	-	1	CO1	L4
	10) nodes. Compare the throughput										
	by changing the error rate and data										
	rate.										
4	Implement ethernet LAN using n	3	-	1	-	-		-	1	CO2	L4

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	nodes	and assign m	nultiple traffic to											
	the no	odes and obt	ain congestion											
	window	v for	diffferent											
	source	/destinations												
5	Implem	nent ESS wit	h transmission	3	-	-	1	-	-	-	1	CO2	L4	
	nodes	in wireless L	AN and obtain											
	the per	formance para	ameters											
6	Implem	nentation of	the link state	3	-	-	1	-	-	-	1	CO2	L4	
	routing algorithm													
7	Write a	program for t	he HDLC frame	3	1	-	-	-	-	-	1	CO3	L4	
	to perfe	orm Bit stuffing	g and character											
	stuffing	l												
8	Write a	a program for	distance vector	3	1	-	-	-	-	-	1	CO3	L4	
	algorith	nm to find the	suitable path for											
	transm	ission												
9	Implem	nent Dijkstras	' algorithm to	3	-	1	-	-	-	-	1	CO3	L4	
	compu	te the shortest	routing path											
10	For the	e given data, u	se CRC-CCITT	3	-	1	-	-	-	-	1	CO4	L4	
	polyno	mial to obta	in CRC code.											
	Verify	the program	for the cases											
	with an	d without erro	r 🛛											
11	Implem	nentation od	stop and wait	3	-	-	1	-	-	-	1	CO4	L4	
	protoco	ol and sliding v	vindow protocol											
12	Write	a program	for congestion	3	-	-	1	-	-	-	1	CO4	L4	
	control	using leaky b												

Note: Write CO based on the theory course.

Total

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	12	CO1, CO3,	L4
CIA Exam – 2	12	CO1, CO2,CO3,CO4	L4
CIA Exam – 3	12	CO3,CO4	L4
Assignment - 1	8	CO1, CO3,	L4
Assignment - 2	8	CO1, CO2,CO3,CO4	L4
Assignment - 3	8	CO3,CO4	L4
Seminar - 1			
Seminar - 2			
Seminar - 3			
Other Activities – define –			
Slip test			
Final CIA Marks	20	-	-
-		1	1

36

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SNo	Description	Marks
1	Observation and Weekly Laboratory Activities	04 Marks
2	Record Writing	8 Marks for each Expt

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3	Intern	8 Marks								
4	Total	Internal Asses	sment	20 Marks						
5	SEE									
-	Total			100 Mark	S					

D. EXPERIMENTS

Experiment 01 : TCP/TCP transmission protocol

-	Experiment No.:	1	Marks		Date		Date	
1	Title	Imp ther	lement a po n.	int to point	network with	four nodes a	and duplex li	inks between
2	Course Outcomes	Chc OSI	Choose suitable tool to model a network and understand the protocols at various OSI reference levels.					
3	Aim	Imp ther ban	nplement a point to point network with four nodes and duplex links between nem. Analyze the network performance by setting the queue size and varying the andwidth.					
4	Material / Equipment Required	tLab	Manual					
5	Theory, Formula, Principle, Concept	a, TCP (Transmission Control protocol) is a standard that defines how to establish and maintain a network conversation via which application programs can exchange data. TCP works with the Internet Protocol (IP), which defines how computers send packetss of data to each other. Together, TCP and IP are the basic rules defining the Internet						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	, #= , # se #= # # ; se #C se #C	Simulation p t val(stop) 10. Initializatio Create a ns simu t ns [new Simu Open the NS tra t tracefile [open	arameters setu 0 on ilator lator] ce file n lab1.tr w]	p ;# time of sin	=== nulation end ===		



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02011.0		\$ns trace-all \$tracefile		
		#Onen the NAM trace file		
		set namfile [open lab1 nam w]		
		\$ns namtrace-all \$namfile		
		#		
		# Nodes Definition		
		#=====================================		
		#Create 4 nodes		
		set n1 [\$ns node]		
		set n2 [\$ns node]		
		set n3 [\$ns node]		
		#=====================================		
		# These below line helps to define color, label and	snape	
		"		
		\$ns at 0.0 "\$n0 color blue"		
		\$ns at 0.0 "\$n1 color red"		
		C		
		Sns at 0.0 "Sn0 label Source/Tcp0"		
		\$ns at 0.0 "\$n2 label Router"		
		\$ns at 0.0 "\$n3 label Destination"		
		\$n0 shape hexagon		
		\$n1 shape hexagon		
		\$n3 shape square		
		#		
		# Links Definition		
		#======================================		
		#Createlinks between nodes		
		\$ns duplex-link \$n0 \$n2 100.0Mb 20ms DropTail		
		\$ns queue-limit \$n0 \$n2 20	#Q1	
		\$ns duplex-link \$n1 \$n2 100.0Mb 20ms DropTail	10000	
		\$ns queue-limit \$n1 \$n2 20	#Q2	
		Sns duplex-link Sn2 Sn3 100.0Mb 20ms DropTail	#02	
		shs queue-min 5n2 5n5 20	#Q3	
		#Above Highlighted Bandwidth and Queue Size w	ill be chang	
		#Give node position (for NAM)		
		\$ns duplex-link-on \$n0 \$n2 orient right-down		
		\$ns duplex-link-op \$n1 \$n2 orient right-up		
		\$ns duplex-link-op \$n2 \$n3 orient right		
		#======================================		
		# Agents Definition		
		#Setup a TCP connection		
		set tcp0 [new Agent/TCP]		
		\$ns attach-agent \$n0 \$tcp0		
		set sink2 [new Agent/TCPSink]		

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Copyright ©2017. cA	AS. All rights reserved.	Stop0 set packetSize 1500	
		stepo set packetsize_1500	
		#Setup a TCP connection	
		set tcp1 [new Agent/TCP]	
		\$ns attach-agent \$n1 \$tcp1	
		set sink3 [new Agent/TCPSink]	
		\$ns attach-agent \$n3 \$sink3	
		\$ns connect \$tcp1 \$sink3	
		\$tcp1 set packetSize_1500	
		#	
		# Applications Definition	
		#=====================================	
		#Setup a FTP Application over TCP connection	
		set ftp0 [new Application/FTP]	
		\$ftp0 attach-agent \$tcp0	
		\$ns at 1.0 "\$ftp0 start"	
		\$ns at 8.0 "\$ftp0 stop"	
		#Setup a FTP Application over TCP connection	
		set ftp1 [new Application/FTP]	
		\$ftp1 attach-agent \$tcp1	
		\$ns at 1.0 "\$ftp1 start"	
		\$ns at 8.0 "\$ftp1 stop"	
		#	
		# Termination	
		#Define a 'finish' procedure	
		proc finish {} {	
		global ns tracefile namfile	
		\$ns flush-trace	
		close \$tracefile	
		close \$namfile	
		exec nam lab1.nam &	
		exit 0	
		}	
		\$ns at \$val(stop) "\$ns nam-end-wireless \$val(stop)"	

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Copyrig	ght ©2017. cA	Litle: AS. All rights reserved.	Course Lab Manual \$ns run Awk Script: BEGIN{ tcppack=0 tcppack1=0 } { if(\$1=="r"&&\$4=="3"&&\$5= { tcppack++; } if(\$1=="d"&&\$3=="2"&&\$5= { tcppack1++; } } END{ printf("\n total number of data printf("\n total number of pack }	="tcp"&&\$6=="154 =="tcp"&&\$6=="15 packets received at ets dropped at Node	40") 40") Node 3: %d\n' 2: %d\n", tcpj	ge: 11/52 , tcppack++); pack1++);			
7	Block, 0 Diagram Equation Graph	Circuit, Model n, Reaction n, Expected							
8	Observa	ation Table,							
	Look-up Output	Table,							
9	Sample	Calculations							
10	Graphs,	Outputs	Bandwidth(MB) N0-N2, N1-N2, N2-N3	Queue Size Q1, Q2, Q3	Received at Node 3	Dropped at Node 2			
			100,100,100	20, 20, 20	6820	0			
			100,100,1	20, 20,2	508	45			
			300,300,10	50, 50,3	3021	48			
		<u> </u>							
11	Results	& Analysis							
12	Applicat	ion Areas	FTP, data and control), which Protocol (SMTP)	is used in sending	large files. Sin	iple Mail Iransfer			
13	Remark	s							
14	Faculty Date	Signature with							

Experiment 02 : TCP/UDP Transmission protocol

-	Experiment No.:	2	Marks	Date Planned	Date Conducted	
1	Title		n1-n2 and			

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			 n2-n3. Apply TCP agent between n0-n3 and UDP between n1-r applications over TCP and UDP agents changing the pa determine the number of packets sent by TCP/UDP. 	13. Apply relevant rameter and
2	Course	Outcomes (Choose suitable tool to model a network and understand the	protocols at various
		C	DSI reference levels.	
3	Aim		 Implement a four node point to point network with links r n2-n3. Apply TCP agent between n0-n3 and UDP between n1-r applications over TCP and UDP agents changing the pa determine the number of packets sent by TCP/UDP 	i0-n2, n1-n2 and n3. Apply relevant rameter and
1	Material	/1	ah Manual	
4	Equipm Require	ent d		
5	Theory, Principle	Formula,L e, Concept e t	JDP (User Datagram Protocol) is an ommunications protocol to Transmission ControlProtocol (TCP) establishing low-latency and loss-tolerating connections between einternet.	alternative) used primarily for en applications on
6	Procedu Progran Algorith Code	ıre, n, Activity, m, Pseudo		
7	Block, Model Reactio Expecte	Circuit, Diagram, n Equation, d Graph	$ \begin{array}{c} ftpo\\ tcpo\\ \hline $	

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8	Observa	ation Table,	# # Simulation parameters setup	
	Look-up	Table,	# Simulation parameters setup	
	Output		set val(stop) 50.0 :# time of simulation end	
			, in the second s	
			#	
			# Initialization	
			#	
			#Create a ns simulator	
			set ns [new Simulator]	
			#Open the NS trace file	
			set tracefile [open lab2 tr w]	
			Sns trace-all Stracefile	
			ons autor un outorne	
			#Open the NAM trace file	
			set namfile [open lab2.nam w]	
			\$ns namtrace-all \$namfile	
			#	
			#	
			#Create 4 nodes	
			set n0 [\$ns node]	
			set n1 [\$ns node]	
			set n2 [\$ns node]	
			set n3 [\$ns node]	
			#======================================	
			# These below line helps to define color, label and shape	
			#	
			\$pe color 1 "blue"	
			Shis color 1 blue	
			siis color 2 Ted	
			\$ns at 0.0 "\$n0 color blue"	
			\$ns at 0.0 "\$n1 color red"	
			\$ns at 0.0 "\$n0 label Source/Tcp0" Dont FOF DRIT Port	

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Copyright ©201	7. cAAS. All rights reserved	Sns at 0.0. "Sn2 Jabal Bouter"				
		\$ns at 0.0 "\$n3 label Destination"				
		and at 0.0° and laber Destination				
		\$n0 shape hexagon				
		\$n1 shape hexagon				
		\$n3 shape square				
		#======================================				
		# Links Definition				
	1	#======================================				
		#Createlinks between nodes				
	3	sns duplex-link sn0 sn2 200.0Mb 10ms Drop1 all				
		sns dunlex-link \$n2 \$n3 200 0Mb 10ms DronTail				
		ns duplex-link \$12 \$13 200.000 1000s Drop1 an				
		\$ns duplex-link \$n1 \$n2 200.0Mb 10ms DropTail				
		\$ns queue-limit \$n1 \$n2 50				
		#Give node position (for NAM)				
	1	\$ns duplex-link-op \$n0 \$n2 orient right-down				
	1	\$ns duplex-link-op \$n2 \$n3 orient right				
		\$ns duplex-link-op \$n1 \$n2 orient right-up				
		\$ns duplex-link-op \$n2 \$n3 color "green"				
		\$ns duplex-link-op \$n0 \$n2 label "TCP Packets"				
		\$ns duplex-link-op \$n1 \$n2 label "UDP Packets"				
		\$ns duplex-link-op \$n2 \$n3 label "UDP+TCP Packets"				
	-	#				
	-	# Agents Definition				
	1	#======================================				
	1	#Setup a TCP connection				
	1	set tcp0 [new Agent/TCP]				
		\$ns attach-agent \$n0 \$tcp0				
		set sink3 [new Agent/TCPSink]				
		\$ns attach-agent \$n3 \$sink3				
		Sns connect StepU Ssink3.				

SHISTITUTE OF JEE	SKIT	Teaching Process	Rev No.: 1.0
North Contraction	Doc Code:	SKITPh5b1.F03	Date: 11-07-2019
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Copyright ©2017. cA	AS. All rights reserved	Step0 set interval 0.1	
		stepo set interval_0.1	
	4	#Setup a UDP connection	
	5	set udp1 [new Agent/UDP]	
	5	\$ns attach-agent \$n1 \$udp1	
	5	set null2 [new Agent/Null]	
		\$ns attach-agent \$n3 \$null2	
		\$ns connect \$udp1 \$null2	
		Sudp1 set packetSize_1500	
		sudp1 set interval_0.1	
		\$tcn0 set class 1	
		Sudp1 set class_1	
	4	#======================================	
	4	# Applications Definition	
	4	#======================================	
	ŧ	#Setup a FTP Application over TCP connection	
	5	set ftp0 [new Application/FTP]	
	4	Stro attach-agent Stcp0	
	3	Sns at 1.0 "Sftp0 start"	
	9	Sins at 9.0 "\$ftp0 stop"	
		1 1	
	#	Setup a CBR Application over UDP connection	
	s	et cbr1 [new Application/Traffic/CBR]	
	9	Scbr1 attach-agent \$udp1	
	9	Scbr1 set packetSize_ 1000 # Change the Packet	Size
		scbr1 set rate_ 1.0Mb	
	1	Scori set random_ null	
	1	ons at 1.0 SCOTI start	
	4	sus at 9.0 scorr stop	
	ŧ	ŧ	
	ŧ	# Termination	
	#	ŧ	
	ŧ	Define a 'finish' procedure	
	F	proc finish {} {	

SKI Doc Co Title		SKIT	Teaching Pro	Rev No.: 1.0				
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Copyrig	ht ©2017. cA	AS. All rights reserve	d.					
			close Stracefile					
			close \$namfile					
			exec nam lab2.nam &					
			exit 0					
			I She at Sval(ston) "She nam and wire	lace Sval(eton)"				
			shis at \$val(stop) "finish"	icss avai(stop)				
			\$ns at \$val(stop) "nuts \"done\" : \$ns	halt"				
			Sns run	, maile				
			Awk Script:					
			BEGIN{					
			tcppack=0					
			tcppack1=0					
) [
			if(\$1=="r"&&\$4=="2"&&\$5=="tcn	"&&\$6=="1540") #154	0, 1040, 1340			
			{		,,			
			tennack++:					
			}					
			if(\$1=="r"&&\$4=="2"&&\$5=="cbr"	'&&\$6=="1500") #1500	, 1500, 1500			
			{					
			tcppack1++;					
			}					
			}					
			END{	adrais continuon No.	la O and Nada 2.			
			grinu(witotal number of TCP data p	ackets sent between not	te 0 and Node 2:			
			printf("\n total number of UDP data r	ackets sent between No	de 1 and Node 2.			
			%d\n", teppack 1++):	Jackets sent between 140	de l'alle Hode 2.			
			}					
			,					
9	Sample	_						
	Calculat	ions						
10	Graphs,	Outputs						
11	Results	& Analysis						
			Simulation Time (Sec)	Packet Size (Byte)	Sent at Node 2			
			Start Time:1	TCP:1500	TCP:3930			
			Stop Time:9	UDP:1500	UDP:1001			
			Start Time:1	TCP:1000	TCP:9410			
			Stop Time:20	UDP:1500	UDP:1584			
			Start Time:1	TCP:1300	TCP:11910			
			Stop Time:25	UDP:1500	UDP:2000			
40	A			entine hat an Part	in an the later of			
12	Applicat	ion Areas	low-latency and loss-tolerating conne	ections betweenapplicat	ions on the internet.			
13	Remark	S						
14	Faculty	Signature						
	with Dat	e						

SHISTITUTE OF AN	SKIT	Teaching Process	Rev No.: 1.0
San Kriss	Doc Code:	SKITPh5b1.F03	Date: 11-07-2019
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Copyright ©2017. cAAS. All rights reserved. Experiment 03 : Ethernet LAN throughput calculation

-	Experiment No.:	periment No.: 1 Marks	Date Planned	Date Conducted
1	Title	Implement Etherne	et LAN using n (6-10)	nodes. Compare the throughput by
2	Course Outcomes	rse Outcomes Choose suitable to OSI reference level	ol to model a network an ls.	d understand the protocols at various
3	Aim	Implement Etherne changing the error	et LAN using n (6-10) rate and data rate.	nodes. Compare the throughput by
4	Material / Equipment Required	erial / pment uired		
5	Theory, Formula, Principle, Concept	ory, Formula, ETHERNET. ciple, Concept communication net or limited geograp wireless. Ethernet, of standard LANtec	Local Area Netwo workconnecting various te hical area.The connectio Token Ring and Wireless chnologies.	rk (LAN) is a data rminals or computers within a building n among the devices could wired or LAN using IEEE 802.11 are examples
6	Procedure, Program, Activity, Algorithm, Pseudo Code	e set ns [new Simular set ff [open lab3.tr v \$ns trace-all \$tf set nf [open lab3.na \$ns namtrace-all \$r \$ns color 0 blue set nf [open lab3.na \$ns namtrace-all \$r \$ns color 0 blue set n0 [\$ns node] \$n0 color "red" set n1 [\$ns node] \$n1 color "red" set n2 [\$ns node] \$n2 color "red" set n3 [\$ns node] \$n3 color "red" set n4 [\$ns node] \$n4 color "magenta set n5 [\$ns node] \$n5 color "magenta set n6 [\$ns node] \$n6 color "magenta set n7 [\$ns node] \$n7 color "magenta set n7 [\$ns node]	tor] w] am w] nf a" a" a" a" a" uDP" ode" tion/Null" \$n1 \$n2 \$n3" 100Mb 300 \$n5 \$n6 \$n7" 100Mb 300 \$n5 \$n6 \$n7" 100Mb 300 \$n5 \$n6 \$n7" 100Mb 300 \$n5 \$n6 \$n7" 100Mb 300	ns LL Queue/DropTail Mac/802_3 ns LL Queue/DropTail Mac/802_3 Fail

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Copyrig	ht ©2017. cAA	S. All rights reserve	d.					
			# lossmodel is a command and it is single word. Sp	pace should not be given				
			between loss and model					
			set err [new ErrorModel]					
			\$ns lossmodel \$err \$n3 \$n4					
			\$err set rate_ 0.1 #Change the Erro	or Rate 0.1, 0.3, 0.5,				
			# error rate should be changed for each output like	0.1,0.3,0.5*/				
			set udp [new Agent/UDP]					
			\$ns attach-agent \$n1 \$udp					
			set cbr [new Application/Traffic/CBR]					
			\$cbr attach-agent \$udp					
			\$cbr set fid_0					
			\$cbr set packetSize_ 1000					
			\$cbr set interval_ 0.001 #Change the Data	a Rate 0.001, 0.01, 0.1,				
			set null [new Agent/Null]					
			\$ns attach-agent \$n7 \$null					
			Carrow and Carla Carroll					
			shis connect suap shull					
			proc finish { } {					
			global ns nf tr					
			\$ns flush-trace					
			close \$nf					
			close \$tt					
			exec nam lab3.nam &					
			exit 0					
			}					
			\$ns at 0.1. "Schr start"					
			Sns at 3.0 "finish"					
			\$ns nin					
			pus run					
			Awk Script:					
			PEGINI					
			tennack=0					
			tennack1=0					
			(Uppack I=U	A Barrison Contraction				
			{					
			if(\$1=="r"&&\$4=="7"&&\$5=="cbr"&&\$6=="100	0")				
			{					
			tcppack++;					
			}					
			}					
			END{					
			printf("\n total number of data packets at Node 7: 9	6d\n", tcppack++);				
			}					
7	Block,	Circuit,						
	Model	Diagram,						
	Reaction	Equation.						
	Expected	d Graph						

SKIT Doc Code:		SKIT	Te	Rev No.: 1.0				
		Doc Code:	SKITPh5b1.F03 Date: 11-07-20					
8	ANGALORE	Title:	Course Lab Manual		Page: 19 / 52			
Copyrig	ght ©2017. cA	AS. All rights reserve	d.					
				ANN2 ANN2 ANN2 ANN2 ANN2 ANN2 ANN2 ANN2	E red module			
8	Observa Look-up Output	ition Table, Table,						
9	Sample Calculat	ions						
10	Graphs,	Outputs						
11	Results	& Analysis	Error Rate	Data Rate	Received at Node 7			
			0.1	0.001	1255			
			0.3	0.01	95			
			0.5	0.1	05			
12	Applicat	ion Areas	Provides better quality of is well-known for its cost-s	service (QoS). Voice: Voice savings	over Internet Protocol (VoIP)			
13	Remark	S						
14	Faculty with Dat	Signature e						

Experiment 04 : Ethernet LAN with N Nodes

-	Experiment No.:	1	м	arks	5		Date Planned		Date Conducted	
1	Title	Imple obtair	ment n con	Eth gest	ernet	LAN using	n nodes and fferent source	assign multip es/ destinatio	ble traffic to the tr	ne nodes and
2 Course Outcomes Design a suitable network a				etwork and s	imulate using	g a Network s	imulator tool.			
3 Aim Implement Ethernet LAN using n nodes and ass obtain congestion window for different sources/ c					assign multip es/ destinatio	ole traffic to th	e nodes and			
4	Material	/Lab N	/lanua	al						
	Equipment									
	Required									
5	Theory, Formula	,Ether	net	is	the	traditional	technology	for conn	ecting wired	l <u>local area</u>

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* dangaLoRE*	Title:	Course Lab Manual	Page: 20 / 52			

Copyrig	ght ©2017. cAAS. All rights r	eserved.
	Principle, Conce	pt networks (LANs), enabling devices to communicate with each other via a protocol
		a set of rules or common network language.
6	Procedure,	set n0 [\$ns node]
	Program, Activ	vity, set n1 [\$ns node]
	Algorithm Pseudo	udo set n2 [\$ns node]
	Code	set n3 [\$ns node]
	Obde	\$ns make-lan "\$n0 \$n1 \$n2 \$n3" 10mb 10ms LL Queue/DropTail Mac/802_3
		\$ns color 1 "blue"
		\$ns color 2 "red"
		\$ns at 0.0 "\$n3 color blue"
		\$ns at 0.0 "\$n1 color red"
		\$ns at 0.0 "\$n0 label Source/Tcp0"
		\$ns at 0.0 "\$n2 label Source/Tcp2"
		\$ns at 0.0 "\$n1 label Destination/Sink1"
		\$ns at 0.0 "\$n3 label Destination/Sink3"
		\$n0 shape hexagon
		\$n2 shape hexagon
		Snl shape square
		\$n3 shape square
		ons shape square
		set tcp0 [new Agent/TCP/Reno]
		\$ns attach-agent \$n0 \$tcp0
		set ftp0 [new Application/FTP]
		\$ftp0 attach-agent \$tcp0
		set sink3 [new Agent/TCPSink]
		\$ns attach-agent \$n3 \$sink3
		\$ns connect \$tcp0 \$sink3
		set tcp2 [new Agent/TCP]
		\$ns attach-agent \$n2 \$tcp2
		set ftp2 [new Application/FTP]
		\$ftp2 attach-agent \$tcp2
		set sink1 [new Agent/TCPSink]
		\$ns attach-agent \$n1 \$sink1
		\$ns connect \$tcp2 \$sink1
		\$tcp0 set class_ 1
		\$tcp2 set class_2 , out to Director Doct FOF DDIT

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Copyrig	ght ©2017. cA	AS. All rights reserve	d.	
			###### To trace the congestion window####################################	
			set file1 [open file1.tr w]	
			Step0 attach Shiel	
			stcp0 trace cwnd_	
			#Step0 set maxewind_10	
			set mez [open mez.tr w]	
			Step2 attach Shiez	
			proc finish J J J	
			global of tf ne	
			Sne fluch_trace	
			exec nam lab4 nam &	
			close \$nf	
			close \$tf	
			exit 0	
			}	
			\$ns at 0.1 "\$ftp0 start"	
			\$ns at 1.5 "\$ftp0 stop"	
			\$ns at 2 "\$ftp0 start"	
			se - respect to the second second many	
			\$ns at 3 "\$ftp0 stop"	
			\$ns at 0.2 "\$ftp2 start"	
			\$ns at 2 "\$ftp2 stop"	
			\$ns at 2.5 "\$ftp2 start"	
			\$ns at 4 "\$ftp2 stop"	
			\$ns at 5.0 "finish"	
			\$ns run	
7	Block	Circuit		
'	Model	Diagram	Cierco O	
	Reaction	n Equation		PI FTPI
	Expecte	d Granh		
	Lybecie	u Graph	ZANI	
			Stp2 TCp2 OV	
			3 Sink 1 K	
-				
8	Observa	ation Lable,		
	Look-up	Table,		
	Output			
9	Sample			
	Calculat	tions		
10	Graphs,	Outputs		

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sults & Analysis				
Souts & Analysis	Time	TCP	TCPReno	
	0.5	23.02	21.91	
	1	29.73	29.53	
	1.5	34.59	34.71	
	2	2	41.11	
	2.5	26.23	2	
	3	32.84	24.62	
oplication Areas	Provides	better q	uality of ser	vice (QoS). Voice: Voice over Internet Protocol (VoIP)
·	is well-kno	own for	its cost-savii	ngs
emarks				
aculty Signature				
th Date				
D D D D D D D D D D D D D D D D D D D	plication Areas marks culty Signature h Date	plication Areas marks culty Signature h Date	plication Areas plication Areas plication Areas plication Areas plication Areas plication Areas plication Areas plication Areas provides better q provides q	Image Icit Icit Icit Icit Icit Icit Icit 0.5 23.02 21.91 1 29.73 29.53 1.5 34.59 34.71 2 2 41.11 2.5 26.23 2 3 32.84 24.62 plication Areas Provides better quality of services well-known for its cost-savir marks culty Signature h Date Date

Experiment 05 : Wireless LAN

-	Experiment No.:	1	Marks		Da	te .			Date	9		
					Plan	ned			Condu	cted		
1	Title	Imple perfo	ement ESS rmance para	with transm meters.	ission	nodes	in	Wireles	s LAN	and	obtain	the
2	Course Outcomes	Desig	gn a suitable i	network and s	simulate	e using	a No	etwork s	imulator	tool.		
3	Aim	Imple perfo	ement ESS rmance para	with transm meters.	ission	nodes	in	Wireles	s LAN	and	obtain	the
4	Material / Equipment Required	Lab N	Manual									
5	Theory, Formula, Principle, Concept	As w exter surve wirele	ireless LAN (nds to the eillance, and essaccess. R	WLAN) devic outdoors.Ap outdoor inv emote netwo	ces incr plicatio ventory rks as v	rease, nssuch contro vell as	the r as ol al clien	need to public I stretcl t device	provide ; wi-fi n the r s need t	them acce need o be o	connec ss, out for out connecte	tivity door door ed.
6	Procedure, Program, Activity, Algorithm, Pseudo Code	set n \$ns r \$ns r \$ns r creat set n set n	f [open lab5.r namtrace-all-v node-config -a -llTy -mac' -ifqT -ifqL -phy' -chan -prop -antT -topo -agen -route re-god 3 0 [\$ns node] 1 [\$ns node]	nam w] wireless \$nf 1 adhocRouting pe LL \ Type Mac/80 ype Queue/Di en 50 \ Fype Phy/Wir unelType Chai Type Propaga ype Antenna/ Instance \$top utTrace OFF	000 100 AODV 2_11 \ ropTail elessPf nnel/W ation/Tr OmniA o \	00 7 \ iy \ ireless(woRay antenna	Chan Grou 1 \	nel \ Ind \				

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		3	set n2 [\$ns node]	
			¢ 011 1"- 0"	
			\$n0 label "tcp0"	
			sni label sinkl/tepi	
		3	\$n2 label "sink2"	
			\$n0 set V 50	
			\$n0 set X_50	
			\$n0 set 7_0	
			\$n1 set X 100	
			$s_{n1} \operatorname{set} X = 100$	
			\$n1 set 7_0	
			$\sin^2 \sec X = 600$	
			\$n2 set X 600	
			sn2 set T = 000	
		3 1		
		3	\$ns at 0.1 "\$n0 setdest 50 50 15"	
			\$ns at 0.1 "\$n1 setdest 100 100 25"	
		1	\$ns at 0.1 "\$n2 setdest 600 600 25"	
			set tcp0 [new Agent/TCP].	
		S	et ftp0 [new Application/FTP]	
		\$	ftp0 attach-agent \$tcp0	
		S	et sink1 [new Agent/TCPSink]	
		\$	ns attach-agent \$n1 \$sink1	
		\$	ns connect \$tcp0 \$sink1	
		S	et tcp1 [new Agent/TCP]	
		\$	ns attach-agent \$n1 \$tcp1	
		S	et ftp1 [new Application/FTP]	
		\$	ftp1 attach-agent Stcp1	
		S	et sink2 [new Agent/TCPSink]	
		\$	ins attach-agent \$n2 \$sink2	
		\$	ns connect Step1 \$sink2	
		\$	ns at 5 "Sttp0 start"	
		\$	ns at 5 "Sttp1 start"	
		5	ns at 100 "\$n1 setdest 550 550 15"	
		\$	ns at 190 "\$n1 setdest /0 /0 15"	
		p	roc tinisn { } {	
			global ns nf tf	

\$ns flush-trace

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Copyrię	ht ©2017. cA	AS. All rights reserved	1.	
Zopyrig	Block, Model Reaction Expecte	Circuit, Diagram, h Equation, d Graph	exec nam lab5.nam & close \$tf exit 0 } \$ns at 250 "finish" \$ns run BEGIN{ tcppack=0 tcppack=0 } { if(\$1=="s"&&\$3=="_0_"&&\$4=="AGT"&&\$8=="1040") { tcppack++; } if(\$1=="r"&&\$3=="_2_"&&\$4=="AGT"&&\$8=="1040") { tcppack1++; } Prof. Siddu Biradar, Dept. ECE, DBIT, Bangalore END{ printf("\n total number of data packets sent from Nod tcppack++); printf("\n total number of data packets received at Nod tcppack++); }	Prage. 247 52
			Source Router	
8	Observa Look-up	ition Table, Table,		
9	Sample			
	Calculat	ions		
10	Graphs,	Outputs		
11	Results	& Analysis		

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12 A	Applicati	ion Areas		
13 F	Remarks	S		
14 F	aculty	Signature		
v	with Dat	е		

Experiment 06 : Link state routing algorithm

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	1 Title Implementation of Link state routing algorithm.							
2	Course Outcomes	Desig	ın a suitable ı	network and s	simulate using	g a Network s	imulator tool.	
3	Aim	Imple	mentation of	Link state rou	uting algorithr	n.		
4	Material /	Lab N	lanual					
	Equipment							
	Required							
5	Theory, Formula,	A roi	uting method	d used by o	dynamic route	ers in which	every router	maintains a
	Principle, Concept	datab	ase of its in	dividual autor	nomous syste	em (AS) topo	ology. The O	pen Shortest
		Path	First (OSPF) routing pro	tocol uses th	e link state	routing algori	thm to allow
6	Dreesedure	USPF	-routers to ex	change routil	ng information	n with each o	ther.	
0	Procedure,	#===	Simulation para	meters setun				
	Algorithm Bouldo	#====		meters setup				
	Code	set va	al(stop) 10.0	;#	time of simula	tion end		
	Couc							
		#===						
		#	Initialization					
		#	ate a ns simulat	or				
		set n	s [new Simulate	or]				
		#Opt	en the NS trace	file				
		set tracefile [open lab6.tr w]						
		\$ns t	race-all \$tracefi	ile				
		#Oni	en the NAM tra	ce file				
		set n	amfile [open lal	b6.nam w]				
		\$ns r	amtrace-all \$na	amfile				

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Copyrigh	nt ©2017. cA	AS. All rights reserved		
		ŧ	*Create 5 nodes	
		5	et n0 [\$ns node]	
		5	set n1 [\$ns node]	
		5	et n2 [\$ns node]	
		5	set n3 [\$ns node]	
		5	set n4 [\$ns node]	
		4		
			Links Definition	
		4	tCreatalinks between nodes	
			Sns dupley_link \$n0 \$n1 100 0Mb 10ms DronTail	
			Sns queue-limit \$n0 \$n1 50	
			Sns duplex-link \$n0 \$n2 100 0Mb 10ms DronTail	
			Sns queue-limit \$n0 \$n2 50	
			Sns duplex-link \$n2 \$n3 100 0Mb 10ms DronTail	
		4	Sns queue-limit \$n2 \$n3 50	
			Sns duplex-link \$n1 \$n3 100.0Mb 10ms DropTail	
		3	\$ns queue-limit \$n1 \$n3 50	
			\$ns duplex-link \$n3 \$n4 100.0Mb 10ms DropTail	
		1	\$ns queue-limit \$n3 \$n4 50	
		3	\$ns duplex-link \$n0 \$n3 100.0Mb 10ms DropTail	
			\$ns queue-limit \$n0 \$n3 50	
		3	\$ns duplex-link \$n1 \$n2 100.0Mb 10ms DropTail	
		3	\$ns queue-limit \$n1 \$n2 50	
			#Give node position (for NAM)	
			\$ns duplex-link-op \$n0 \$n1 orient right	
			\$ns duplex-link-op \$n0 \$n2 orient right-down	
			\$ns duplex-link-op \$n2 \$n3 orient right	
			\$ns duplex-link-op \$n1 \$n3 orient left-down	
			\$ns duplex-link-op \$n3 \$n4 orient left-down	
			Sns duplex-link-op Sn0 Sn3 orient right-down	
			\$ns duplex-link-op \$n1 \$n2 orient left-down	
		ġ	#Set the link costs. All link costs are symmetric	

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	3	ns cost \$n0 \$n5 5	
	c	ins cost \$n1 \$n0.2	
	\$	ins cost \$n1 \$n2 2	
	\$	ins cost \$n1 \$n3 3	
	3		
	s	ons cost \$n2 \$n1 2	
	s	ins cost \$n2 \$n0 1	
	s	ins cost \$n2 \$n3 1	
	S	ons cost \$n3 \$n2 1	
	S	ins cost \$n3 \$n1 3	
	S	ins cost \$n3 \$n0 3	
	S	ins cost \$n3 \$n4 2	
	c	inc cost \$n4 \$n3 2	
	3	sis cost 314 315 2	
	#		
	#	Agents Definition	
	Ŧ	#=====================================	
	*	set udp() [new_Agent/[IDP]	
		See autoch-agent Sp0 Sudp0	
		set null1 [new Agent/Null]	
		Sns attach-agent Sn4 Snull1	
		Sns connect SudpO Snull1	
		Sudp0 set packetSize 1500	
	+	#	
	1	# Applications Definition	
	#	#	
	4	#Setup a CBR Application over UDP connection	
	5	set cbr0 [new Application/Traffic/CBR]	
	-	Scbr0 attach-agent \$udp0	
	-	\$cbr0 set packetSize_ 1000	
		\$cbr0 set rate_1.0Mb	
		\$cbr0 set random_ null	
	5	\$ns at 1.0 "\$cbr0 start"	
		Sns at 5.0 "Scbr0 stop"	

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			<pre>#====================================</pre>	
7	Block, Model Reactior Expecte	Circuit, Diagram, n Equation, d Graph	UDP ICER 3 C C C C C C C C C C C C C C C C C C	a: no b: ni c: nz d: nz e: ny
8	Observa Look-up Output	tion Table, Table,		
9	Sample Calculat Graphs,	ions Outputs	 N0-N1-N2-N3-N4: Total Cost is of 7 N0-N2- N1 -N3-N4 : Total Cost is of 8 N0-N2-N3-N4 : Total Cost is of 4 N0-N3-N4 : Total Cost is of 5 	
4.4	Doculto	8 Apolycia	 Shortest according to Link State algorithm is N0-N2-N3-I Cost is of 4 	N4 having Total
11	Applies		routers to evolve and routing information distance waster of	
12	Applicat	ion Areas	routers to exchange routing information , distance vector route	15
13	Remark	S		

AND TOTE OF TROMNOLOGY	SKIT	Teaching Process	Rev No.: 1.0			
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Experiment 07 : HDLC frame to perform Bit and character stuffing

-	- Experiment No.:		Marks		Date Planned		Date Conducted			
1	Title	HDLC frame to perform Bit stuffing and character stuffing								
2	Course Outcomes	Simulate the networking concepts and protocols using C/C++.								
3	Aim	Write	rite a program for HDLC frame to perfom Bit Stuffing							
4	Material Equipment Required	Lab N	ab Manual							
5	5 Theory, Formula, Bit stuffing is the process of inserting noninformation bits into data to break up patterns to affect the synchronous transmission of information. It is widely used network and communication protocols, in which bit stuffing is a required part of transmission process. Bit stuffing is commonly used to bring bit streams up to common transmission rate or to fill frames. Bit stuffing is also used for run-leng limited coding. Character stuffing Since this can interfere with the framing, a techniq calledcharacter stuffing is used. The sender's data link layer inserts an AS DLEcharacter just before the DLE character in the data. The receiver's data I layer removes this DLE before this data is given to the network layer.						break up bit idely used in ed part of the ams up to a for run-length a technique ts an ASCII er's data link			
6	6 Procedure, Program, Algorithm, Code 1) Turn on the computer and launch the application, Pseudo Code 1) Turn on the computer and launch the application, Pseudo Code 2) Open gedit editor and type program. Program name should have the program. extension . 3) Save the program and close the file. 4) Run the simulation program. 5) Now press the play button in the simulation window and the simulation begins. 6) After simulation is completed see the output in the output window, 7) Write down the output wave forms. 8) Close the file and then start with new program computation.					e the proper				
		Algor	itnm:	.	D (1) (1) (1)	4 4 4 9 1				
		1. rea	ad messsage	a[]: i=ponter	a[] flag: "0111 	1110"				
				j=pointer b	[]					



Convrid	nht ©2017 cAAS All rights resen		1 ago: 00 / 02
οοργηξ	ni ezon. chao. Ai nghis reserv	count =0	
		2. Add flag to b[]	
		3. Read the bit of a[]	
		4. Save it in b []	
		5. if (bit = 1) count ++	
		if (count =6) add '0' to b[] , make count = 0	
		if (bit =0) count = 0	
		6. Repeat step 3,4 and 5 for all bits of a[].	
		Program: BIT stuffing:	
		#include <string.h> #include<stdio.h></stdio.h></string.h>	
		main()	
		{ char a[20],fs[50]="",t[6],r[5]; int i,j,p=0,q=0;	
		printf("enter bit string : "); scanf("%s",a); strcat(fs "01111110"):	
		if(strlen(a)<6)	
		۲ strcat(fs,a);	
		s else s	
		for(i=0;i <strlen(a)-5;i++)< th=""><th></th></strlen(a)-5;i++)<>	
		for(j=i;j <i+6;j++)< th=""><th></th></i+6;j++)<>	
		t[p++]=a[j];	
		} t[p]='\0';	
		if(strcmp(t,"011111")==0)	
		{ strcat(fs,"0111110");	
		i=j-1;	
		} else	
		ا در ۱۵۱هه (۱۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹ - ۲۵۱۹	
		r[1]='(0';	
		Sucau(15,1 <i>)</i> ,	



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		}
		p=0; }
		for(q=i;q <strlen(a);q++)< th=""></strlen(a);q++)<>
		{ { {
		}
		t[p]='\0';
		strcat(fs,t);
		strcat(fs,"0111110"):
		printf("After stuffing : %s",fs);
		getch();
		}
		CHARACTER stuffing:
		#include <string.h></string.h>
		#include <stdio.h></stdio.h>
		main()
		{
		char a[30],fs[50]="",t[3],sd,ed,x[3],s[3],d[3],y[3]; int i,j,p=0,q=0;
		printf("Enter characters to be stuffed : ");
		scanf("%s",a);
		printt("\nEnter a character that represents starting delimiter : "); scanf(" %c" &sd):
		printf("\nEnter a character that represents ending delimiter : ");
		scanf(" %c",&ed);
		x[0]=s[0]=s[1]=sd; x[1]=s[2]='\0'
		y[0]=d[0]=d[1]=ed;
		d[2]=y[1]='\0';
		strcat(ts,x);
		for(i=0;i <strlen(a);i++)< th=""></strlen(a);i++)<>
		+[0]-5[i]·
		t[0]=a[1], t[1]='(0';
		if(t[0]==sd)
		strcat(fs,s);
		if(t[0]==ed)
		strcat(fs,d);
		else
		Subal(13,1),

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			}					
			strcat(fs,y);					
			printf("\nAfter stuffing : %s".fs):					
			aetch():					
			}					
7	Block.	Circuit.	,					
-	Model	Diagram						
	Reaction Equation							
	Expecte	d Graph						
0								
ð	Observa	ation Table,						
	соок-ир	i able,						
	Output							
9	Sample							
	Calculations							
0	Graphs,	Outputs						
11	Results	& Analysis						
12	Applicat	ion Areas	Plesiochronous digital hierarchy, Synchronous digital hierarchy	1				
13	Remark	S						
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Experiment 08 : Distance vector algorithm to find suitable path for transmission

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title Distance vector algorithm to find suitable path for transmission							
2	Course Outcomes	Simu	late the netwo	orking concer	ots and proto	cols using C/0	C++.	
3	Aim	Write transı	ite an program for Distance vector algorithm to find suitable path for nsmission					
4	Material /	Lab N	lanual					
	Equipment							
	Required							
5	Theory, Formula,	Theory, Formula,						
	Principle, Concept	A dist	A distance-vector routingprotocol in data networks determines the best route for					
		data	ata packets based on distance. Distance-vector routing protocols measure					
		the di	ne distance by the number of routers a packet has to pass, one router counts as					
		one h	iop.					
6	Procedure,	1) Tu	rn on the con	nputer and la	unch the app	lication,		
	Program, Activity,	2) Op	oen gedit ed	itor and type	program. P	rogram name	e should hav	e the proper
	Algorithm, Pseudo			51	1 0	0		
	Code	exten	extension.					
		3) Sa	ve the progra	am and close	the file.			
		4)Rur	n the simulati	on program.				
		5)Nov	w press the	play button	in the simu	lation window	v and the s	imulation will



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		begins.
		6)After simulation is completed see the output in the output window,
		7) Write down the output wave forms.
		8)Close the file and then start with new program computation.
		Alogorithm:
		1. read the no. Of nodes from graph
		2. Maintain routing table for all the nodes
		3. initialise distance between the same node= 0 and previous node as the same
		node.
		4. update the routing table.
		Program:
		#include <stdio.h></stdio.h>
		#include <stdlib.h></stdlib.h>
		#define nul 1000
		#define nodes 10
		int no:
		struct node
		{
		int a[nodes][3]:
		}
		router[nodes];
		void init(int r)
		{
		int i;
		for(i=1;i<=no;i++)
		{
		router[r].a[i][1]=i;
		router[r].a[i][2]=999;
		router[r].a[i][3]=nul;
		}
		router[r].a[r][2]=0;
		router[r].a[r][3]=r;
		}
		void inp(int r)
		{
		int i;
		printf("\n enter dist to the node %d to other nodes",r);
		printf("\n please enter 999 if there is no direct route\n");
		for(i=1;i<=no;i++)
		{
		if(i!=r)
		{
		printf("\n enter dist to the node %d:",i);
		scanf("%d",&router[r].a[i][2]);
		router[r].a[i][3]=i;

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	3		

y void display(int r)
{
int i;
printf("\n\n the routimg table for node %d is as follows".r):
for(i=1:i<=no:i++)
{
if(router[r].a[i][2]>=999)
printf("\n\t\t\t %d \t no link \t no hop",router[r].a[i][1]);
else
printf("\n\t\t\t %d \t %d \t\ %d",router[r].a[i][1],router[r].a[i][2],router[r].a[i][3]);
}
}
void dv_algo(int r)
{
int i,j,z;
for(i=1;i<=no;i++)
if(router[r].a[i][2]!=999 && router[r].a[i][2]!=0)
(for/i=1.iz=po.i)
IOI (j = 1, j < = 110, j + +) s
ر z=router[r] a[i][2]+router[i] a[i][2]:
if(router[r] a[i][2]>z)
router[r].a[j][2]=z;
router[r].a[j][3]=i;
}
}
}
}
}
void find(int x,int y)
if(router[x].a[y][3]!=y)
(find(v routor[v].c[v][2]);
$\frac{1110(x,100(e)[x],a[y][5])}{100(x,100(e)[x],a[y][5])}$
find(router[x] a[y][3]y);
return
}
}
int main()
{
int i,j,x,y;
int choice;
printf("enter the no of nodes required(less than 10 pls):");
scanf("%d",&no);
for(i=1;i<=no;i++)

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			<pre>{ init(i); inp(i); } printf("\n the configuration of the nodes after initilization is as fol for(i=i;i<=no;i++) display(i); for(j=1;j<=no;j++) for(i=1;i<=no;i++) dv_algo(i); printf("\n the configuration of the nodes after computation of pat for(i=1;i<=no;i++) display(i); while(1) f </pre>	lows:"); h is as follows:");
			<pre>{ printf("\n\n enter 1 to continue 0 to quit:"); scanf("\%d",&choice); if(choice!=1) break; printf("\n enter the nodes btn which shortest path is to be found: scanf("%d%d",&x,&y); printf("\n the shortest path is:"); printf("\n the shortest path is:"); printf("%d>",x); find(x,y); printf("%d",y); printf("\n the length of the shortest path is%d",router[x].a[y][2]); } return 0; }</pre>	\n");
7	Block, Model Reactior Expecte	Circuit, Diagram, n Equation, d Graph		
8	Observa Look-up Output	ition Table, Table,		
9	Sample Calculat	ions		
10	Graphs,	Outputs		
11	Results	& Analysis		
12	Applicat	ion Areas	Protocol network, LAN, ARPANET routing	
13	Remark	S		
14	Faculty with Dat	Signature e		

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Experiment 09 : Dijkstra's Algorithm to compute shortest path

-	Experiment No.:	1	Marks		Date Planned		Date Conducted		
1	Title	Dijks	tra's Algorithi	n to compute	shortest path		conducted		
2	Course Outcomes	Simul	imulate the networking concepts and protocols using C/C++.						
3	Aim	Imple	nplement Dijkstra's Algorithm to compute shortest routing path.						
4	Material /	Lab N	ab Manual						
	Required								
5	Theory, Formula, Principle, Concept								
6	Procedure, Program, Activity, Algorithm, Pseudo Code	1) Tu 2) Op exten 3) Sa	Turn on the computer and launch the application, Open gedit editor and type program. Program name should have the proper atension . Save the program and close the file.						
		4)Rur 5)Nov begin	Run the simulation program. Now press the play button in the simulation window and the simulation will						
		6)Afte	After simulation is completed see the output in the output window,						
		7) Wr) Write down the output wave forms.						
		8)Clo)Close the file and then start with new program computation.						
		Algor	lgorithm:						
		1. rea	read no. Of nodes in graph						
		2. cho	oose start noo	de let current	node = start n	ode			
		3. ma	rk the curren	t node as visi	ted				
		4. set	path length	of non visited	neighbours of	current nod	es		
		5. upo	date the path	length of nor	visited neight	oours of curr	rent nodes		
		6. sel	ect the node	with minimun	n path length				
		7. set	. set current nodes = node with minimum path length and mark their current node						
		as vis	s visited						
		8. Re	peat the step	5 & 7, (n-1) t	imes.				
		Progr	am :						
		#inclu	ude <stdio.h></stdio.h>						



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		void sort(void);
		static int dsp[10][10],nodes;
		struct{
		char src;
		char dest;
		int length;
		}stemp,permanent[10]={' ',' ',0},temp[10]={' ',' ',-1};
		static int perm,tem;
		void main()
		{
		int i,j,k,l,m,n=0,point;
		char initial,dest,path[10]={' '};
		printf("\t\t Shortest Path (Dijkstra's algorithm)");
		printf("\n************************************
		printf("\nEnter the number of nodes:");
		scanf("%d",&nodes);
		printf("\nEnter the adjacency matrix for the graph:\n");
		for(i=0;i <nodes;i++)< td=""></nodes;i++)<>
		{
		for(j=0;j <nodes;j++)< td=""></nodes;j++)<>
		scanf("%d",&dsp[i][j]);
		}
		fflush(stdin);
		printf("\n enter the source node:");
		scanf("%c",&initial);fflush(stdin);
		printf("\n Enter the destination node:");
		scanf("%c",&dest);
		permanent[perm].src=initial;
		permanent[perm].dest=initial;



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Copyrig	ht ©2017. cA	AS. All rights reserved	permanent[perm++].length=0:	
			i=normanont[norm 1] doct 07:	
			i-permanent[perm-i].dest-97,	
			for(j=0;j <nodes;j++)< td=""><td></td></nodes;j++)<>	
			{	
			if(i!=j)	
			{	
			if(dsp[i][j]>0)	
			{	
			temp[tem].src=permanent[perm-1].src;	
			temp[tem].dest=j+97;	
			temp[tem++].length=dsp[i][j];	
			}	
			}	
			}	
			sort();	
			while(tem>=0)	
			{	
		j	=permanent[perm-1].dest-97;	
			for(i=0;i <nodes;i++)< td=""><td></td></nodes;i++)<>	
			{	
			if(i!=initial-97)	
			{	
			if(dsp[j][i]>0)	
			{	
			I=-1;	
			for(k=0;k <perm;k++)< td=""><td></td></perm;k++)<>	
			{	
			if(permanent[k].dest==(i+97))	
		I	=k;	
			}	

for(k=0;k<=tem;k++)

{



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		}	
		}	
		sort();	
		}	
		printf("\nShortest path:\n");	
		printf("From %c to %c is:",initial,dest);	
		for(i=0;i <perm-1;i++)< td=""><td></td></perm-1;i++)<>	
		{	
		if(permanent[i].dest==dest)	
		{	
		point=i;n=i; break;	
		}	
		} i=0;	
		for(j=perm;j>0;j)	
		{	
		if(permanent[j-1].dest==permanent[point].src)	
		{	
	r	path[i++]=permanent[point].dest;	
	r	point=j-1;	
		}	
		}	
		path[i]=initial;	
		for(j=i;j>=0;j)	
		printf("%c ",path[j]);	
		printf("\t length=%d",permanent[n].length);	
		getch();	
		}	

for(i=0;i<=tem;i++)

void sort()

int i,j,k;

{

NUMBER OF STREET
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		<pre>{ k=1; for(j=0;j<=tem;j++) { if((temp[j].length <= temp[j+1].length)) { stemp=temp[j]; temp[j]=temp[j+1]; temp[j]=temp[j+1]; temp[j+1]=stemp;</pre>
		break:
		}
		}
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs Outputs	
11	Results & Analysis	
12	Application Areas	vertices in a weighted graph. Google maps. Routing systems
13	Remarks	
14	Faculty Signature with Date	

Experiment 10 : Using CRC-CCITT polynomial to obtain CRC code

-	Experiment No.:	1	Marks	Date	Date	
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1	Title		Using CRC-CCITT	polynomial to	o obtain CRC	C code		
2	Course	Outcomes	Model the network	s for different	configuration	n and analyze	the results.	
3	Aim		For the given dat	a use CRC-0	CCITT polyn	omial to obta	in CRC code	. Verify the
			program for the ca	ses				
			a) without error					
			b) with error					
4	Materia	/	Lab Manual					
	Require	d						
5	Theory.	Formula.	Whenever digital d	ata is stored	or interfaced	data corrupti	on might occu	ur. Since the
	Principle	e, Concept	beginning of comp	uter science,	developers I	have been thir	nking of ways	to deal with
	-		this type of proble	em. For seria	l data they	came up with	the solution	to attach a
			parity bit to each	sent byte. T	his simple o	detection med	chanism work	s if an odd
			number of bits in a	a byte change	es, but an ev	en number of	false bits in c	one byte will
			not be detected b	y the parity of	check. To ov	vercome this p	problem deve	lopers have
			CRC calculation o	r cyclic redun	dancy check	was the resu	It of this Now	adays CRC
			calculations are u	ised in all ty	pes of com	munications.	All packets	sent over a
			network connectio	n are checke	, ed with a CR	C. Also each	, data block o	n your hard
			disk has a CRC v	alue attache	d to it. Mod	ern computer	world cannot	t do without
			these		1 0	1 = 5		
			CRC		10110			
			1.0	1	0 0 1 1	Ĩ		
					10000			
					0 0 0 0 0			
					10000	-		
					1001	1 1		
					111	L 0 = 14 =	remainder	
			calculations. So le	t's see why th	hey are so w	idely used. Th	ne answer is a	simple; they
			are powerful, det	ect many typ	bes of errors	s and are exi	tremely fast	to calculate
			especially when de	edicated hard	ware chips a	re used.		

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6	Procedure,		Algorithm:
	Program, Algorithm	Activity,	1 Multiply $M(x)$ by highest power in $G(x)$ i.e. Add So much zeros to $M(x)$
	Code	1 36000	2 Divide the result by $G(x)$. The remainder = $C(x)$. Special case: This work if
			2. Divide the result by $G(x)$. The remainder $= G(x)$. Special case. This work in
			bitstring = all zeros. We don't allow such an $M(x)$.But $M(x)$ bitstring = 1 will work, for
			example. Can divide 1101 into 1000.
			3. If: x div y gives remainder c that means: x = n y + c Hence (x-c) = n y (x-c) div y
			gives remainder 0 Here $(x-c) = (x+c)$ Hence $(x+c)$ div y gives remainder 0
		,	4. Transmit: $T(x) = M(x) + C(x)$
			5. Receiver end: Receive $T(x)$. Divide by $G(x)$, should have remainder 0.
			Program:
			#include <stdio.h></stdio.h>
			int a[100],b[100],i,j,len,k,count=0;
			//Generator Polynomial:g(x)=x^16+x^12+x^5+1
			int gp[]={1,0,0,0,1,0,0,0,0,0,1,0,0,0,0,1,};
			int main()
			{
			void div();
			printf("\nEnter the length of Data Frame :");
			scant("%d",&len); printf("\nEnter the Message :"):
			for(i=0;i <len;i++)< th=""></len;i++)<>
			scanf("%d",&a[i]);
			//Append r(16) degree Zeros to Msg bits
			for(i=0;i<16;i++)
			a[len++]=0;
			for(i=0:i <len:i++)< th=""></len:i++)<>
			b[i]=a[i];
			(Ne of times to be divided in Mag Longth
			k=len-16:
			div();
			for(i=0;i <len;i++)< th=""></len;i++)<>
			b[i]=b[i]^a[i]; //MOD 2 Substraction
			print(nData to be transmitted :); for(i=0:i <len:i++)< th=""></len:i++)<>
			printf("%2d",b[i]);
			printf("\n\nEnter the Reveived Data - ").
			for(i=0;i <len;i++)< th=""></len;i++)<>
			scanf("%d",&a[i]);
			div();

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		e:	Course Lab Manua		Page: 44 / 52		
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			} \v	for(i=0;i <len;i if(a[i] { printf("\nData oid div() for(i=0;i<k;i+- { if(a[i] { } coun }</k;i+- </len;i 	++) !=0) printf("\nERROR in Re return 0; Recived is ERROR FRE +) ==gp[0]) for(j=i;j<17+i;j++) a[j]=a[j]^gp[co t=0;	cived Data"); Ξ"); unt++];	
			,				
7 Block, Circuit,							
7	Block, Model	Cir Diad	cuit, ram				
7	Block, Model	Cir Dian	rcuit, ram	CRC-CCITT	CRC-16	CRC-32	
7	Block, Model	Cir Dian	ram	CRC-CCITT	CRC-16	CRC-32	
7	Block, Model Checl	Cir Diao ksum	cuit, ram	CRC-CCITT 16 bits	CRC-16 16 bits	CRC-32 32 bits	
7	Block, Model Checl Wie	Cir Diao ksum dth	ram	CRC-CCITT 16 bits	CRC-16 16 bits	CRC-32 32 bits	
8	Block, Model Check Wie Gene	Cir Dian ksum dth rator	rcuit, ram	CRC-CCITT 16 bits	CRC-16 16 bits	CRC-32 32 bits	
8	Block, Model Check Wie Gene Polyn	Cir Dian ksum dth rator omial	cuit, ram (1000	CRC-CCITT 16 bits 01000000100001	CRC-16 16 bits 1100000000000101	CRC-32 32 bits 100000100110000010001110110	0110111
8	Block, Model Check Wia Gene Polyn	Cir Dian ksum dth rrator omial	rcuit, ram 1000	CRC-CCITT 16 bits 01000000100001 on with CRC	CRC-16 16 bits 1100000000000101	CRC-32 32 bits 100000100110000010001110110	0110111
9	Block, Model Check Wie Gene Polyn E	Cir Dian ksum dth erator omial	rcuit, ram	CRC-CCITT 16 bits 01000000100001 on with CRC	CRC-16 16 bits 1100000000000101	CRC-32 32 bits 100000100110000010001110110	0110111

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10	Graphs,	Outputs	Enter the length of Data Frame: 4			
			Enter the Message: 1 0 1 1			
			Data to be transmitted: 1 0 1 1 1 0 1 1 0 0 0 1 0 1 1 0 1 0 1			
			Enter the Reveived Data: 1 0 1 1 1 0 1 1 0 0 0 0 0 1 1 0 1 0 1			
			ERROR in Recived Data			
11	Results	& Analysis				
12	Applicat	ion Areas	Digital networks and storage devices			
13	Remark	S				
14	Faculty	Signature				

Experiment 11 : Implementation of Stop & Wait protocol

with Date

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title	Implementation of Stop & Wait protocol						
2	Course Outcomes	Mode	I the network	s for different	configuration	n and analyze	the results.	
3	Aim	Imple	mentation of	Stop & Wait	protocol and s	sliding windo	w protocol	
4	Material /	Lab N	lanual					
	Required							
5	Theory, Formula, Principle, Concept	ory, Formula, sinte Concept						
6	Procedure,	1) Tu	rn on the com	puter and lau	unch the appl	ication,		
	Program, Activity,	2) Op	oen g-edit ed	litor and type	e program. P	rogram name	e should hav	e the proper
	Algorithm, Pseudo Code	exten	sion .					
		3) Sa	ve the progra	m and close	the file.			
		4)Rur	n the simulation	on program.				
		5)Nov	w press the	play button	in the simul	ation windov	v and the si	mulation will
		begin	begins.					
		6)After simulation is completed see the output in the output window,						
		7) Write down the output wave forms.						
		8)Close the file and then start with new program computation.						
		Algo	r ithm :					
		1. Re	ad number of	frame				
		2. ser	nd a frame					
		3. set	the timmer					
		4. if a	cknowledgen	nent recieved	before timeo	ut, send the r	next frame	
		5. Els	e send the fra	ame again				
		6. rep	eat 2,3,4,5 fc	or all the fram	es.			

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		P	rogram:		
			includozatdia h>		
		# #			
		'' #	include <como.n></como.n>		
		,, , , , , , , , , , , , , , , , , , ,	oid main()		
		r r			
		Ľ	int i,j,noframes,)	(x1=10,x2;	
			noframes=10;		
			i=1;		
			j=1;		
			printf("n	umber of frames is %d ",noframe	s);
			getch();		
			while(noframes:	>0)	
			{		
			printf("\r	sending frames is %d",i);	
			x=rand()%10;	
			if(x%10	==0)	
			{		
				for(x2=1;x2<2;x2++)	
				{	
				printf("\n waiting for %d s	seconds\n",x2);
				sleep(x2);	
				}	A
				printit (in sending frames %d/n ,i)),
			١	x-rand() % r0,	
			ر مrintf("\ı	ack for frame %d\n" i):	
			noframe	s=noframes-1	
		i-	++:		
		j+	, ++;		
		Ĩ	}		
			printf("\n end of	stop and wait protocol\n");	
		n			
		1			
7	Block.	Circuit.			
	Model	Diagram,			
	Reactio	n Equation,			

	Reaction Equation Expected Graph
8	Observation Table
	Look-up Table
	Output
9	Sample
	Calculations

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10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Telecommunications, IBM Binary Synchronous Communication
13	Remarks	
14	Faculty Signature	
	with Date	

Experiment 12 : Congesion control using Leakg bucket algorithm

-	Experiment No.:	1	Marks		Date Planned		Date Conducted			
1	Title	Cond	Concession control using Leakg bucket algorithm							
2	Course Outcomes	Mode	lodel the networks for different configuration and analyze the results.							
3	Aim	Write	e a program fo	or congesion	control using	leaky bucket	algorithm			
4	Material / Equipment Required	Lab N	ab Manual							
5	Theory, Formula, Principle, Concept	The r const small outpu be los zero. where other bucke In the for bo	nain concept ant despite the hole at the lat flow follows st because of From netwo e all the inco wise the pace et transmits on the following fig oth the two ap	of the leaky l he variant inp bottom. In ca a constant r spillover. In a rk perspectiv oming packet kets are disc ne packet fro gure we can oproaches (e.	oucket algorit but traffic, suc ase the bucket ate, while if the a similar way e, leaky buck s are stored carded. In or m the queue notice the ma g. leaky bucket	hm is that the ch as the wat to contains w he bucket is f if the bucket in case ther der to regula in a fixed time ain rationale et with water	e output data ter flow in a l ater (or pack full any additi is empty the of a finite qu re is space in ate the output e (e.g. at eve of leaky buck (a) and with Packet Packet The Bucket Holds Packets Regulated Flow	flow remains pucket with a ets) then the onal load will output will be leue (bucket) n the queue, it flow, leaky ry clock tick). det algorithm, packets (b)).		



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6	Procedure, Program, Algorithm,	Activity, Pseudo	 Turn on the computer and launch the application, Open g-edit editor and type program. Program name should have the proper extension .
	Code		3) Save the program and close the file.
			4)Run the simulation program.
			5)Now press the play button in the simulation window and the simulation will
			begins.
			6)After simulation is completed see the output in the output window,
			7) Write down the output wave forms.
			8)Close the file and then start with new program computation.
			Algorithm:
			Steps: 1. Read The Data For Packets
			2. Read The Queue Size
			3. Divide the Data into Packets
			4. Assign the random Propagation delays for each packets to input into the bucket
			(input_packet).
			5. wlile((Clock++<5*total_packets)and (out_packets< total_paclets)) a. if (clock ==
			input_packet) i. insert into Queue b. if (clock % 5 == 0) i. Remove paclet from
			Queue 6. End
			Program:
			#include <stdio.h></stdio.h>
			#include <stdlib.h> #define MIN(x y) (x>y)?v:x</stdlib.h>
			int main()
			{ int orate drop=0 cap x count=0 inp[10]={0} i=0 nsec ch:
			printf("\n enter bucket size : ");
			scanf("%d",∩);
			scanf("%d",&orate);
			do
			t printf("\n enter number of packets coming at second %d :",i+1);
			scanf("%d",&inp[i]);
			printf("\n enter 1 to contiue or 0 to quit");
			scanf("%d",&ch);
			}

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		while(ch);	
		nsec=i;	
		printf("\n second \t recieved \t sent \t dropped \t remained \n");	
		for(i=0:count II i <nsec:i++)< th=""><th></th></nsec:i++)<>	
		{	
		rintf(" %d" i+1):	
		printi(//dd , / / /,	
		printi((t/od(t ,inp[i]), printf(" \t % d\t " MIN((inp[i]+count) orato));	
		if(/y=inp[i]+count croto)>0)	
		it(x>cap)	
		{	
		count=cap;	
		drop=x-cap;	
		}	
		else	
		ł	
		count=x;	
		drop=0;	
		}	
		}	
		else	
		{	
		drop=0;	
		count=0;	
		}	
		printf(" \t %d \t %d \n",drop,count);	
		}	
		return 0;	
		}	
7	Block, Circu	t,	
	Model Diagran	1,	
	Reaction Equation	1.	
	Expected Graph		
	,		
8	Observation Table	2	
-	Look-up Table		
	Output	- 3	
9	Sample		
•	Calculations		
10	Graphs, Outputs	Output: Enter The Bucket Size	
		5	
		Enter The Operation Rate	
		2	
		Enter The No. Of Seconds You Want To Stimulate	
		3	
		Enter The Size Of The Packet Entering At 1 sec	
		5	

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Copyright ©2017. cAAS. All rights reserve			d.						
			Enter The Size Of The Packet Entering At 1 sec 4						
			3						
Second Pac				cket Reciev	ed Packet Sent P	acket Left P	Packet Dropped		
			1	5	2	3	0		
			2	4	2	3	2		
			3	3	2	3	1		
			4	0	2	1	0		
			5	Õ	1	0	0		
					-		•		
11	Results	& Analysis							
12 Application Areas The leaky bucket as a meter can be used in either traffic shaping or traffic r						fic shaping or traffic policing			
		-	The leaky bucket algorithm as a meter can also be used in a leaky bucket counter						
		1	to measure the rate of random or stochastic processes.						
13	Remark	S							
14	Faculty	Signature							
	with Dat	e							

VIVA QUESTIONS

- 1. What are functions of different layers?
- 2. Differentiate between TCP/IP Layers and OSI Layers
- 3. Why header is required?
- 4. What is the use of adding header and trailer to frames?
- 5. What is encapsulation
- 6. Why fragmentation requires?
- 7. What is MTU?
- 8. Which layer imposes MTU
- 9. Differentiate between flow control and congestion control.
- 10. Differentiate between Point-to-Point Connection and End-to-End connections.
- 11. What are protocols running in different? layers
- 12. What is Protocol Stack?
- 13. Differentiate between TCP and UDP.
- 14. Differentiate between Connectionless and connection oriented connection.
- 15. Why frame sorting is required?
- 16. What is meant by subnet?
- 17. What is meant by Gateway?
- 18. What is an IP address?
- 19. What is MAC address?
- 20. Why IP address is required when we have MAC address?
- 21. What is meant by port?

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- 22. What are ephemerical port number and well known port numbers?
- 23. What is a socket?
- 24. What are the parameters of socket()?
- 25. Describe bind(), listen(), accept(),connect(), send() and recv().
- 26. What are system calls? Mention few of them.
- 27. What is IPC? Name three techniques.
- 28. Explain mkfifo(), open(), close() with parameters.
- 29. What is meant by file descriptor?
- 30. What is meant by traffic shaping?
- 31. How do you classify congestion control algorithms?
- 32. Differentiate between Leaky bucket and Token bucket.
- 33. How do you implement Leaky bucket?
- 34. How do you generate busty traffic?
- 35 What is the polynomial used in CRC-CCITT?
- 36. What are the other error detection algorithms?
- 37. What is difference between CRC and Hamming code?
- 38. Why Hamming code is called 7,4 code?
- 39. What is odd parity and even parity?
- 40. What is meant by syndrome?
- 41. What is generator matrix?
- 42. What is spanning tree?
- 43. Differentiate between Prim's and Kruskal's algorithm.
- 44. What are Routing algorithms?
- 45. How do you classify routing algorithms? Give examples for each.
- 46. What are drawbacks in distance vector algorithm?
- 47. How routers update distances to each of its neighbor?
- 48. How do you overcome count to infinity problem?
- 49. What is cryptography?
- 50. How do you classify cryptographic algorithms?
- 51. What is public key?
- 52. What is private key?
- 53. What are key, ciphertext and plaintext?
- 54. What is simulation?
- 55. What are advantages of simulation?
- 56. Differentiate between Simulation and Emulation.
- 57. What is meant by router?
- 58. What is meant by bridge?
- 59. What is meant by switch?
- 60. What is meant by hub?
- 61. Differentiate between route, bridge, switch and hub.
- 62. What is ping and telnet?
- 63. What is FTP?
- 64. What is BER?
- 65. What is meant by congestion window?

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- 66. What is BSS?
- 67. What is incoming throughput and outgoing throughput?
- 68. What is collision?
- 69. How do you generate multiple traffics across different sender-receiver pairs?
- 70. How do you setup Ethernet LAN?
- 71. What is meant by mobile host?
- 72. What is meant by NCTUns?
- 73. What are dispatcher, coordinator and nctunsclient?
- 74. Name few other Network simulators
- 75. Differentiate between logical and physical address.
- 76. Which address gets affected if a system moves from one place to another place?
- 77. What is ICMP? What are uses of ICMP? Name few.
- 78. Which layer implements security for data?