Assignment Submission Coversheet

Faculty of Science, Engineering and Built Environment

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Assignment Tit	e :	Problem Solving Repo	ort 3										
Due Date:	9	eptember 20 th 2019		Assessment Item	n: 3	3							
Course Code/N	ame:	334 / Bachelor of Cy	ber Security		L								
Unit Code/Nam	ie: S	IT202 Computer Net	works	Unit Chair /		Prof Jir	nho Choi						
Practical Group (if applicable)	:			- Campus Coordin	ator:								
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COMMENTS		Assessor's				Date:							
Awarded:		Signature:											

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Question 1

Consider a scenario where a web portal uses cookies to track the users and provides a customized view to the individual user based on the previously visited sites. The web portal sends a cookie to the browser which is stored in the browser at the client's side along with the visited sites. This helps to keep track the previously visited pages of a client from different sites. Prepare a diagram illustrating how the cookie is used between a browser and the web portal when a user revisits the web portal and how the pages are retrieved from different webservers to provide a customized view to the user. Consider two different webservers for two visited sites, a web portal and a client in your diagram. Explain the steps of your diagram

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Question 2

In the following diagram, a web client is communicating with a web server which opens a TCP connection at client's end. The client is using an initial sequence number (ISN) 2048 with a port of 51000 and receiving window size of 2000. In response, server also opens a TCP connection with ISN 21732 and receiving window size of 4000, port 80. After connection establishment, client sends two data segments each of size 500 bytes. Then server responds in a single segment with 1000 bytes. Then client closes the connection, in response server also closes the connection.

Show all TCP segments during connection establishment, data transfer and connection termination between client and server (no segments are corrupted/dropped in the exchange). For each segment, write header information which should include port number, sequence number, acknowledgement number, values of all bits in the control field, window sizes and ranges of data bytes in the data section (as appropriate for the segment type). Each segment needs to be placed in a separate table. First row in the table should mention the label of segment based on their type and direction clearly client to server or vice versa. All tables should have a number at the beginning (on top of the table) which indicates the order they are sent by either the client or the server.

Segment Numb	oer:			L													
Segment Direct	tion:	Client to Server						Comment:	Init	Initiate Connection / Handshake							
0 4 8 8	4 12 9 1 8 0	10	11	12	13	14	15	16 17 18 19 20 21	22	23	24	26	27	28	30		
	Source Port Num	ber						Dest	inati	ion Po	ort Nu	mber					
	51000									80							
					Se	eque	nce	Number									
							204	18									
				Δ	ckno	owle	dgm	ent Number									
Header Len	Reserved			Fla	igs				Wi	ndov	/ Size						
		URG	ACK	PSH	RST	SYN	FIN			200	0						
	TCP Checksun	า							Urg	ent P	ointer						
						(Optio	ons									
							Dat	a									
							ION	NE									

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Segment Numb	Number: 2																
Segment Direct	tion:	Server	to Clie	nt		Comment:			Initiate Connection / Handsh								
0 1 2 8	4 5 9 7 8 6	11	12	13	15	16 17 18	19	21	23	24	25	0 7	17	28	30) (
	Source Port Num	ber				Destination Port Number											
	80								510	000							
				Seque	nce	Number											
					217	32											
			Ac	knowle	dgm	gment Number											
					204	19											
Header Len	Reserved		Flag		1			V	Vindo	w Siz	<u>ze</u>						
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				Seque		Number											
					204												
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	Daramad		FI		217	33		14	<i>(</i> :l -	C:-							
Header Len	Reserved	□□ <mark>≥</mark>	Flag		Ξ	Window Size 2000											
		URG	PSH	SYN	FZ												
	TCP Checksun	n						Ur	gent	Poin	ter						
				(Optio	ons											
					Dat												
					ION	NE											

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Segment Numb	oer:	4										
Segment Direct	tion:	Client to Server	Comment: Start of Data Transfer A									
0 4 7 8	4 2 9 7 8 6	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11 17 18 18 1 18 19 19 19 19 19 19 19 19 19 19 19 19 19									
	Source Port Num	mber	Destination Port Number									
	51000		80									
		Sequence N	lumber									
		2049	€									
		Acknowledgme	ent Number									
		2173	3									
Header Len	Reserved	Flags	Window Size									
		SYN RST PSH ACK URG	2000									
	TCP Checksur		Urgent Pointer									
		Optio	ns									
		Data	3									
		500 Bytes of D	f Data to Send									
Segment Numb Segment Direct		5 Server to Client	Comment: Acknowledgement of Transfer A									
0 4 7 %	4 5 9 7 8 6		116 117 118 119 119 120 120 120 120 130 130									
	Source Port Num	mber	Destination Port Number									
	80		51000									
		Sequence N	e Number									
		2173	3									
		Acknowledgme	ent Number									
		2550)									
Header Len	Reserved	Flags	Window Size									
		FIN SYN RST PSH ACK URG	4000									
	TCP Checksur		Urgent Pointer									
		Optio	ns									
		Data	1									
		NON										

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Segment Numl	ber:			6																					
Segment Direc	tion:	Client to Server						Comment:				_		Sta	art d	of Da	ata ¯	Tra	ınsf	er E	3				
0 1 2 8	4 5 9 7	· ∞ o	10	11	13	14	15	16 17 18 18	19	20	21	22	23	24	25	26	27	0	22	29	30				
	Source F	Port Num	ber					Destination Port Number																	
	5	1000						80																	
					S	Sequer	nce	Number																	
							255	0																	
					Ackn	owled	lgm	ent Number																	
						2	2173	1733																	
Header Len	Reserve	ed		Fl	ags			Window Size																	
			URG	PSH ACK	RST	NAS	FIN						200	10											
	TCP Checksum						Urgent Pointer																		
	Ор						ptio	ons																	
							Dat	:a																	
						50	0 B	ytes																	
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								Number																	
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Segment Numl	oer:		8																	
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	Source Port Num	ıber								С	estina	atio	n P	ort N	umb	er				
	80						51000													
					Sequ	ence	Num	ber												-
						217	33													
				Acl	knowl	edgm	ent N	Number												
						305	51													
Header Len	Reserved			Flags							١	Win	dov	v Size	:					
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	TCP Checksun						Urgent Pointer													
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Segment Direc	tion:		nt to S		13 FI 41	15	_ Cor	mment:	6	0				24 TOW						sfer C ⊗ ₩
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	Source Port Num	iber								L	estina	atio			umb	er				
	51000					0000	Niuma	hor					80							
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						305														
				Acı	knowle			Number												
						227	34													
Header Len	Reserved	 		Flag:		, T								v Size	:					
	<u> </u>		ACK	PSH	RST	FZ							200							
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						Optio	ons													
						Dat	ta													
						100	NE													

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Segment Num	nent Number: 10																
Segment Direction: Client to Server						Commen	t:				Clo	ose C	onne	ction			
0 4 7 %	-	8 6	10	12	14	16	19 IX	20	22	23	24	26	27	28	30	31	
	Source Po	rt Numb	er					Des	stinat	ion Pc	ort Nur	nber					
	51	000								80							
				S	equence	ce Number											
					30!	51											
				Ackn	owledgm	ment Number											
					227	734											
Header Len	Reserved			Flags		Window Size											
			ACK URG	RST PSH	SYN	2000											
	TCP Ch	ecksum	1		l l				Urg	ent P	ointer						
Opt						ons											
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					NO	NE											
Segment Num	ber:		-	11		-				٨	cknow	ılada	omor	st of C	loco		
Segment Direc	tion:		Server	to Client		Acknowledgement of Close Comment: Connection											
3 7 1 0	4 ₂ ₀ _C	∞ 0	10	12 13	14	16 17 18 18 19 19 20 21 22 22 23 24 26 26 27 27 28 28 29 30 30 30 30 30 30 30 30 30 30 30 30 30									31		
	Source Po	rt Numb	er			Destination Port Number											
	8	30								5100	0						
				S	equence	Number											
					227	34											
				Ackn	owledgm	ent Numb	er										
					30!	51											
Header Len	Reserved			Flags					Wi	indow	/ Size						
			ACK URG	RST PSH	SYN	₹ 4000											
	TCP Ch	ecksum			l l	Urgent Pointer											
					Opti	ons											
					Da	ta											
					NO	NE											

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Segment Numb	oer:	12													
Segment Direct	tion:	Server to Client		Comment:	Close Connection										
0 1 2 8	4 5 9 7 8	11 12 13	14	16 17 18	119										
	Source Port	Number		Destination Port Number											
	80				51000										
		Se	quence	Number											
			227	2734											
		Ackno	wledgm	gment Number											
			305	051											
Header Len	Reserved	Flags		Window Size											
		RST PSH ACK URG	SYN SYN		4000										
•	TCP Chec				Urgent Pointer										
			Optio	tions											
			Dat	ta											
			NON	NE											
Segment Numb	ner·	13													
Segment Direct		Client to Server		Comment:	Acknowledgement of Close Connection										
0 4 7 8	4 5 9 7 8	11 11 11 11 11 11 11 11 11 11 11 11 11	14 15	16 17 18	19 20 20 20 20 20 20 20 20 20 20 20 20 20										
	Source Port	Number		Destination Port Number											
	51000	0			80										
		Se	quence	e Number											
			305	51											
		Ackno	wledgm	ent Number											
			227	34											
Header Len	Reserved	Flags			Window Size										
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	TCP Chec		,		Urgent Pointer										
			Optio	ons											
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