NS Lab 4 Answer Sheet
NS3 simulator - TCP Performance Monitoring

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Hand-in time (submit to blackboard) by Sep 30, 2013 13:00CEST

Total points: 20 pts

Please provide your answer in the appropriate space for each question

Task 1 – Throughput of TCP client-server connection

1.

Latency	Measured Throughput	Calculated Throughput	Calculation
64ms	0.514655 Mbps	1.024 Mbps	(16384 / 0.128) * 8
96ms	0.337934 Mbps	0.683Mbps	(16384 / 0.192) * 8
128ms	0.249932 Mbps	0.512 Mbps	(16384 / 0.256) * 8

2. Yes, higher latency means less Mbps. $\text{Throughput} \leq \frac{\text{RWIN}}{\text{RTT}}$

3. Optimal RWIN value: 51200
   Calculation: (3200000 / 8) * 0.128

4. 1.59585 Mbps

Task 2 – Monitoring TCP congestion window

1.

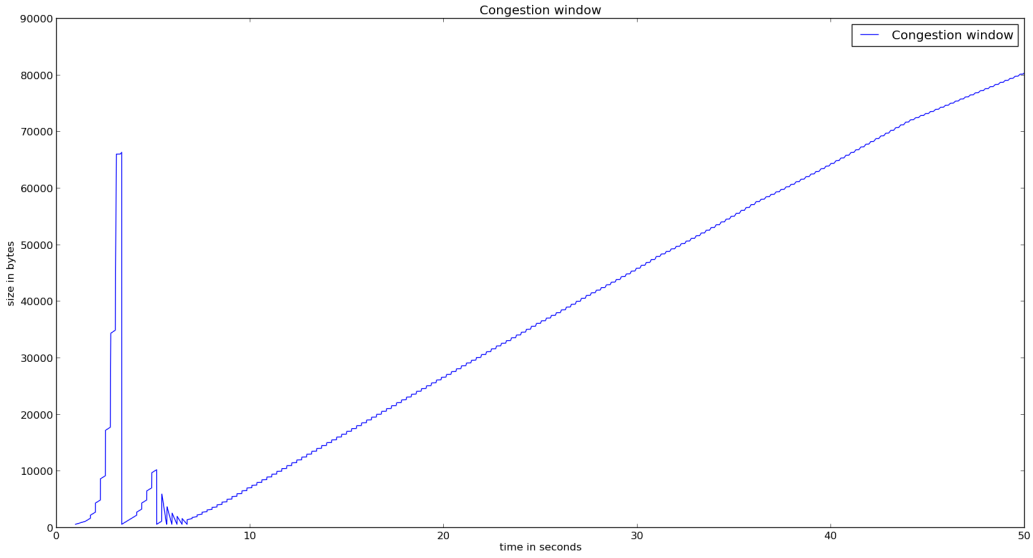

Figure 1: Tahoe – droptail queue = 100

2.a.

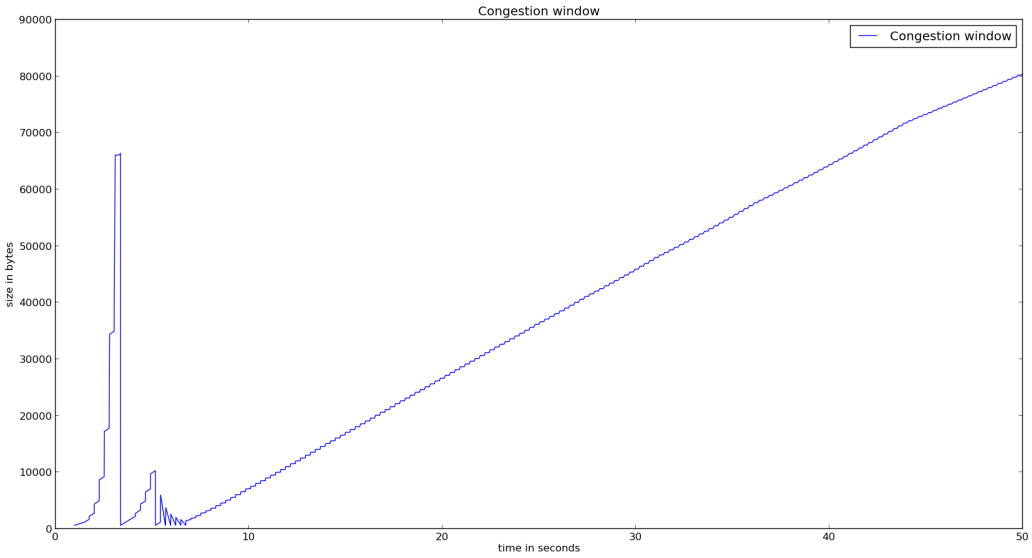

Figure 2: Tahoe, droptail queue = 40

2.b

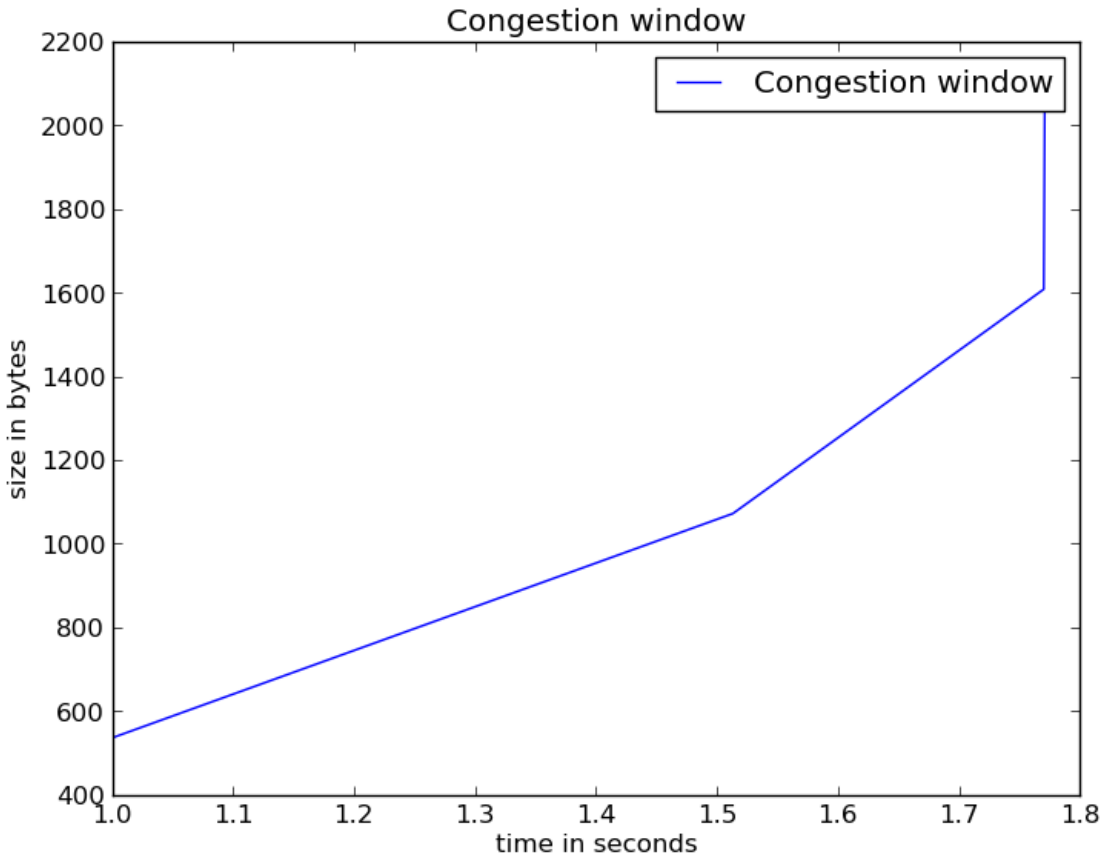

Figure 3: Tahoe, droptail queue = 40 (from 1 until 1.85 secs)

State changes, Tahoe – from 1 until 1.85 secs		
Time (sec, 3 accuracy decimal)	cwnd (bytes)	New state
1.000	526	*(initial state)*
1.5	1070	
1.77	1603	

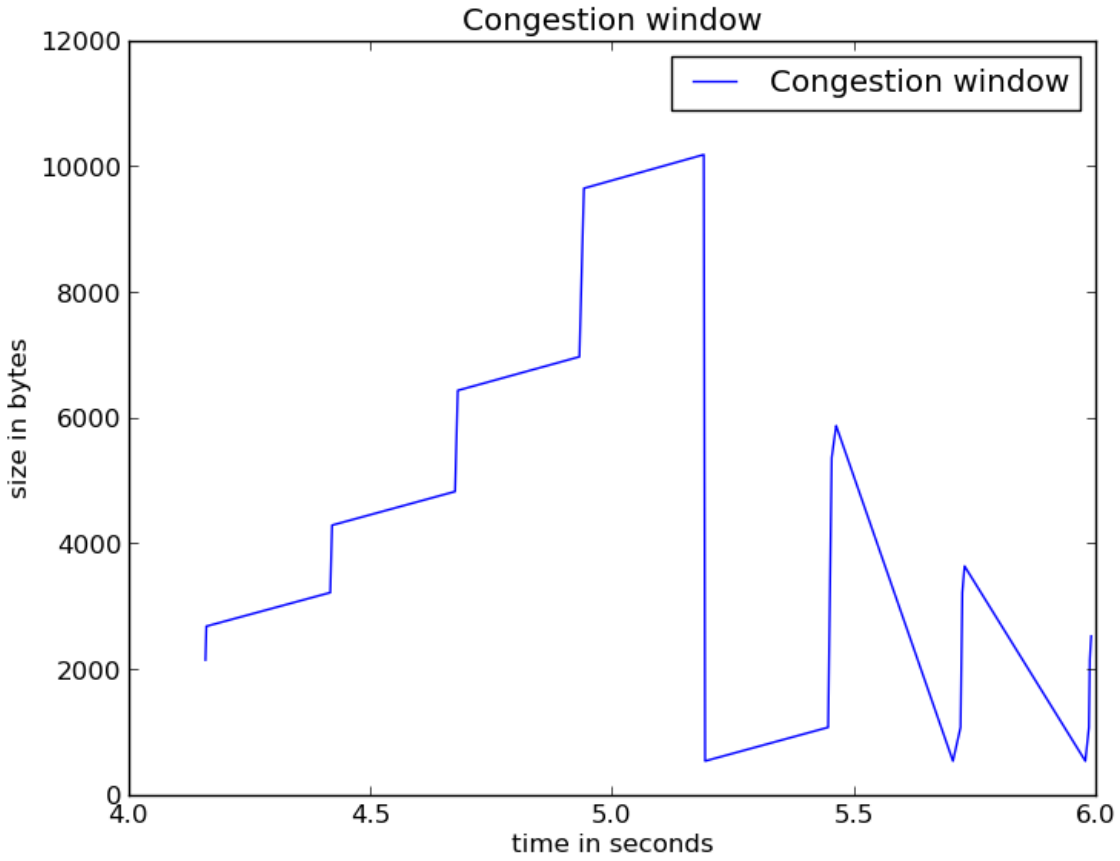

Figure 4: Tahoe, droptail queue = 40 (from 4 until 6 secs)

State changes, Tahoe – from 4 until 6 secs		
Time (sec, 3 accuracy decimal)	cwnd (bytes)	New state
4.000	2000	*Building cwnd window*
5.194	10000	Triple Ack
5.441	1040	Build cwnd window

3.a

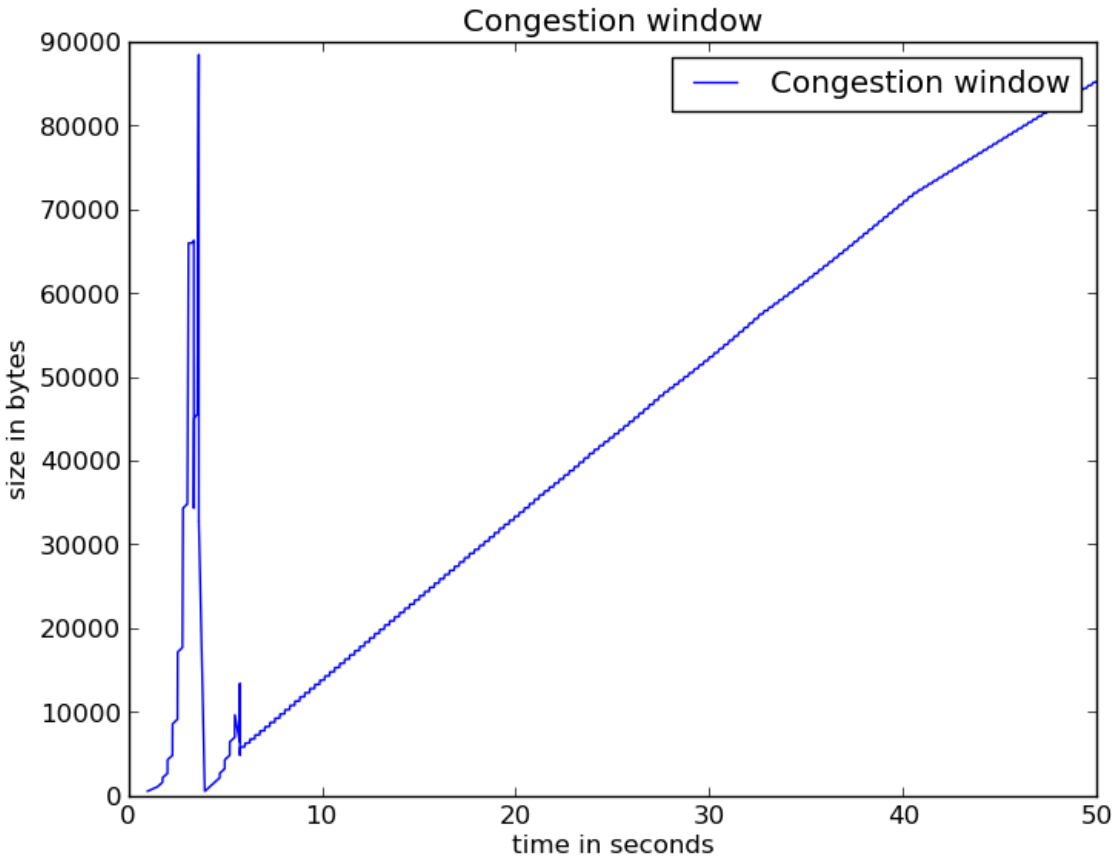

Figure 5: Reno, droptail queue = 40

3.b

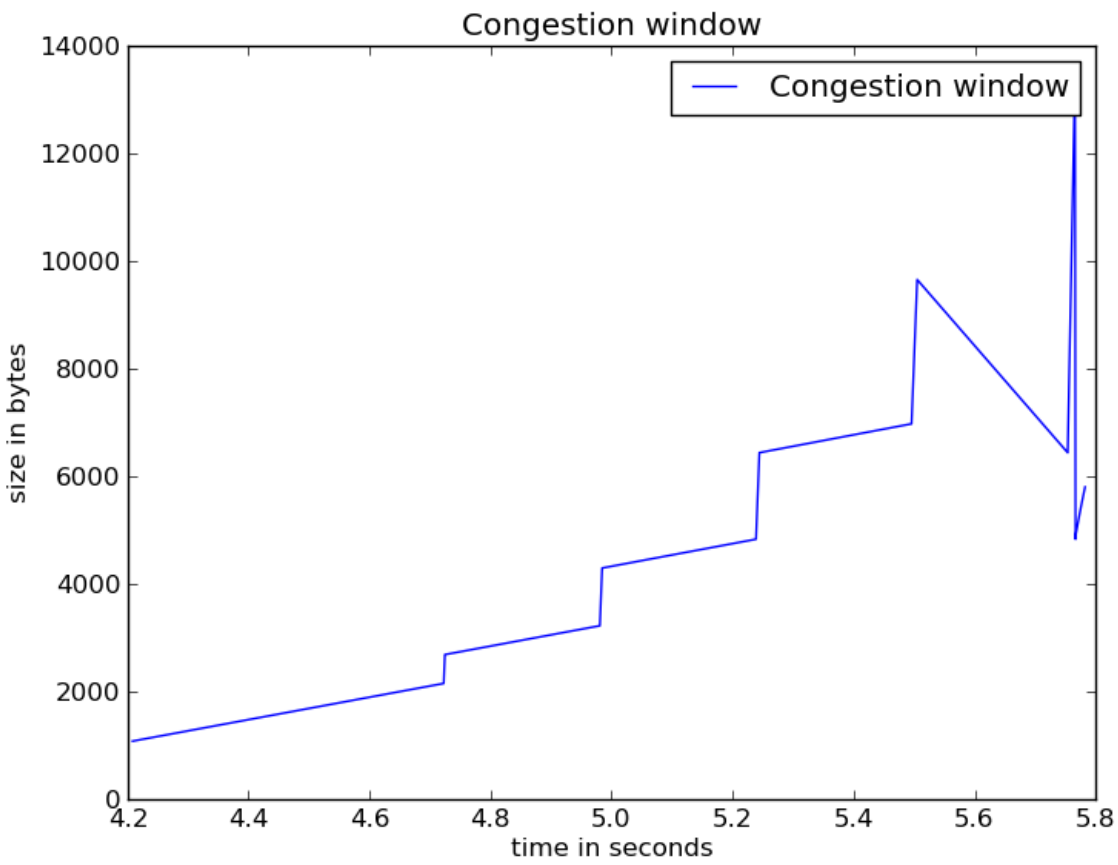

Figure 6: Reno, droptail queue = 40 (from 4 until 6 secs)

State changes, Reno – from 4 until 6 secs				
Time (sec, accuracy 3 decimal)	Current cwnd (bytes)	New cwnd (bytes)	New state	Event
4.200	1000		*(initial state)*	Building cwnd
5.500	10000	6800	...	Triple Acks
5.780	12400	5800		Triple Acks

Submission

You have to submit:

- Your answers to all the questions. Use this provided **answer sheet** for you answers and graphs. Provide your answers in the appropriate answer field for each question

- The source codes of the two tasks.

- The graphs and the produced data.

Attention: You have to submit one PDF file that contains all the answers and graphs; the name of the file should be lab4-<lastname_firstletter>.pdf (example: lab1-vanderveldt_k.pdf, or lab1-pittaras_c.pdf). Additionally you have to submit one zip (or rar) file containing the source codes, the graphs and the data. The name of the file should be: lab4-source-<lastname_firstletter>.zip

Any other kind of submission will not be taken into account. You must also put your full name and your student number at the top of the answer sheet.