

**Amna Mubarak**

**20K-1695**

**BSE-6B**

**Class Activity LAB 07**

1-

```
pradeepkumar@ubuntu:~/ns-allinone-3.27$ cd netanim-3.108/
pradeepkumar@ubuntu:~/ns-allinone-3.27/netanim-3.108$ ls
abort.h                                moc_fileedit.cpp
animatorconstants.h                  moc_fileeditfactory.cpp
animator_fileopen.svg                moc_fileeditfactory.o
animator_grid.svg                    moc_fileedit.o
animatormode.cpp                     moc_filepathmanager.cpp
animatormode.h                       moc_filepathmanager.o
animatormode.o                       moc_netanim.cpp
animator_mouseposition.png           moc_netanim.o
animator_nodeid.svg                  moc_packetsmode.cpp
animator_nodesysid.svg               moc_packetsmode.o
animator_packetstats.svg             moc_predefs.h
animator_pause.svg                   moc_qcustomplot.cpp
animator_play.svg                     moc_qcustomplot.o
animator_reload.svg                  moc_qtbuttonpropertybrowser.cpp
animatorscene.cpp                     moc_qteditorfactory.cpp
animatorscene.h                      moc_qtgroupboxpropertybrowser.cpp
animatorscene.o                      moc_qtpropertybrowser.cpp
animator_showpackets.svg             moc_qtpropertybrowserutils_p.cpp
animator_step.svg                    moc_qtpropertybrowserutils_p.o
```

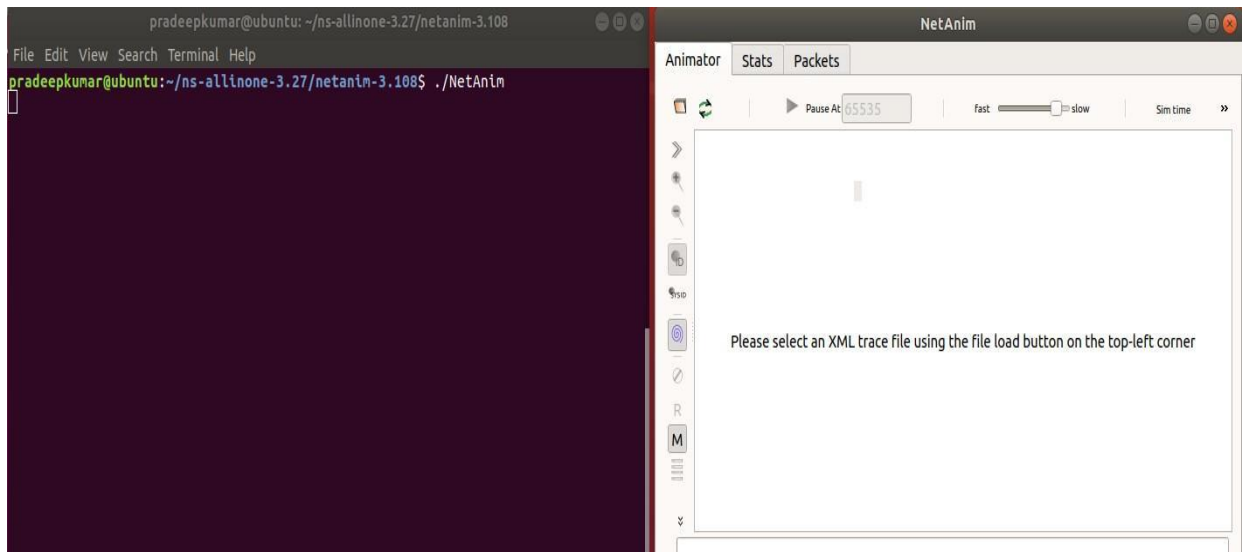
2-

```
pradeepkumar@ubuntu:~/ns-allinone-3.27/netanim-3.108$ make clean
rm -f qrc_resources.cpp qrc_qtpropertybrowser.cpp
rm -f moc_predefs.h
rm -f moc_animatorsScene.cpp moc_animpacket.cpp moc_netanim.cpp moc_animatormode.
cpp moc_statsmode.cpp moc_qtvariantproperty.cpp moc_qttreepropertybrowser.cpp mo
c_qtpropertymanager.cpp moc_qtpropertybrowserutils_p.cpp moc_qtpropertybrowser.c
pp moc_qtgroupboxpropertybrowser.cpp moc_qteditorfactory.cpp moc_qtbuttonpropert
ybrowser.cpp moc_animpropertybrowser.cpp moc_filepathmanager.cpp moc_fileeditfac
tory.cpp moc_fileedit.cpp moc_packetsmode.cpp moc_table.cpp moc_qcustomplot.cpp
rm -f qttreepropertybrowser.moc qtpropertymanager.moc qteditorfactory.moc
rm -f main.o log.o fatal-error.o fatal-impl.o logqt.o resizeableitem.o animnode.
o animatorsScene.o animpacket.o netanim.o animatormode.o mode.o animxmlparser.o a
nimatorview.o animlink.o animresource.o statsview.o statsmode.o routingxmlparser
.o routingstatsscene.o interfacestatsscene.o flowmonxmlparser.o flowmonstatsscne
e.o textbubble.o qtvariantproperty.o qttreepropertybrowser.o qtpropertymanager.o
qtpropertybrowserutils.o qtpropertybrowser.o qtgroupboxpropertybrowser.o qtedit
orfactory.o qtbuttonpropertybrowser.o animpropertybrowser.o filepathmanager.o fi
leeditfactory.o fileedit.o packetsmode.o packetsscene.o packetsscene.o graphpacke
t.o table.o countertablescene.o qcustomplot.o qrc_resources.o qrc_qtpropertybro
wser.o moc_animatorsScene.o moc_animpacket.o moc_netanim.o moc_animatormode.o moc
_statsmode.o moc_qtpropertybrowserutils_p.o moc_animpropertybrowser.o moc_filepa
thmanager.o moc_fileeditfactory.o moc_fileedit.o moc_packetsmode.o moc_table.o m
```

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```
pradeepkumar@ubuntu:~/ns-allinone-3.27/netanim-3.108$ qmake
pradeepkumar@ubuntu:~/ns-allinone-3.27/netanim-3.108$ make
g++ -c -pipe -O2 -Wall -W -D_REENTRANT -fPIC -DNS3_LOG_ENABLE -DQT_NO_DEBUG -DQT
_PRINTSUPPORT_LIB -DQT_WIDGETS_LIB -DQT_GUI_LIB -DQT_CORE_LIB -I. -Iqtpropertybr
owser/src -isystem /usr/include/x86_64-linux-gnu/qt5 -isystem /usr/include/x86_6
4-linux-gnu/qt5/QtPrintSupport -isystem /usr/include/x86_64-linux-gnu/qt5/QtWidg
ets -isystem /usr/include/x86_64-linux-gnu/qt5/QtGui -isystem /usr/include/x86_6
4-linux-gnu/qt5/QtCore -I. -isystem /usr/include/libdrm -I/usr/lib/x86_64-linux-
gnu/qt5/mkspecs/linux-g++ -o main.o main.cpp
g++ -c -pipe -O2 -Wall -W -D_REENTRANT -fPIC -DNS3_LOG_ENABLE -DQT_NO_DEBUG -DQT
_PRINTSUPPORT_LIB -DQT_WIDGETS_LIB -DQT_GUI_LIB -DQT_CORE_LIB -I. -Iqtpropertybr
owser/src -isystem /usr/include/x86_64-linux-gnu/qt5 -isystem /usr/include/x86_6
4-linux-gnu/qt5/QtPrintSupport -isystem /usr/include/x86_64-linux-gnu/qt5/QtWidg
ets -isystem /usr/include/x86_64-linux-gnu/qt5/QtGui -isystem /usr/include/x86_6
4-linux-gnu/qt5/QtCore -I. -isystem /usr/include/libdrm -I/usr/lib/x86_64-linux-
gnu/qt5/mkspecs/linux-g++ -o log.o log.cpp
g++ -c -pipe -O2 -Wall -W -D_REENTRANT -fPIC -DNS3_LOG_ENABLE -DQT_NO_DEBUG -DQT
_PRINTSUPPORT_LIB -DQT_WIDGETS_LIB -DQT_GUI_LIB -DQT_CORE_LIB -I. -Iqtpropertybr
owser/src -isystem /usr/include/x86_64-linux-gnu/qt5 -isystem /usr/include/x86_6
4-linux-gnu/qt5/QtPrintSupport -isystem /usr/include/x86_64-linux-gnu/qt5/QtWidg
ets -isystem /usr/include/x86_64-linux-gnu/qt5/QtGui -isystem /usr/include/x86_6
4-linux-gnu/qt5/QtCore -I. -isystem /usr/include/libdrm -I/usr/lib/x86_64-linux-
```

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5-

```
File Edit View Search Terminal Help
pradeepkumar@ubuntu:~$ cd ns-allinone-3.27/
pradeepkumar@ubuntu:~/ns-allinone-3.27$ ls
bake          constants.pyc  pybindgen-0.17.0.post58+ngcf00cc0  util.pyc
build.py      netanim-3.108  README
constants.py  ns-3.27       util.py
pradeepkumar@ubuntu:~/ns-allinone-3.27$ cd ns-3.27/
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ cd examples/tutorial/
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27/examples/tutorial$ ls
examples-to-run.py  first.py          second.cc  sixth.cc  wscript
fifth.cc           fourth.cc        second.py  third.cc
first.cc           hello-simulator.cc seventh.cc  third.py
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27/examples/tutorial$ cp second.cc ~
~/ns-allinone-3.27/ns-3.27/
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27/examples/tutorial$ cd ..
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27/examples$ cd ..
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ cd scratch/
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27/scratch$ gedit second.cc
```

6-

```

Open ▾ second.cc ~/ns-allinone-3.27/ns-3.27/scratch Save ≡
/* -*- Mode:C++; c-file-style:"gnu"; indent-tabs-mode:nil; -*- */
/*
 * This program is free software; you can redistribute it and/or modify
 * it under the terms of the GNU General Public License version 2 as
 * published by the Free Software Foundation;
 *
 * This program is distributed in the hope that it will be useful,
 * but WITHOUT ANY WARRANTY; without even the implied warranty of
 * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
 * GNU General Public License for more details.
 *
 * You should have received a copy of the GNU General Public License
 * along with this program; if not, write to the Free Software
 * Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA
 */

#include "ns3/core-module.h"
#include "ns3/network-module.h"
#include "ns3/csma-module.h"
#include "ns3/internet-module.h"
#include "ns3/point-to-point-module.h"
#include "ns3/applications-module.h"
#include "ns3/ipv4-global-routing-helper.h"

// Default Network Topology
//
//      10.1.1.0
// n0 ----- n1  n2  n3  n4
// point-to-point |  |  |  |
//                =====
//                LAN 10.1.2.0

```

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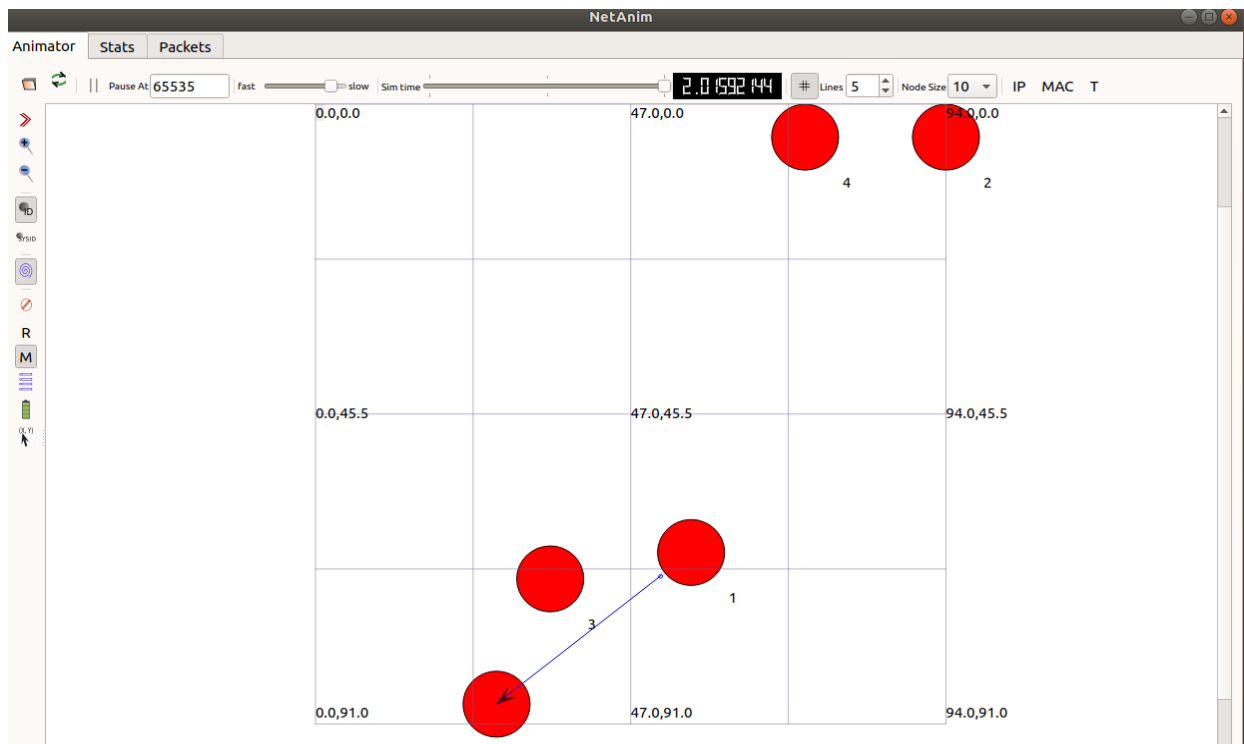
```

pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27/scratch$ cd ..
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ ./waf --run scratch/second
Waf: Entering directory `/home/pradeepkumar/ns-allinone-3.27/ns-3.27/build'
Waf: Leaving directory `/home/pradeepkumar/ns-allinone-3.27/ns-3.27/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (7.912s)
At time 2s client sent 1024 bytes to 10.1.2.4 port 9
At time 2.0078s server received 1024 bytes from 10.1.1.1 port 49153
At time 2.0078s server sent 1024 bytes to 10.1.1.1 port 49153
At time 2.01761s client received 1024 bytes from 10.1.2.4 port 9

```

```
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ ./waf --run scratch/second
Waf: Entering directory `/home/pradeepkumar/ns-allinone-3.27/ns-3.27/build'
[ 981/2575] Compiling scratch/second.cc
[2514/2575] Linking build/scratch/second
Waf: Leaving directory `/home/pradeepkumar/ns-allinone-3.27/ns-3.27/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (17.477s)
AnimationInterface WARNING:Node:0 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
AnimationInterface WARNING:Node:1 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
AnimationInterface WARNING:Node:2 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
AnimationInterface WARNING:Node:3 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
AnimationInterface WARNING:Node:4 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
AnimationInterface WARNING:Node:0 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
AnimationInterface WARNING:Node:1 Does not have a mobility model. Use SetConstan
tPosition if it is stationary
```

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9-

NetAnim

Animator Stats Packets

IP-MAC Sim Time Font Size 10 FlowMon file RemainingEnergy Nodes 0:1:2:3:4 Show Table

All  
None  
0  
1  
2  
3  
4

Node:0  
IP: 127.0.0.1  
10.1.1.1  
IPv6: ::1  
MAC: 00:00:00:00:00:00

Node:1  
IP: 10.1.1.2  
127.0.0.1  
10.1.2.1  
IPv6: ::1  
MAC: 00:00:00:00:00:02

Node:1  
IP: 10.1.1.2  
127.0.0.1  
10.1.2.1  
IPv6: ::1  
MAC: 00:00:00:00:00:03

Node:2  
IP: 127.0.0.1  
10.1.2.2  
IPv6: ::1  
MAC: 00:00:00:00:00:04

Node:3  
IP: 127.0.0.1  
10.1.2.3  
IPv6: ::1  
MAC: 00:00:00:00:00:05

Node:4  
IP: 127.0.0.1  
10.1.2.4  
IPv6: ::1  
MAC: 00:00:00:00:00:06

Node:1  
Node IP: 10.1.1.2  
Node MAC: 0:00:00:02

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NetAnim

Animator Stats Packets

From Time 2 To Time 4 Show Nodes 0:1:2:3:4 Show Graph

☐ Tcp ☐ Udp ☐ Ipv4 ☐ Ipv6 ☐ Icmp ☐ Wifi ☐ Ethernet ☐ Ppp ☐ Aodv ☐ Olsr ☐ Arp ☐ Regex on meta data.\* Submit

Export Table

	From Id	To Id	Tx	Meta
1	0	1	2	
2	1	0	2.01392	



# TCP Congestion Control

```
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ ./waf --run scratch/seventh
Waf: Entering directory `/home/pradeepkumar/ns-allinone-3.27/ns-3.27/build'
Waf: Leaving directory `/home/pradeepkumar/ns-allinone-3.27/ns-3.27/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (3.597s)
1.00419 536
1.0093 1072
1.01528 1608
1.02167 2144
1.02999 2680
1.03831 3216
1.04663 3752
1.05495 4288
1.06327 4824
1.07159 5360
1.07991 5896
1.08823 6432
1.09655 6968
1.10487 7504
1.11319 8040
1.12151 8576
1.12983 9112
```

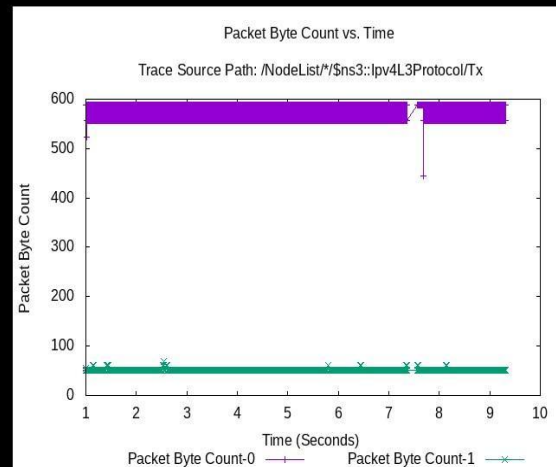
```
pradeepkumar@ubuntu: ~/ns-allinone-3.27/ns-3.27
File Edit View Search Terminal Help
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ gnuplot seventh-packet-byte-count.plt
pradeepkumar@ubuntu:~/ns-allinone-3.27/ns-3.27$ gnuplot

G N U P L O T
Version 5.2 patchlevel 2 last modified 2017-11-01

Copyright (C) 1986-1993, 1998, 2004, 2007-2017
Thomas Williams, Colin Kelley and many others

gnuplot home: http://www.gnuplot.info
faq, bugs, etc: type "help FAQ"
immediate help: type "help" (plot window: hit 'h')

Terminal type is now 'wxt'
gnuplot> plot seventh-packet-byte-count
seventh-packet-byte-count-0.txt seventh-packet-byte-count.plt
seventh-packet-byte-count-1.txt seventh-packet-byte-count.png
seventh-packet-byte-count.dat seventh-packet-byte-count.sh
gnuplot> plot seventh-packet-byte-count
seventh-packet-byte-count-0.txt seventh-packet-byte-count.plt
seventh-packet-byte-count-1.txt seventh-packet-byte-count.png
seventh-packet-byte-count.dat seventh-packet-byte-count.sh
gnuplot> plot seventh-packet-byte-count
```



```
congestion.plt
~/fs/allanone-3.27/fs 3.27
set terminal png
set output "congestion.png"
set title "Congestion Window Calculation"
set xlabel "Time (in Seconds)"
set ylabel "Congestion Window (cwnd)"
plot "seventh.cwnd" using 1:2 with linespoints title "Old Congestion", "seventh.cwnd" using 1:3 with linespoints title "New Congestion"
```

Plain Text ▾ Tab Width: 8 ▾ Ln 6, Col 86 ▾ INS

