The Square Root Formula

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Lab № 3

Outline

1. VMware Player
2. The square root formula

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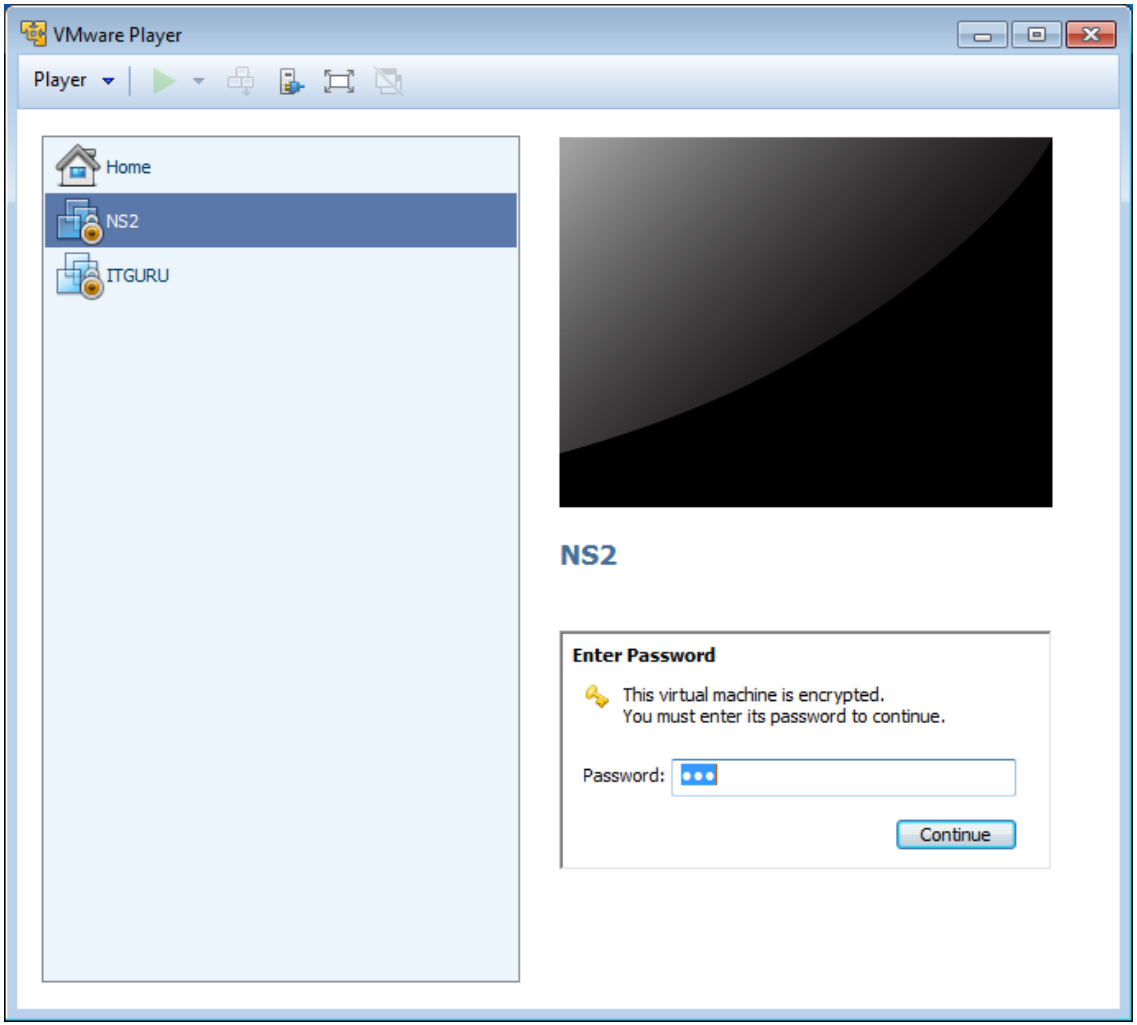
VMware Player

- Virtual machine: **NS2**
- Password to run: **123**



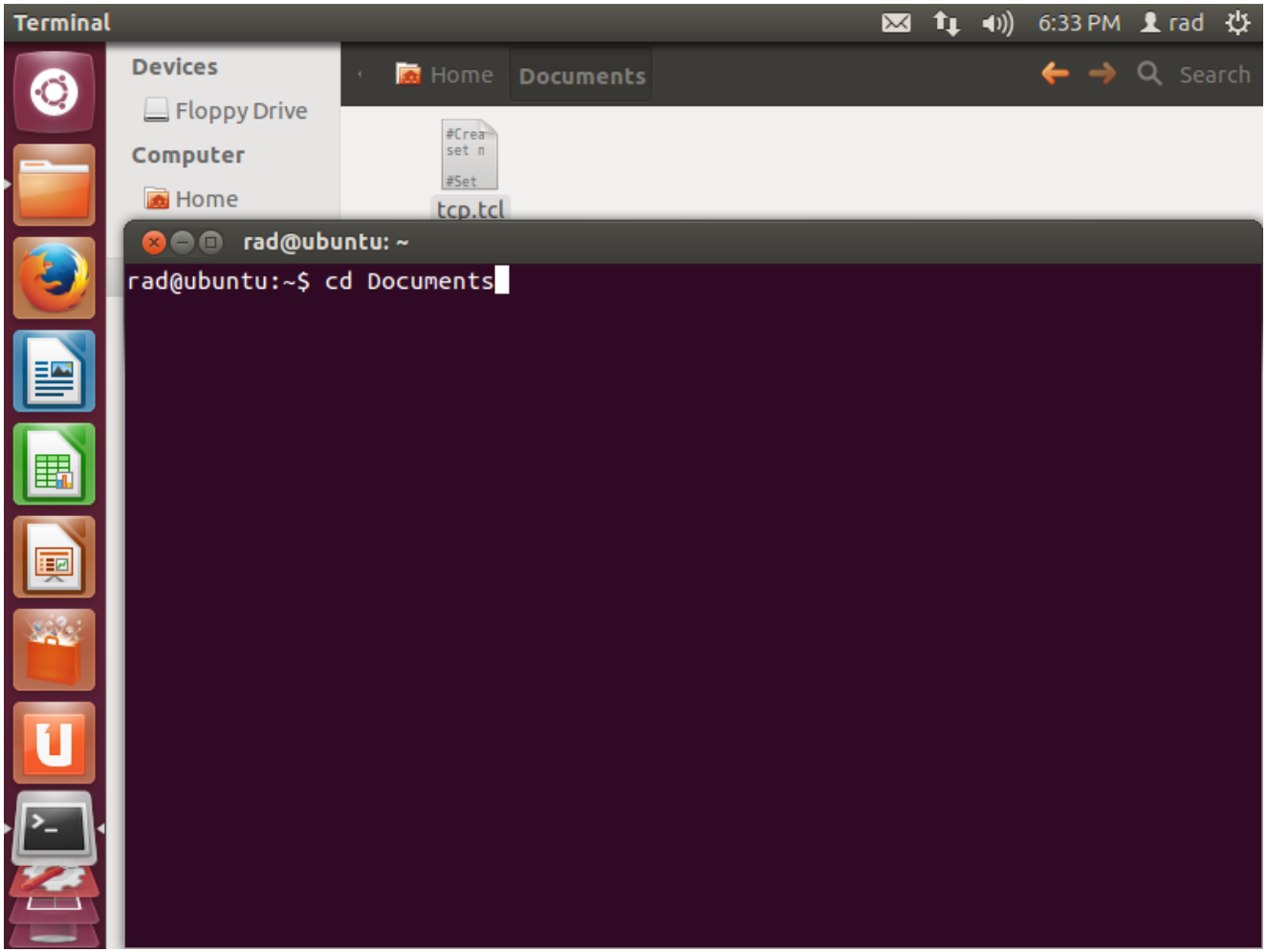
Outline

1 VMware Player

2 The square root formula

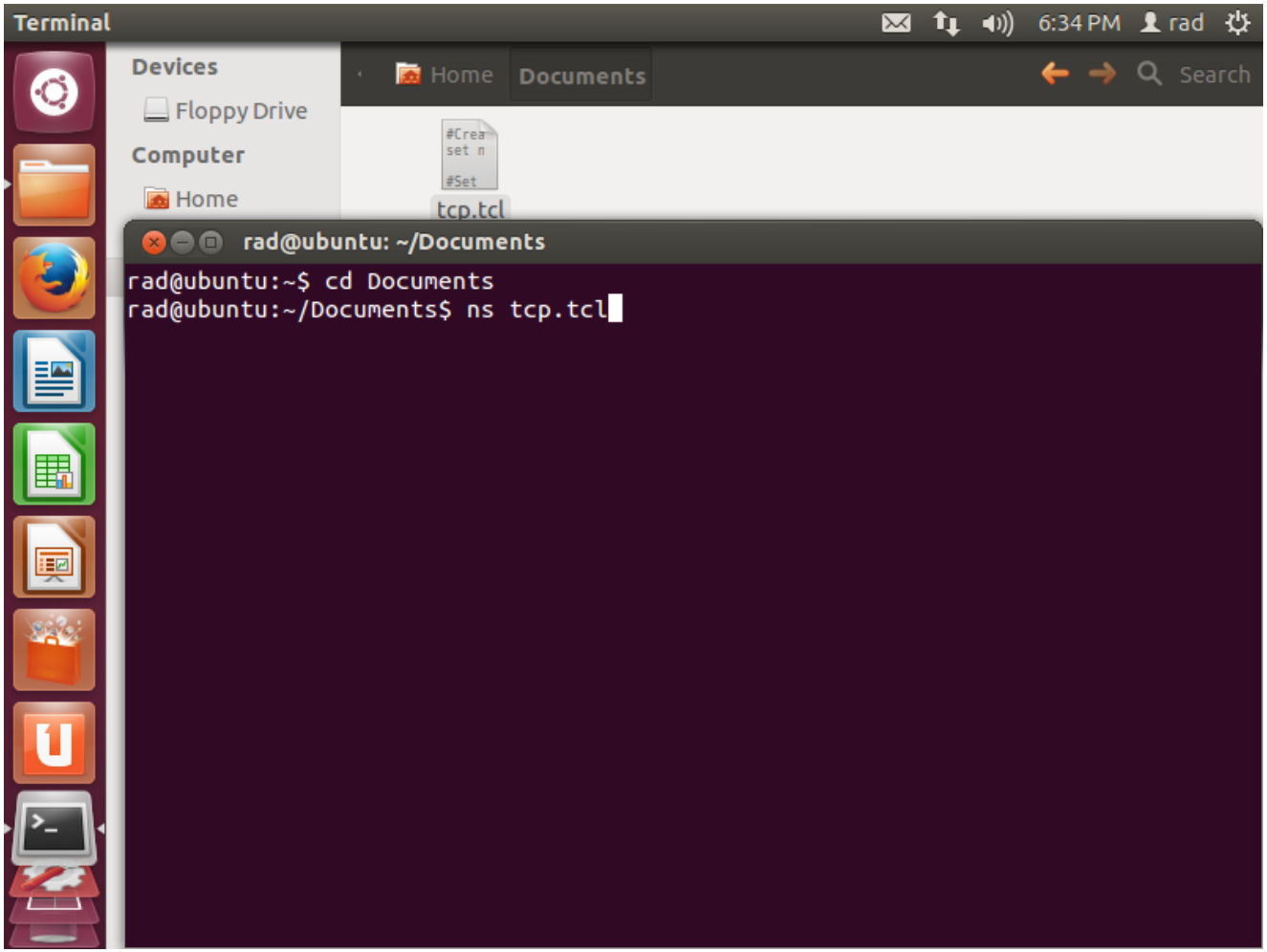
The Square Root Formula

- Change directory: **cd Documents**



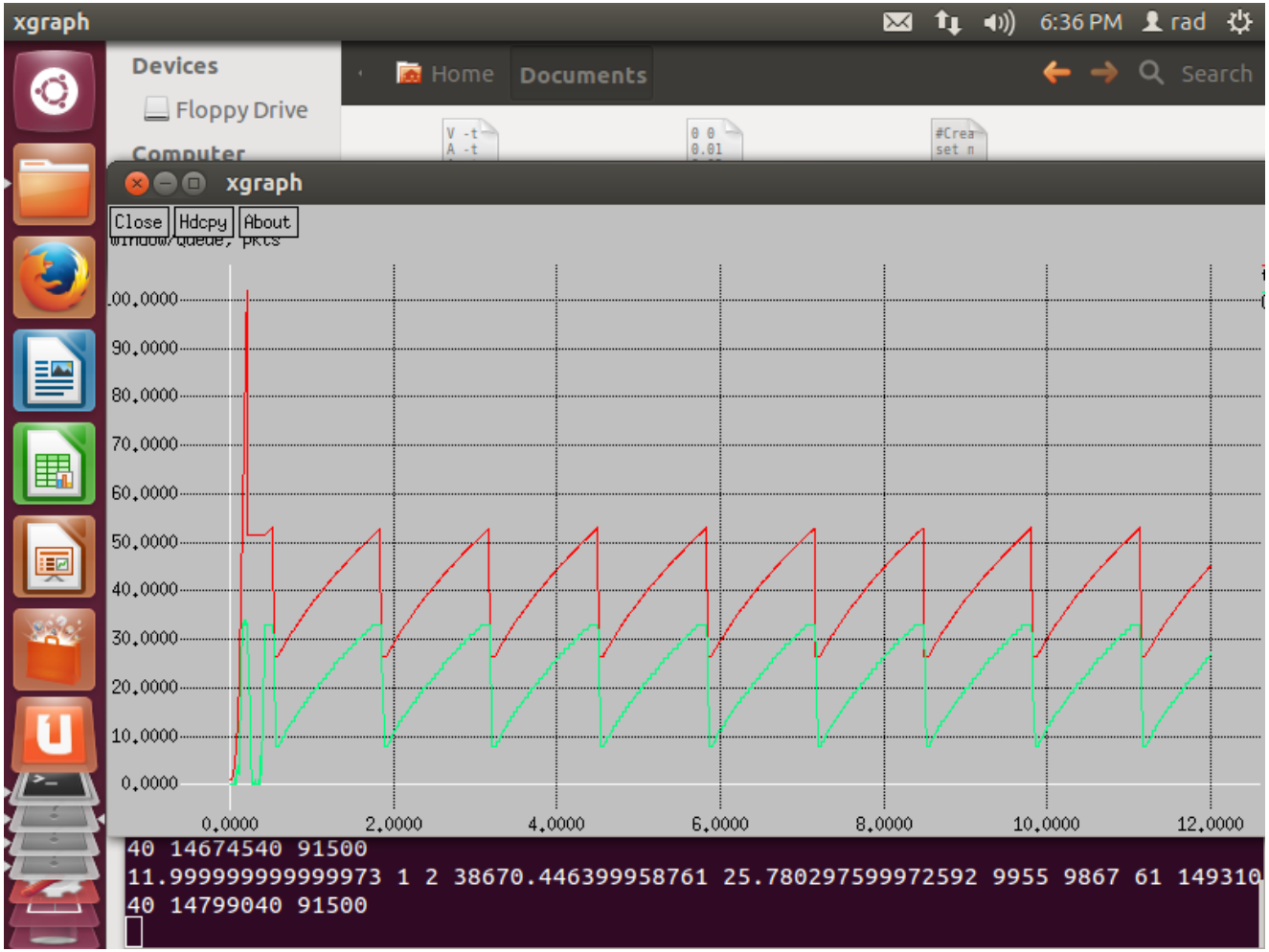
The Square Root Formula (cont'd)

- Run simulation: **ns tcp.tcl**



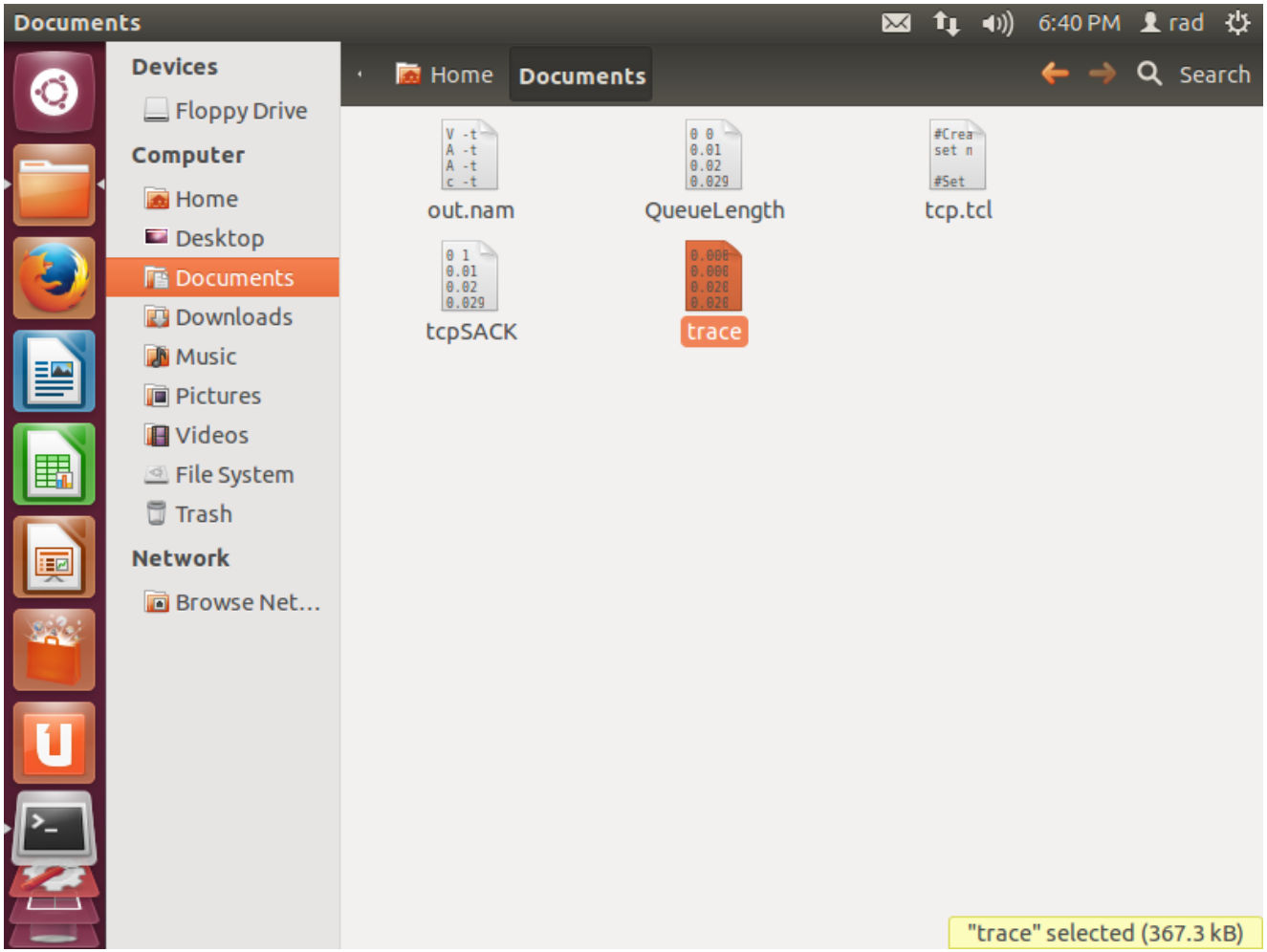
The Square Root Formula (cont'd)

- AIMD (Additive Increase/Multiplicative Decrease)



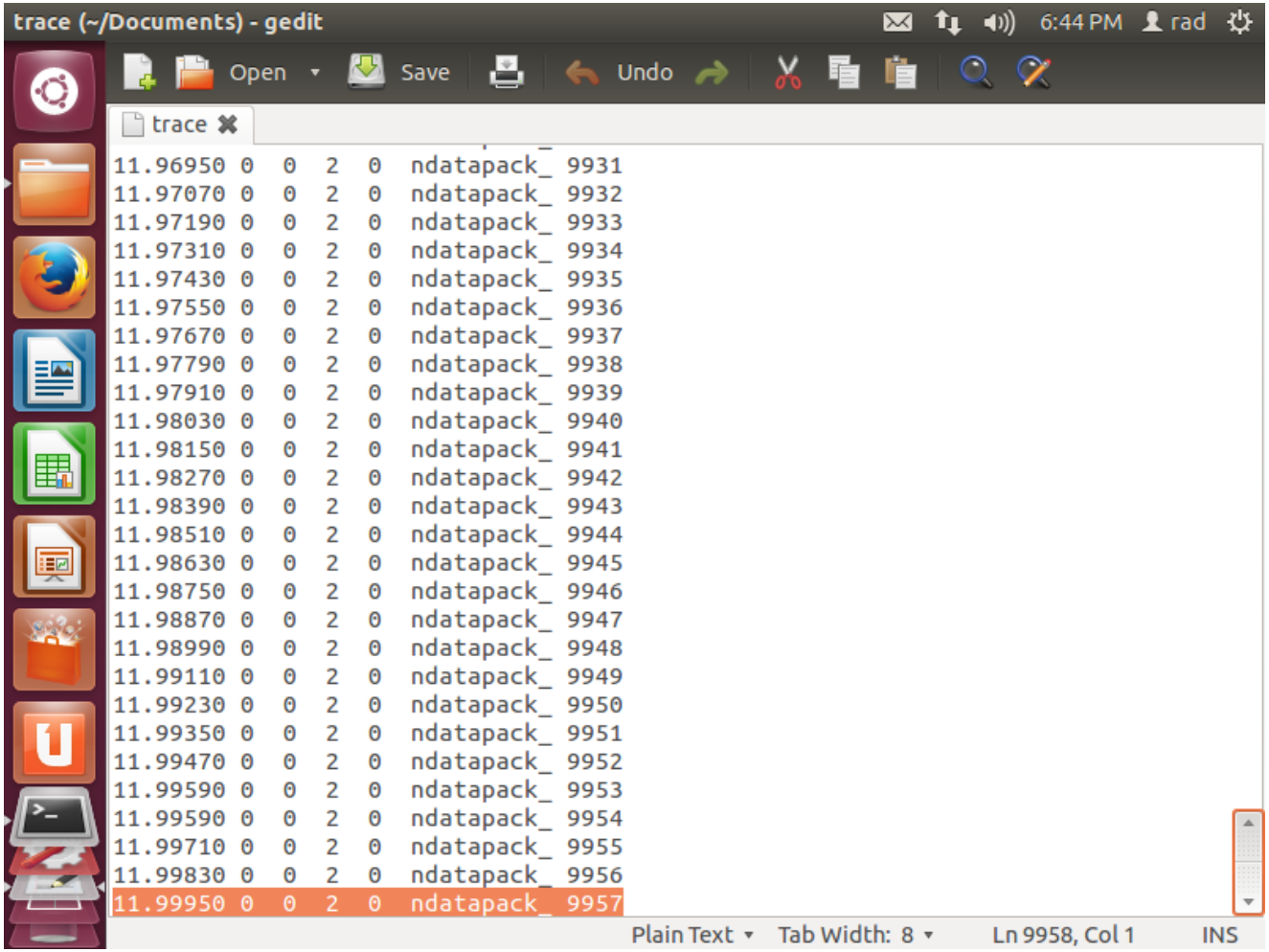
The Square Root Formula (cont'd)

- Open: **trace**



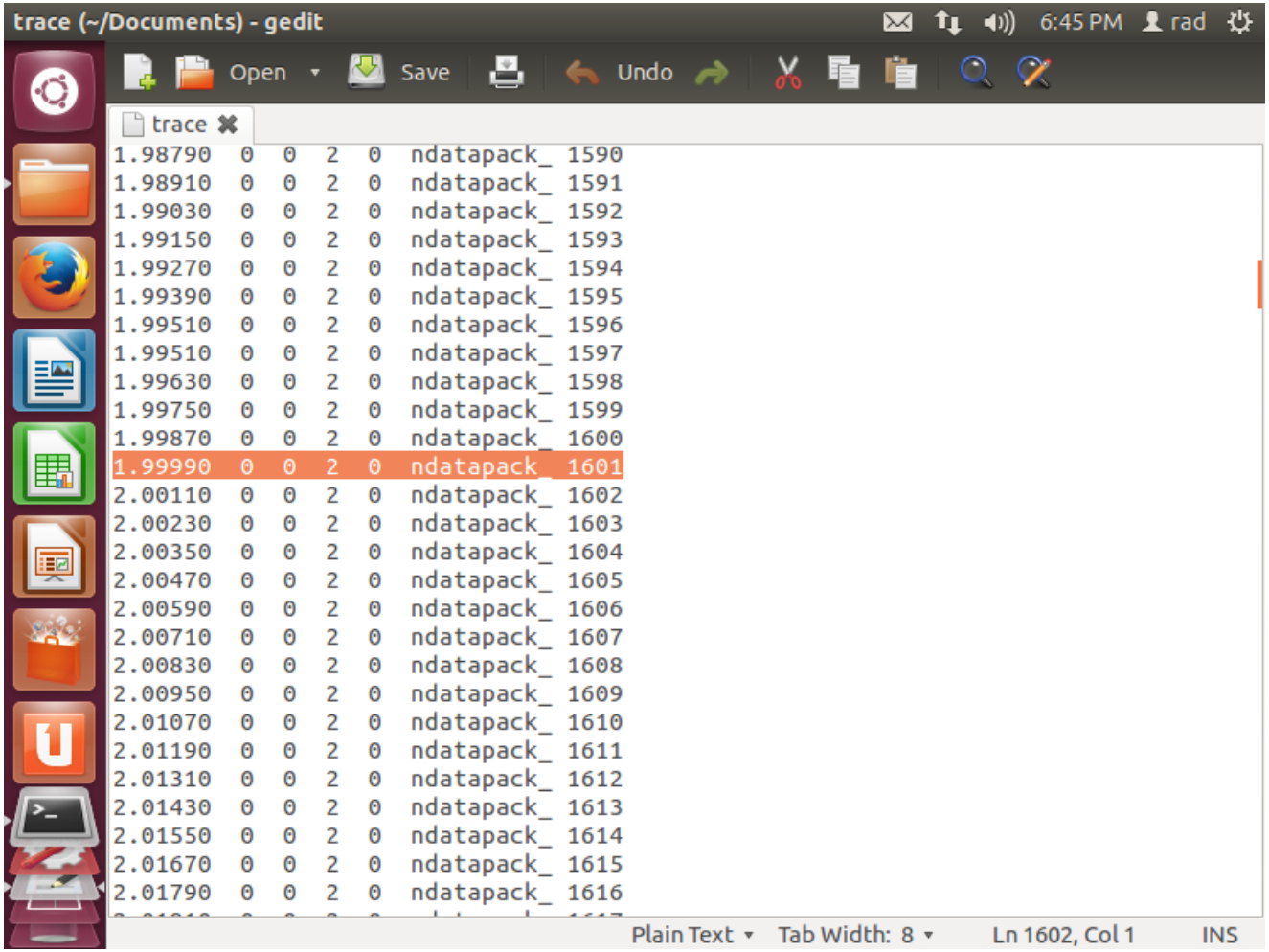
The Square Root Formula (cont'd)

- Time: **from 2 to 12**



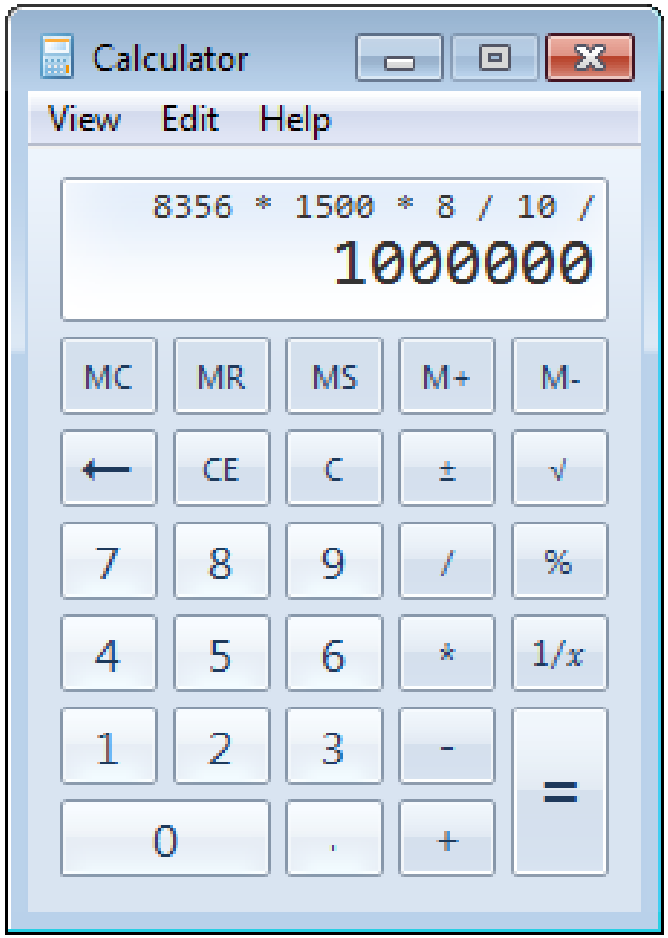
The Square Root Formula (cont'd)

- Time: **from 2 to 12**



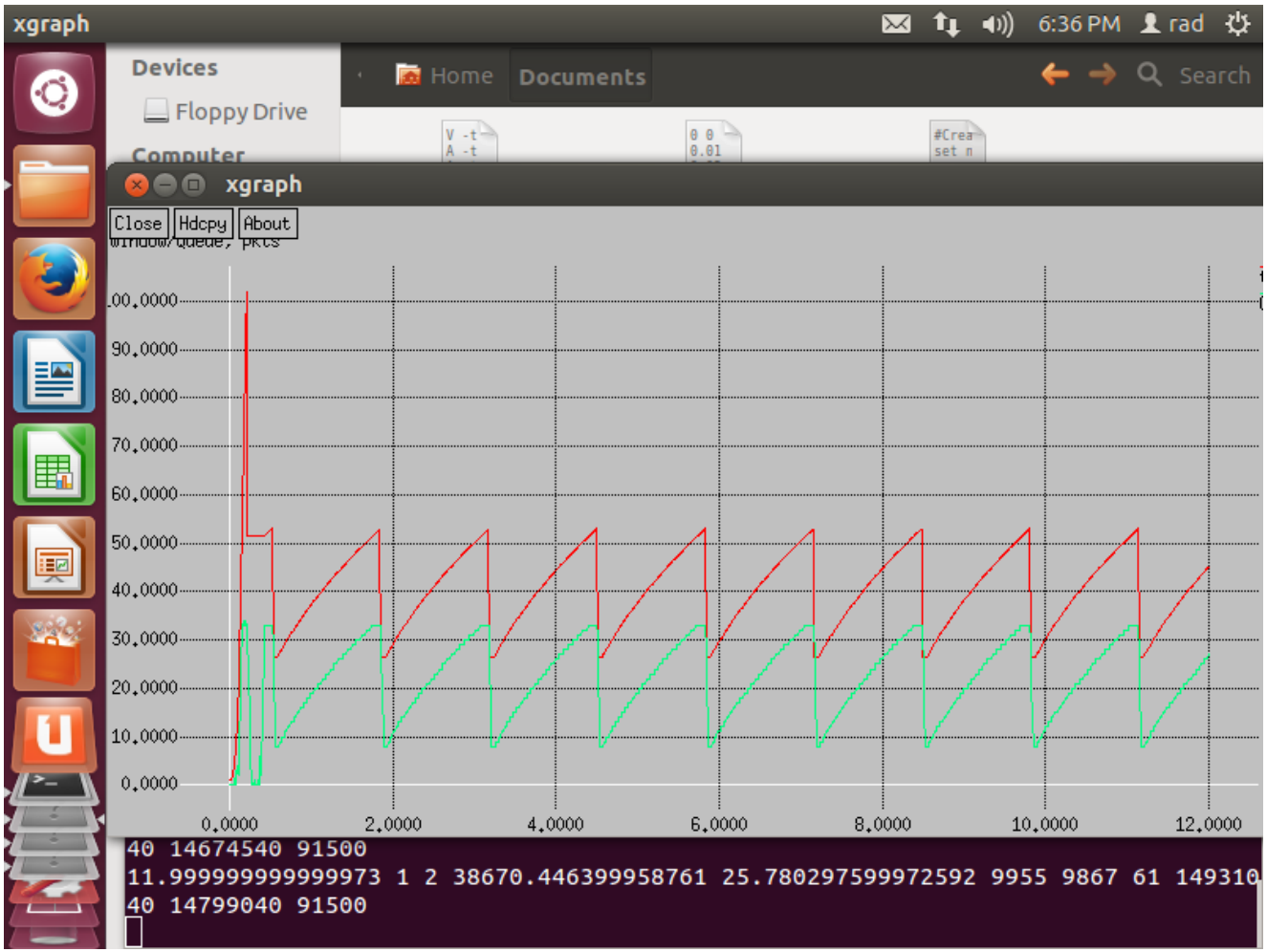
The Square Root Formula (cont'd)

- Packets sent: **9957 - 1601 = 8356**
- Throughput: **10.03 Mb/s**



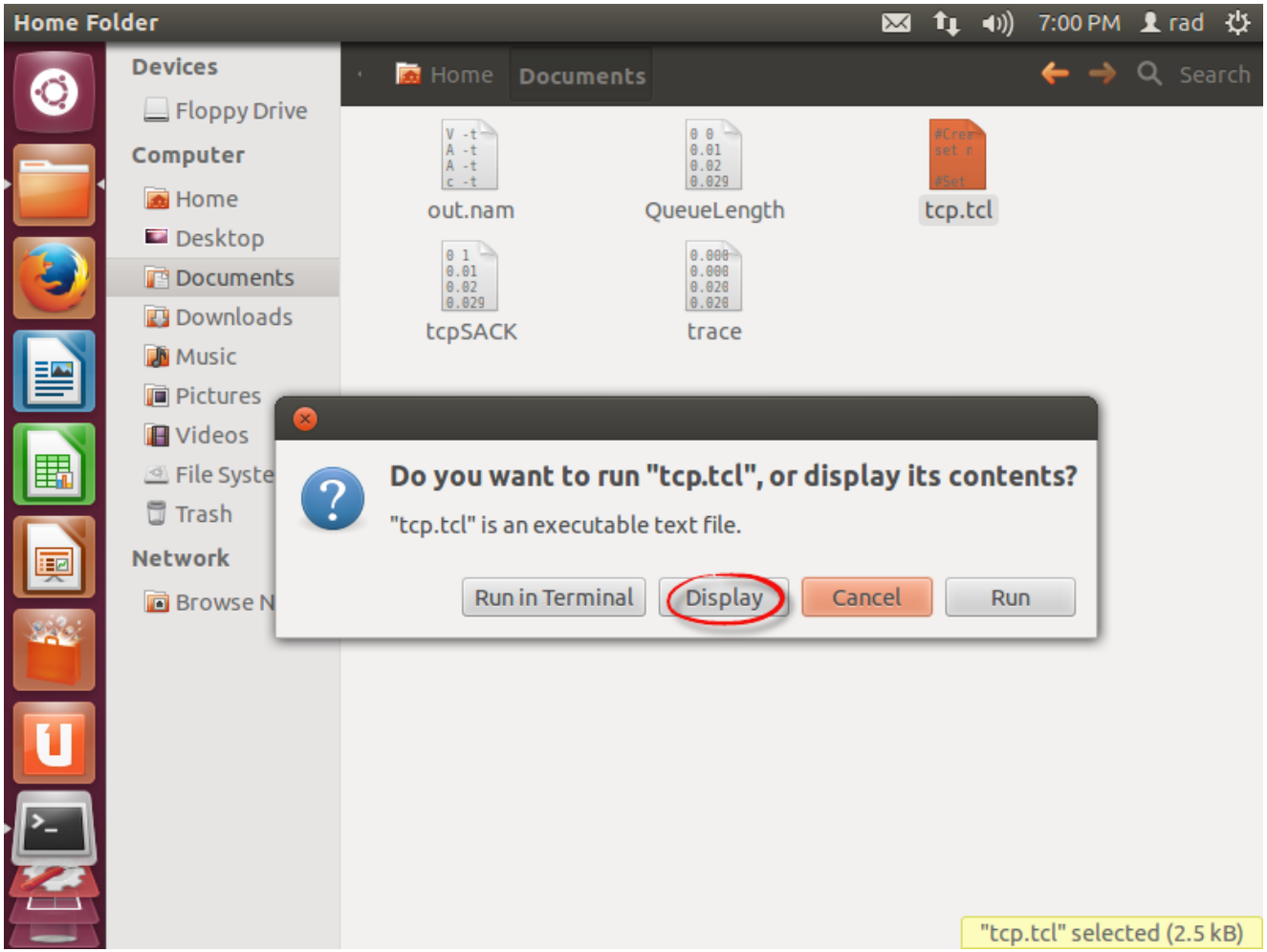
The Square Root Formula (cont'd)

- Mathis model = f(RTT, p) = f(rtt_, ncwndcuts_/ndatapack_)



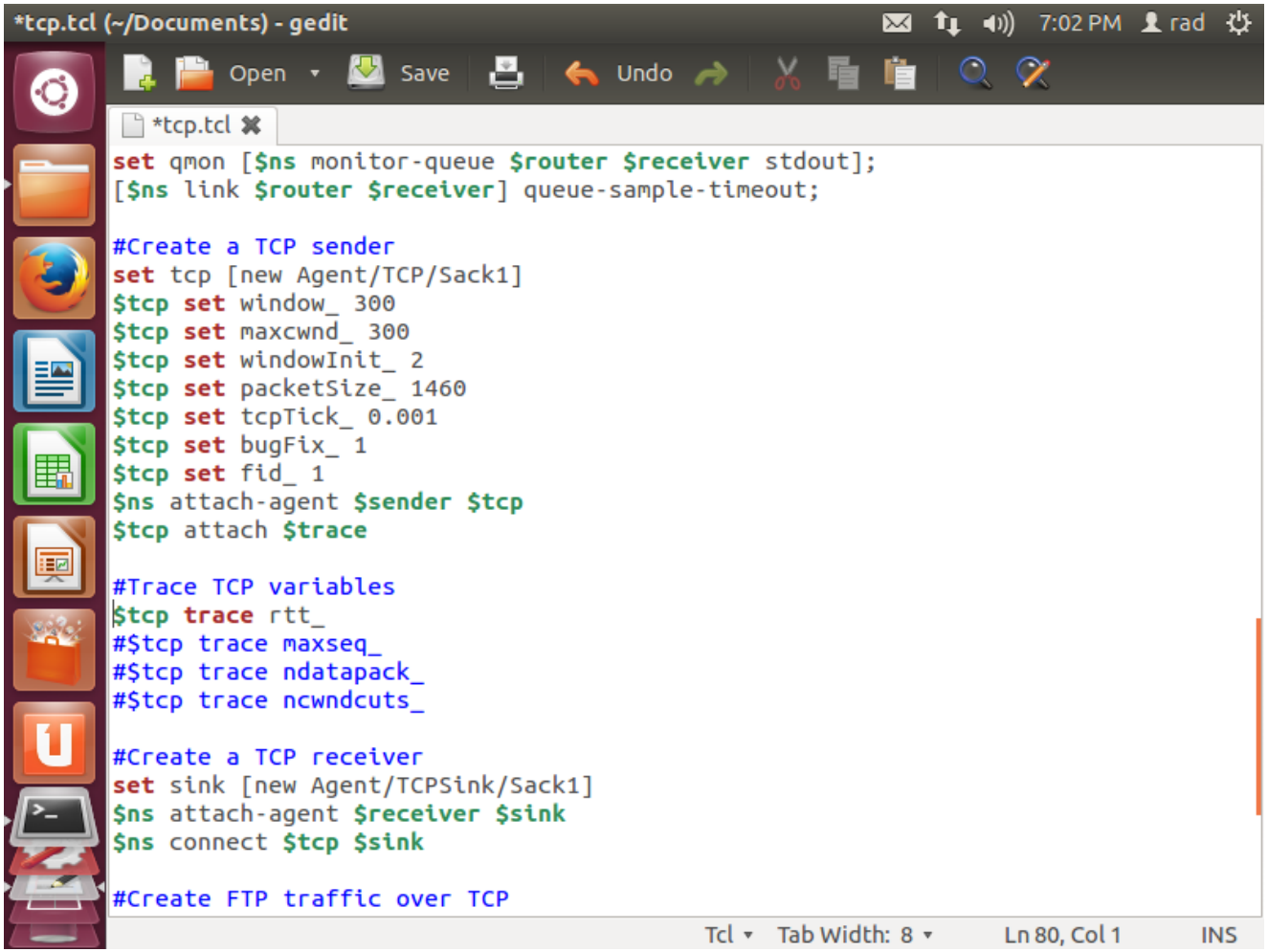
The Square Root Formula (cont'd)

- Edit: **tcp.tcl**



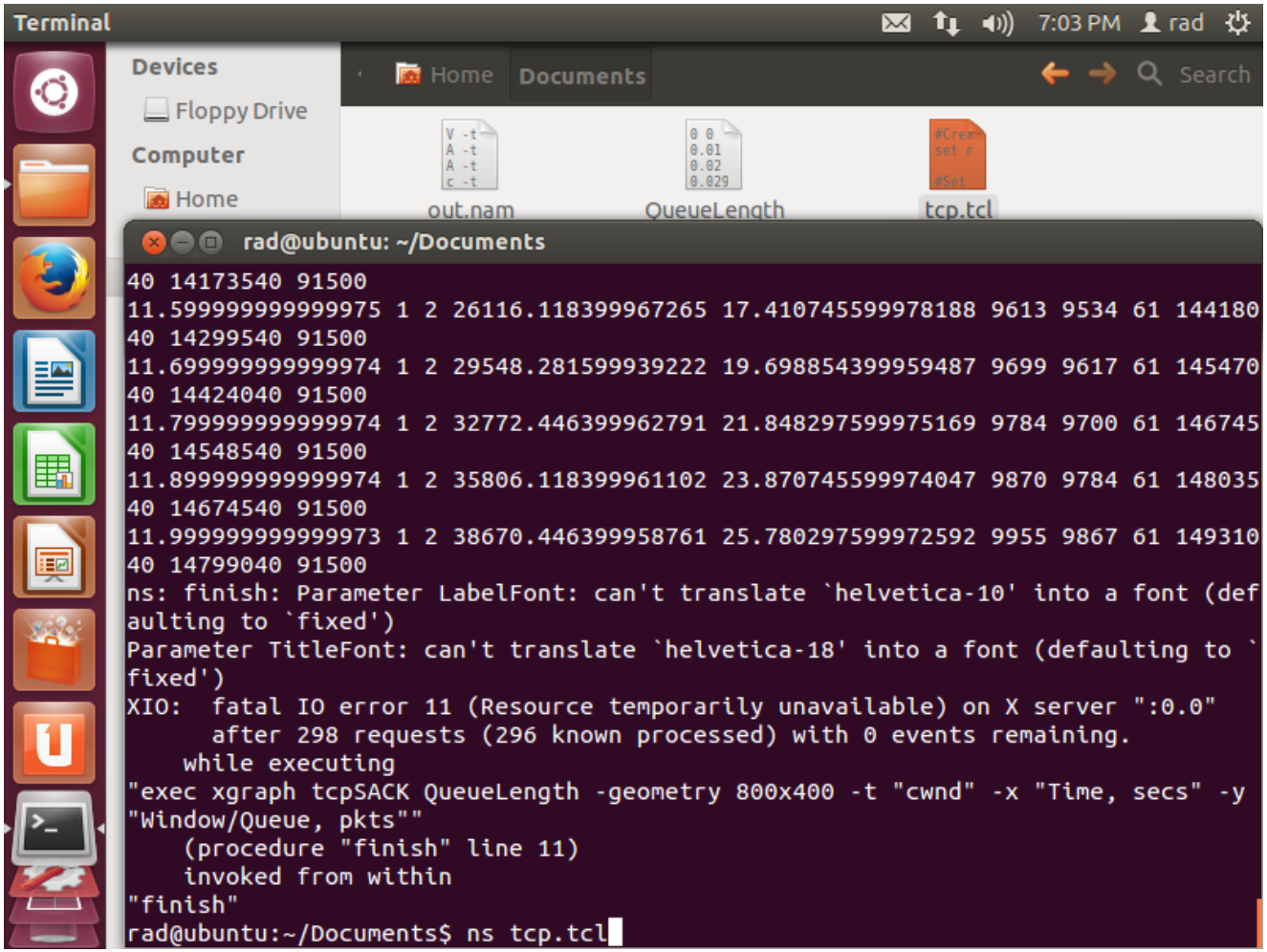
The Square Root Formula (cont'd)

- Trace: **rtt_**



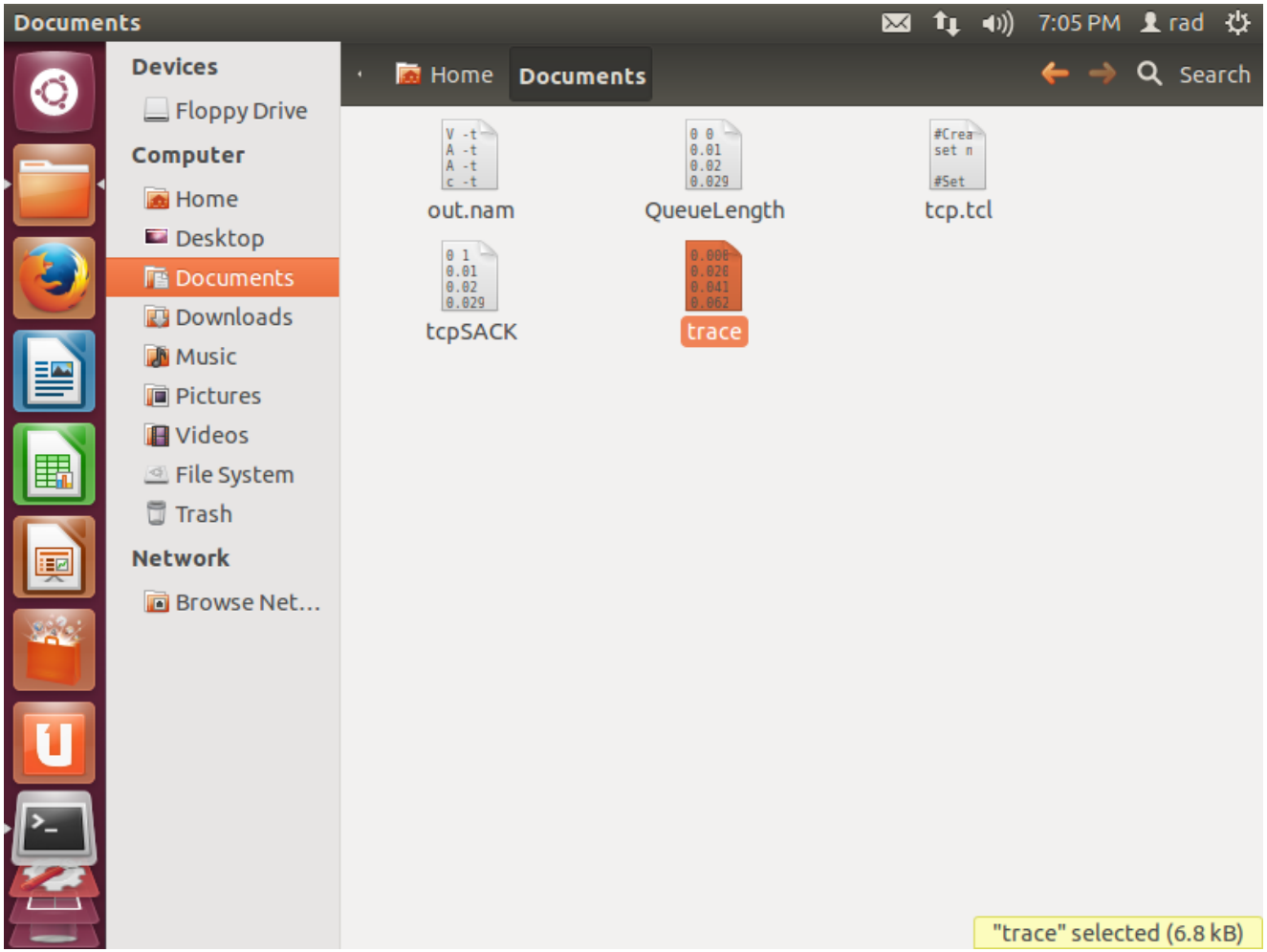
The Square Root Formula (cont'd)

- Rerun: **tcp.tcl**



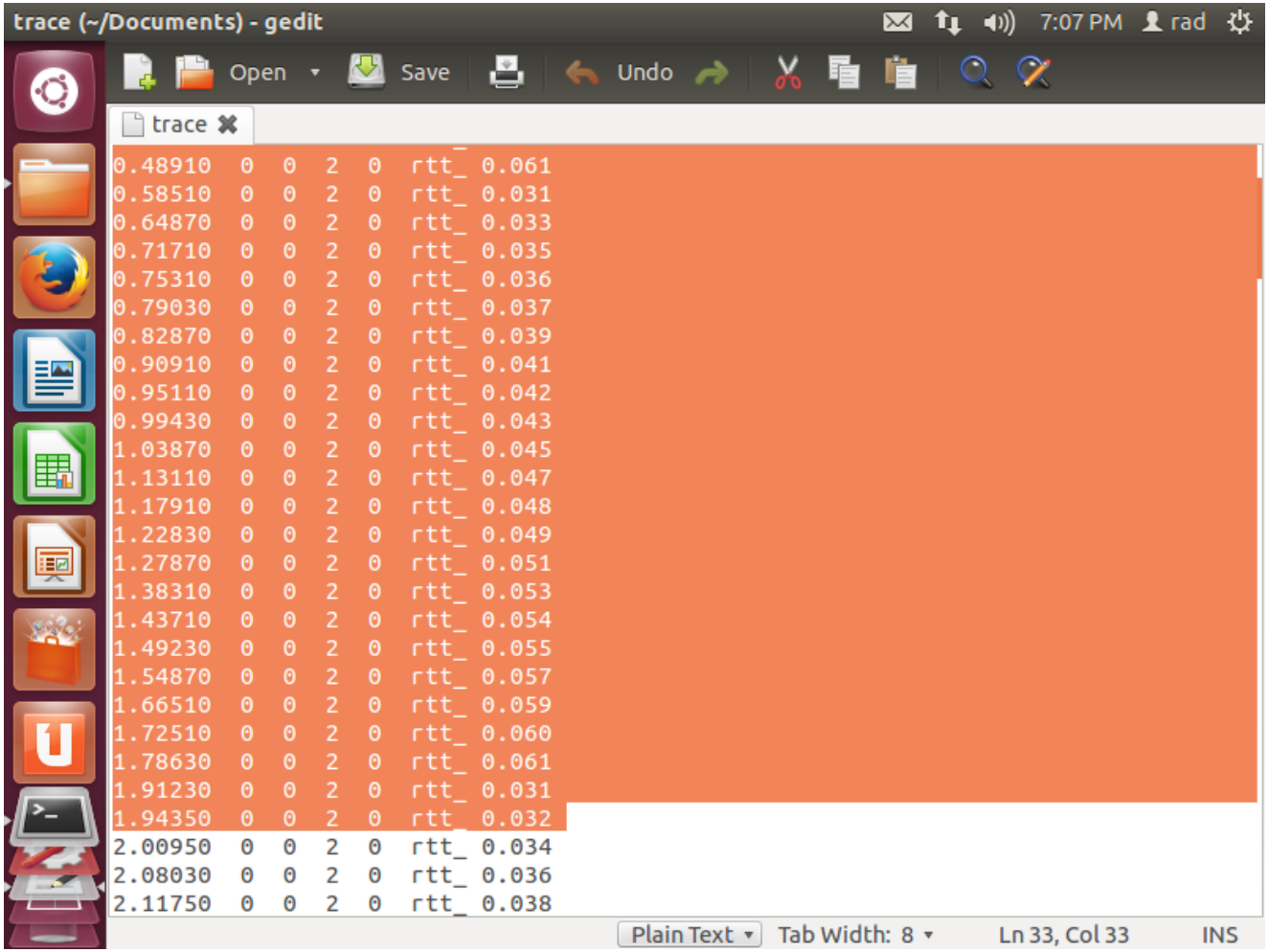
The Square Root Formula (cont'd)

- Open: **trace**



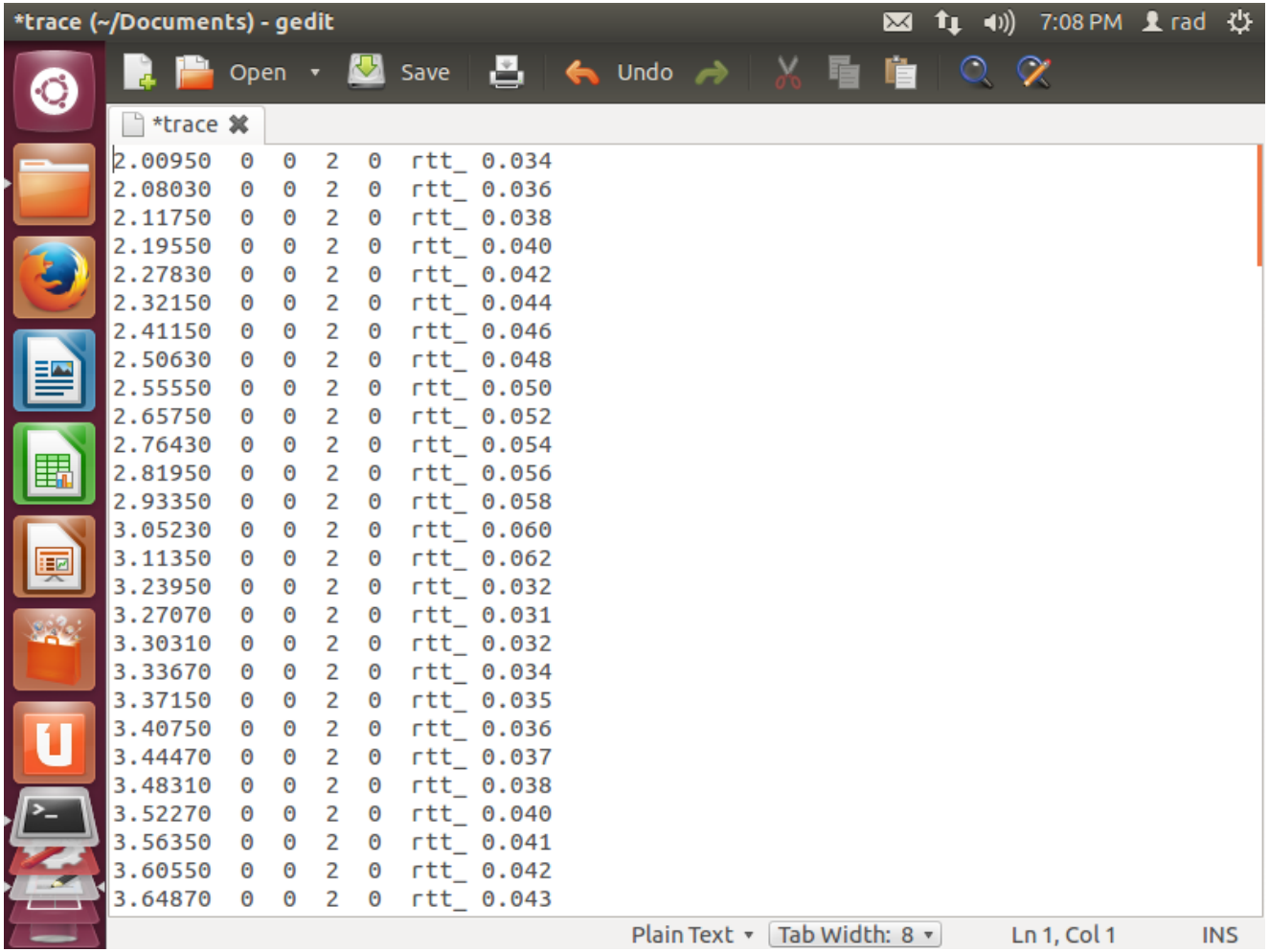
The Square Root Formula (cont'd)

- Cut: **first 2 seconds**



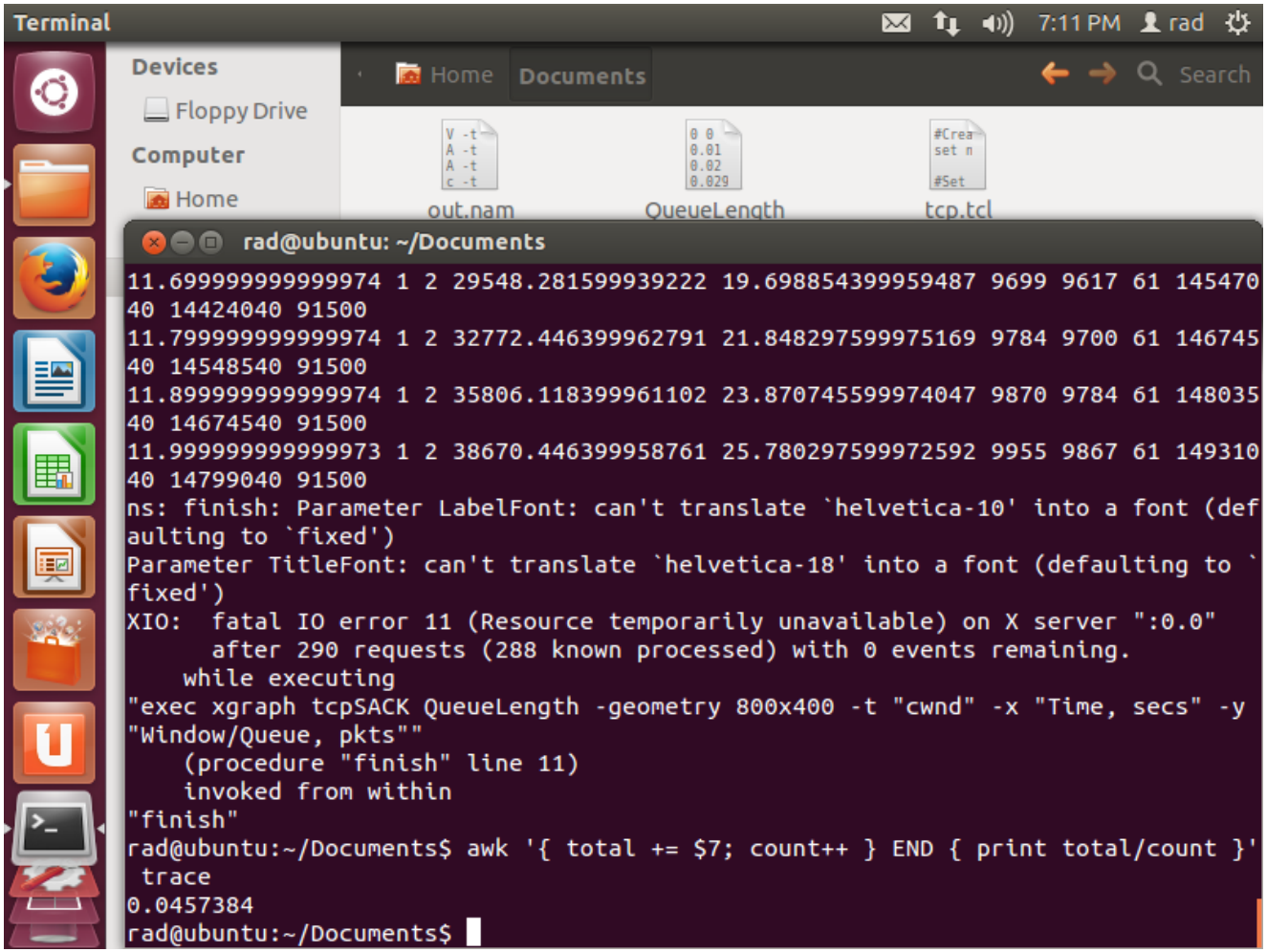
The Square Root Formula (cont'd)

- Save: **trace**



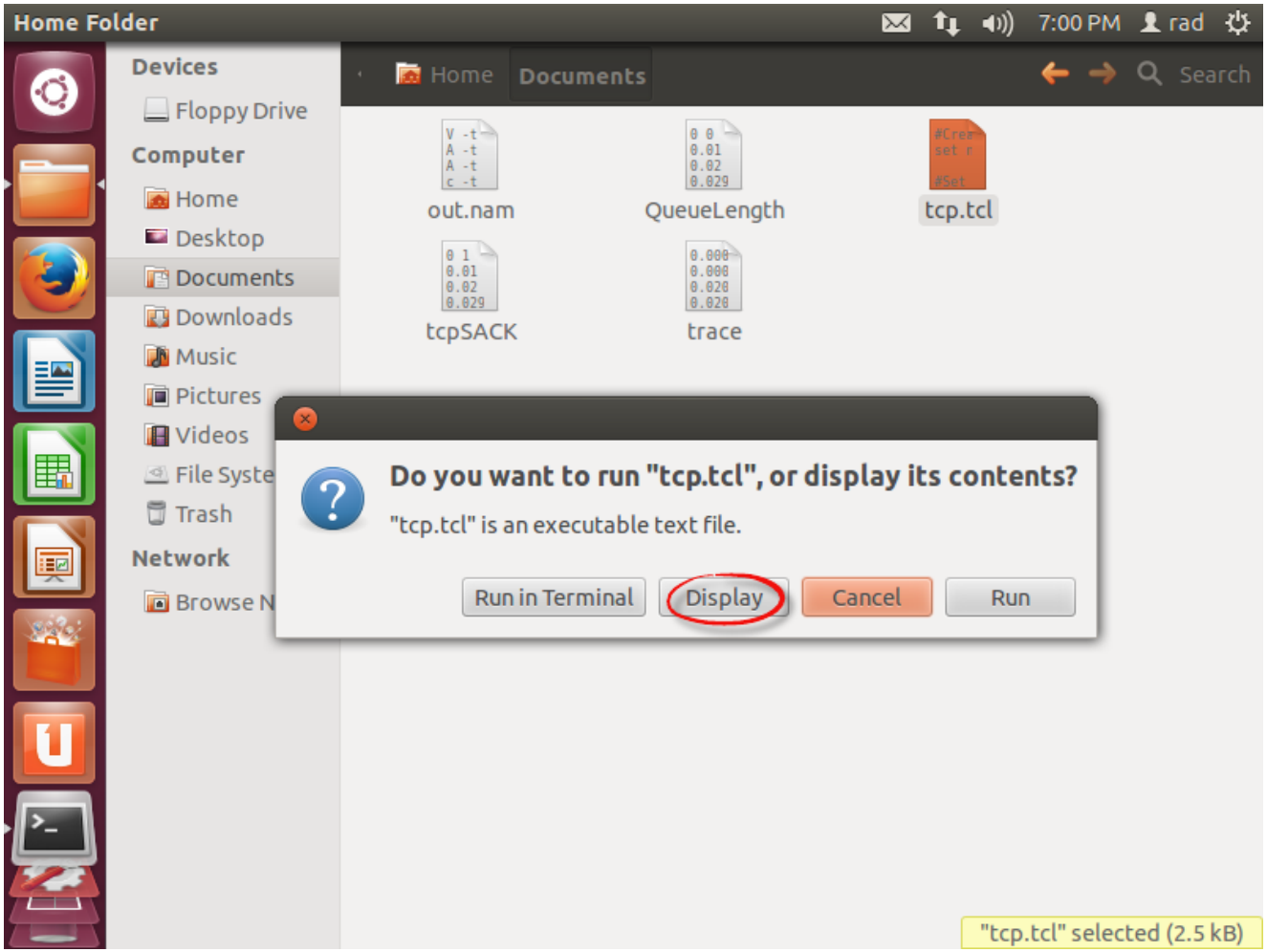
The Square Root Formula (cont'd)

- RTT average: **0.046 s**



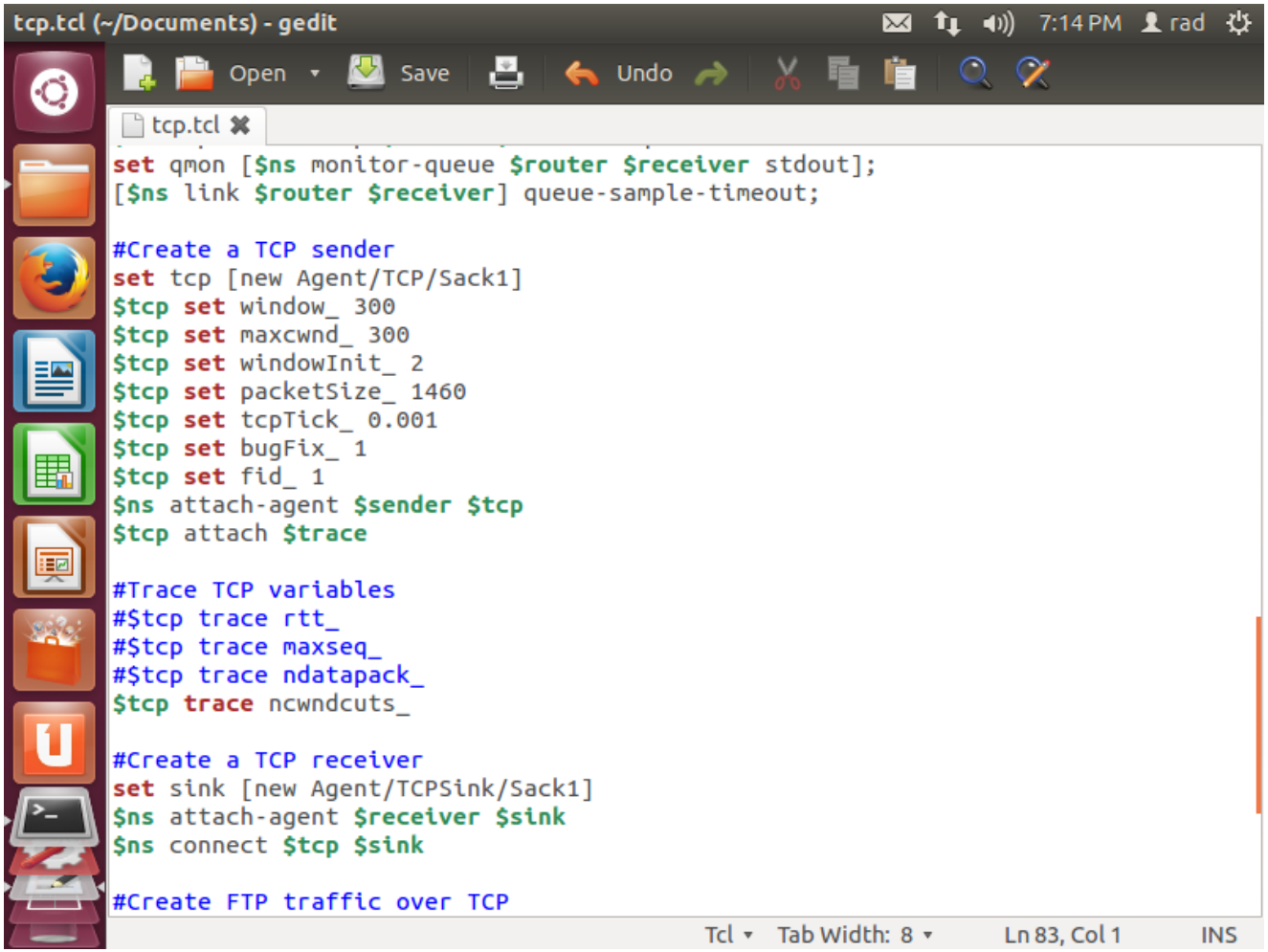
The Square Root Formula (cont'd)

- Edit: **tcp.tcl**



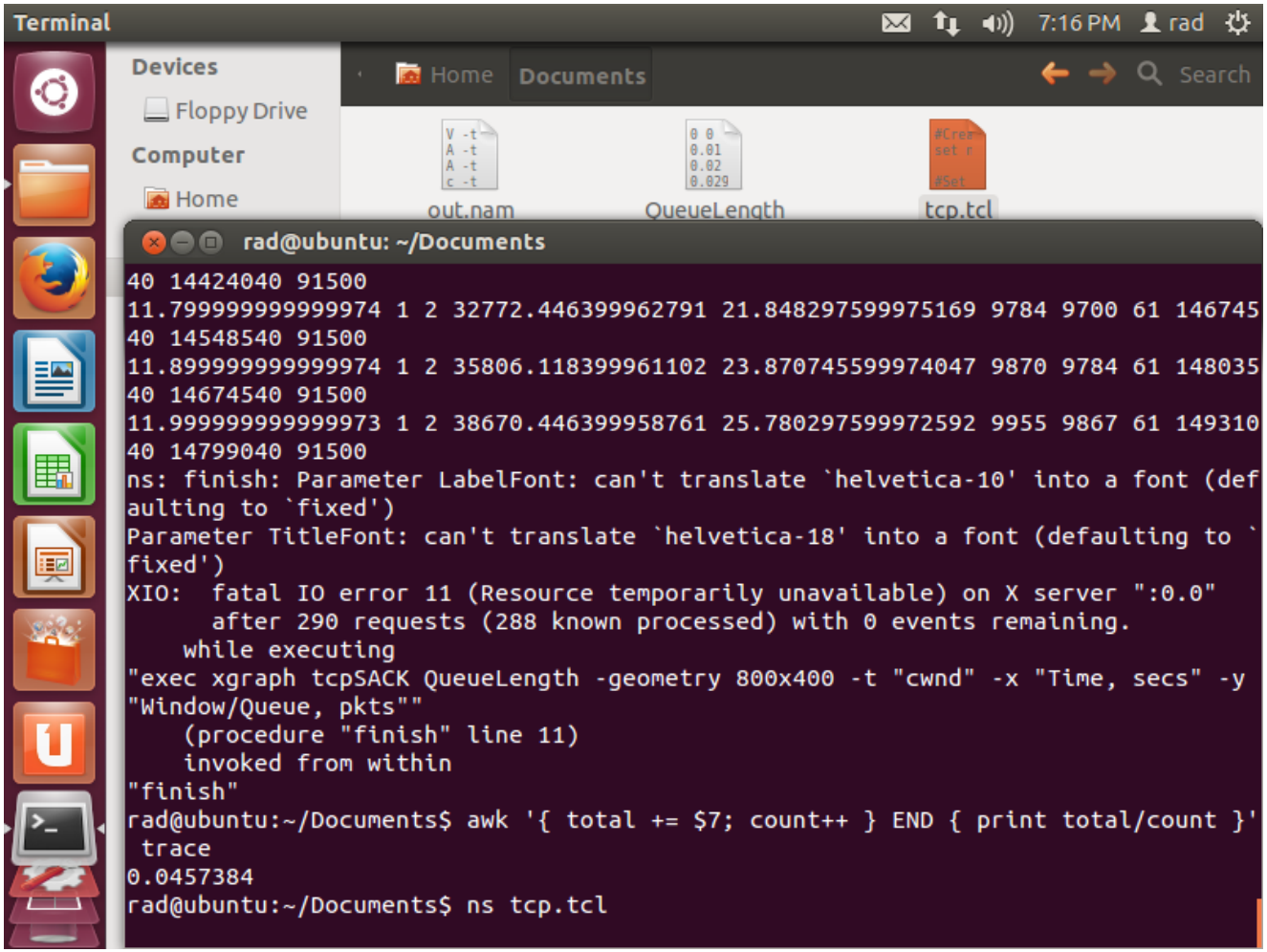
The Square Root Formula (cont'd)

- Trace: **ncwndcuts_**



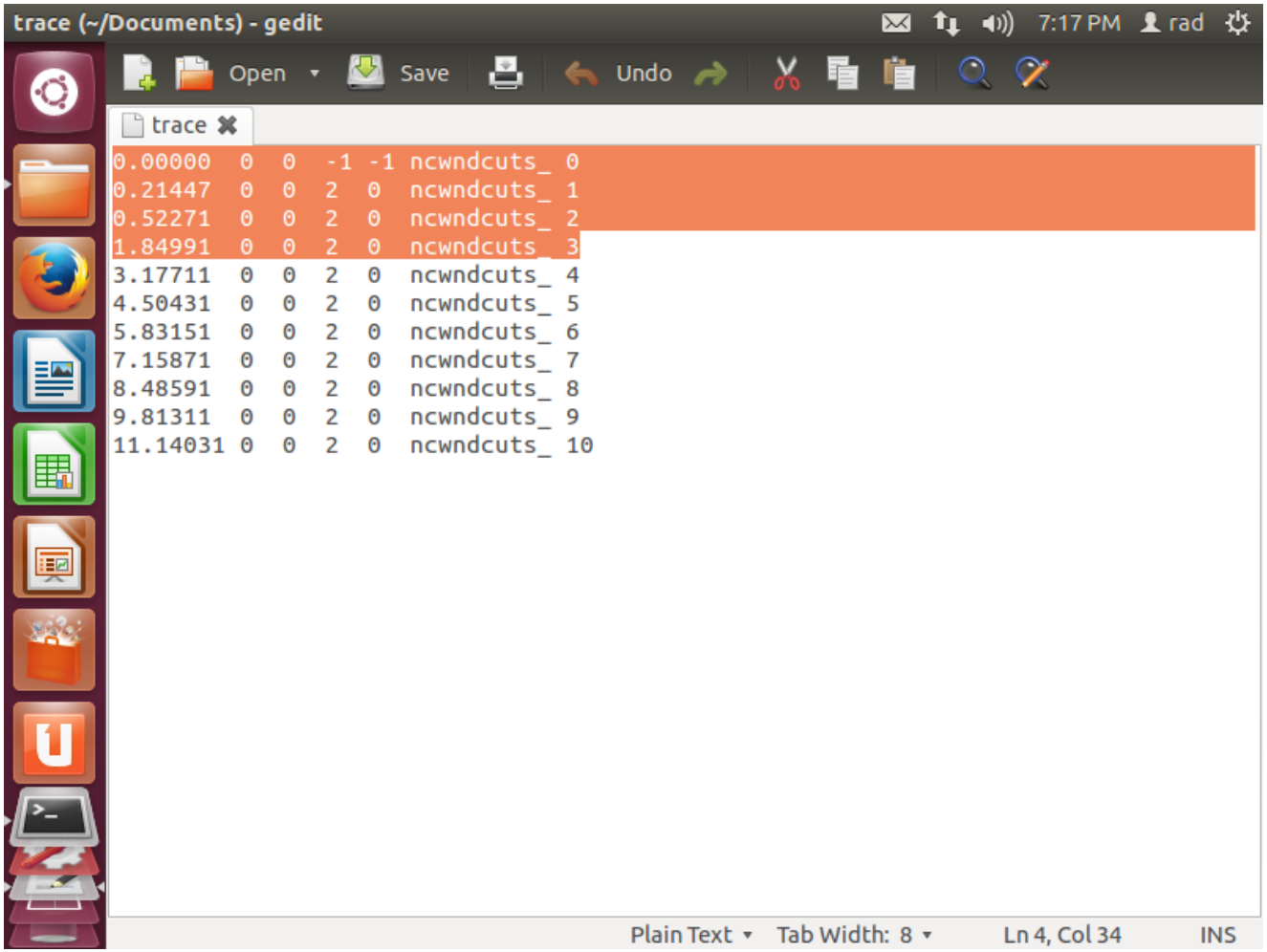
The Square Root Formula (cont'd)

- Rerun: **tcp.tcl**



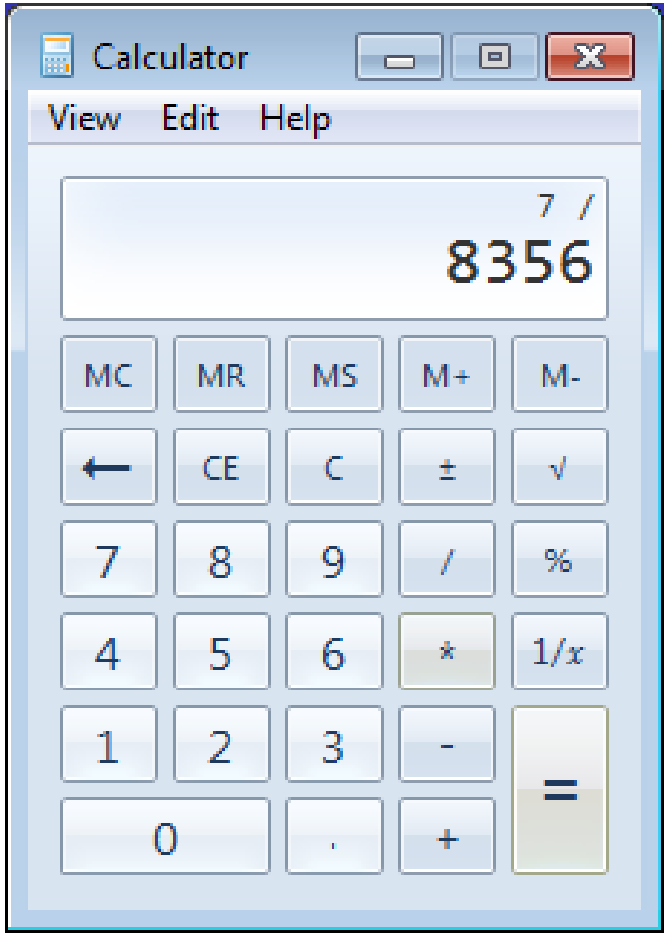
The Square Root Formula (cont'd)

- Open: **trace**



The Square Root Formula (cont'd)

- Packet loss rate: **ncwndcuts_/ndatapack_ = 0.00084**



The Square Root Formula (cont'd)

- Throughput simulated: **10.03 Mb/s**
- Throughput estimated: **11.02 Mb/s**

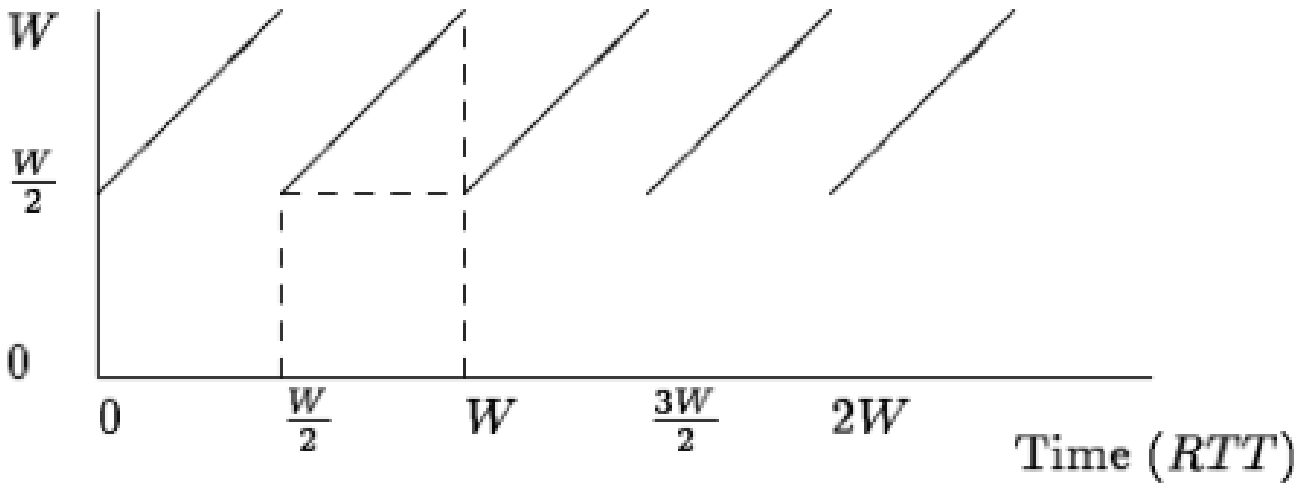
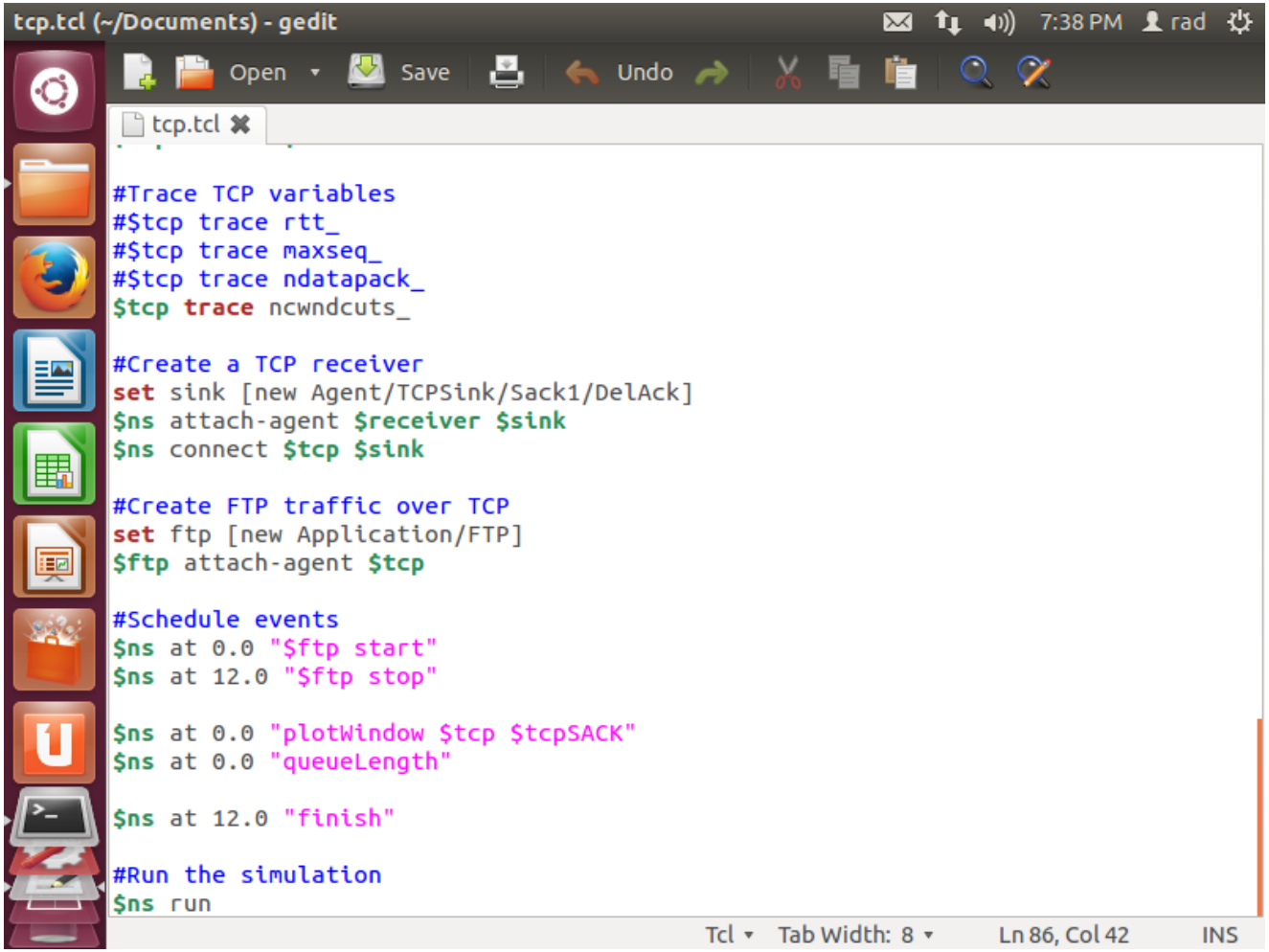


Figure 1: TCP window evolution under periodic loss
Each cycle delivers $(\frac{W}{2})^2 + \frac{1}{2}(\frac{W}{2})^2 = 1/p$ packets and takes $W/2$ round trip times.

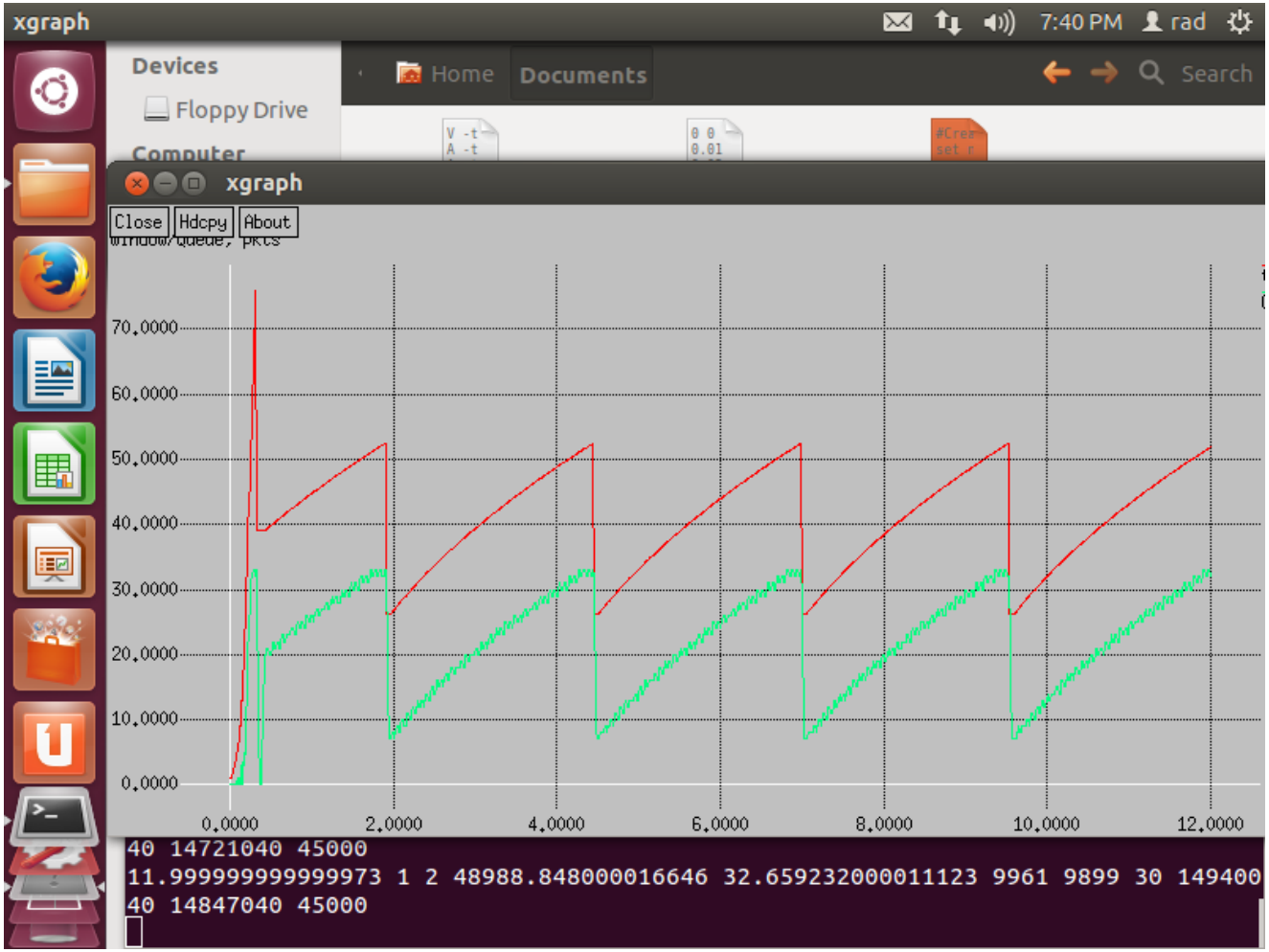
The Square Root Formula (cont'd)

- Agent/TCPSink/Sack1 $\Rightarrow$ Agent/TCPSink/Sack1/**DelAck**



The Square Root Formula (cont'd)

- Agent/TCPSink/Sack1/DelAck



The Square Root Formula (cont'd)

- **Agent/TCP/Sack1**
  - RTT = 0.046 s
  - p = 0.00084
  - Throughput simulated: **10.03 Mb/s**
  - Throughput estimated: **11.02 Mb/s**

- **Agent/TCPSink/Sack1/DelAck**
  - RTT = 0.045 s
  - p = 0.00036
  - Throughput simulated: **10.03 Mb/s**
  - Throughput estimated: **12.17 Mb/s**