Key Ideas:
- 3 Layer Network
- At least once delivery
- At most once delivery
- Sliding window protocol

Quiz 1 Scores

Mean: 67.9
Median: 68
StDev: 13.4
End-to-end Interface

**Src**

conn=open_stream
    (dest, port)
send(conn, bytes1)
send(conn, bytes2)
close_stream(conn)

**Dest**

conn=listen(port)
bytes=recv(conn)
RTT Is Variable

Ping time from mit.edu to stanford.edu
Exponentially Weighted Moving Average (EWMA)

measure = new RTT measurement

ttt = α(measure) + (1-α)(rtt) ; α = 1/8

timeout = β * rtt ; β = 2
Sliding Window in Action

`window = 2-6`

`SnDr`  `Rcvr`

```
1 2 3 4 5 6
```

`a1`  `a2`

`p1`  `p2`
Sliding Window in Action

Send next packet as acks arrive, rather than waiting for all acks in window
Still may wait

window = 3-4

Sndr

Rcvr

p1 p2

p3 p4

p5

a1 a2

a3 a4

a5

idle

idle

idle