

Explain Server/Client examples in [http://www.tutorialspoint.com/java/java\\_networking.htm](http://www.tutorialspoint.com/java/java_networking.htm) to let students understand basic JAVA socket API. You may want to project the webpage on the screen.

**True/False:**

1. BSD Socket API was created at Stanford.  
False. At Berkeley in 1980.
2. TCP guarantees reliable, in-order, and at most once delivery.  
True.
3. Serial schedules are necessary to preserve ACID transaction semantics  
False. The schedule just needs to be semantically equivalent to a serial schedule
4. It is possible to solve the Two Generals Problem with certainty over a lossy channel.  
False

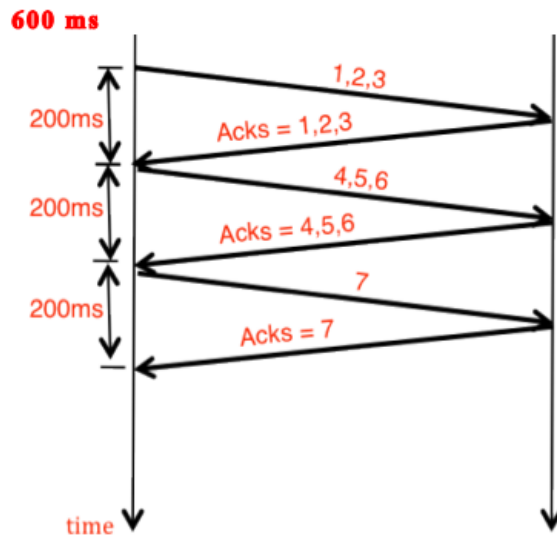
**Short Answer:**

1. What does ACID stand for? Explain each of them.  
Atomicity: all actions in the transaction happen, or none happen  
Consistency: if each transaction is consistent, and the database starts consistent, it ends up consistent, e.g.,
  - Balance cannot be negative
  - Cannot reschedule meeting on February 30Isolation: execution of one transaction is isolated from that of all others  
Durability: if a transaction commits, its effects persist
2. What are some elements you might want to lock in a database?  
Row, Table, Database, Page, Predicates (In theory, never done in practice), Ranges
3. What are types of possible conflicts in an execution of multiple transactions?  
Read-Write, Write-Read, Write-Write

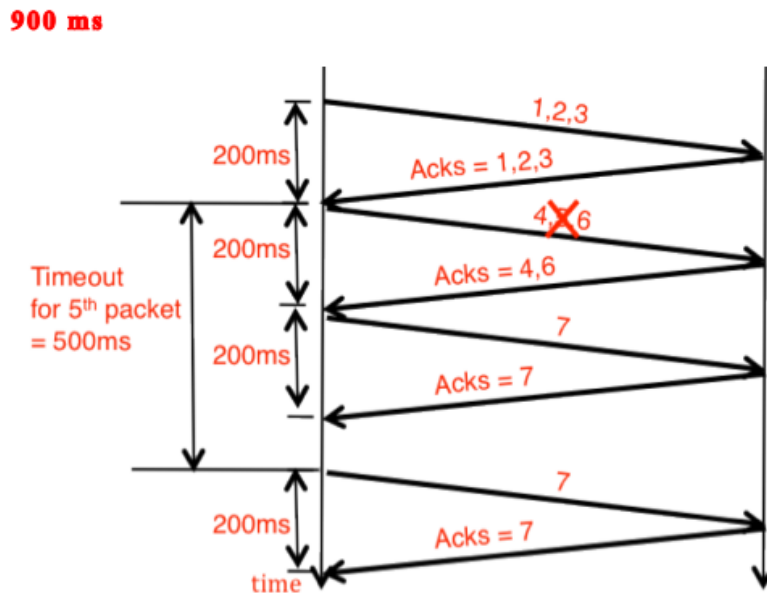
**Long Answer:**

1. Assume two end-hosts using the sliding window protocol to implement flow control, and Selective Repeat to implement reliability. Assume sender sends 7 packets. The window size at the receiver is 3 packets, the round-trip time is 200ms, and the retransmission timeout is 500ms. The transmission time of the packet is negligible, i.e., assume the size of a packet is 0. The time to send all packets is the interval between the time the sender sends the first packet and the time the sender receives the ack from the last packet.

a) How long does it take to send all packets, assuming no losses? Draw the time diagram.

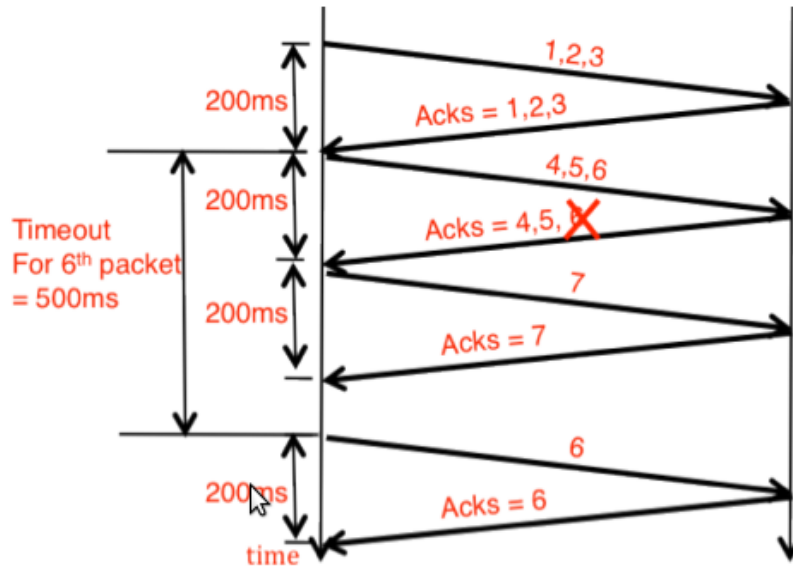


b) How long does it take to send all packets assuming the 5th packet is lost? Draw the time diagram. (In the diagram below, the last packet and ack should be 5, not 7)



c) How long does it take to send all packets assuming the ack of the 6th packet is lost? Draw the time diagram.

**900 ms**



If the acks are cumulative then the answer is **600ms** (this answer was also considered correct):

