CS455 - Introduction To Distributed Systems

[Lab Session 3]

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Topics Covered in Today's Lab

- Quiz 1 review
- FAQ / Good questions
- Logistics
- Assignment 1 discussion/help
    - Milestones

NOTE: Feel free to bring laptops, code, and questions!

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Quiz 1 Review

1. The 4B/5B encoding scheme ensures that the translated codes (4-bit to 5-bit encodings) do not result in more than 1 leading 0 and no more than 2 trailing 0's. This is because:
    a. It allows the transmissions to be more energy efficient
    b. The 5-bit codes are transmitted using NRZI that performs transitions for 1s
    c. The receiver averages for signal strengths would be much closer to the media signal strength between 1 and 0
    d. None of the above
2. What is the efficiency of the 4B/5B encoding scheme?
    - 80%
3. What is the efficiency of the Manchester encoding scheme?
    - 50%

Quiz 1 Review

4. Circuit switched networks require circuits and their accompanying state to be established *before* data can be transferred
    - True

5. Landline-based telephone networks popularized packet-switched networks.
    - False

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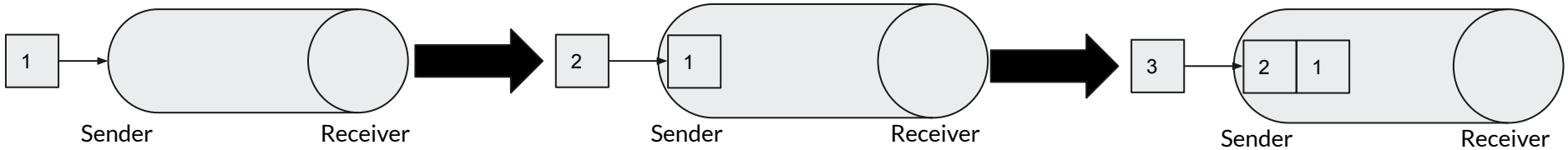
Quiz 1 Review

6. When multiplexing data onto a physical link, setting aside time quanta is not feasible because:
    a. Number of flows must be known ahead of time
    b. The link may be idle if a particular flow is not active
    c. Typical network usage patterns are bursty
    d. All of the above

7. The Delay x Bandwidth product tells us how many bits fit in a network pipe. What is the maximum number of pipes that a sender can fill before it receives an acknowledgement from the receiver?

- 2

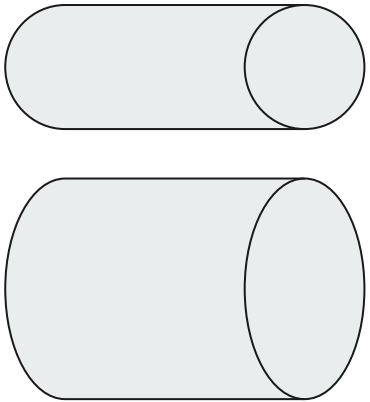


Quiz 1 Review

8. The bandwidth and latency for a link are tightly-coupled: if the bandwidth of a link is high, then the latency must be low.
   - False

9. In layered architectures, services at higher layers are implemented in terms of lower layers.
   - True

10. All communications in distributed systems are based on sending/receiving messages.
    - True



FAQ - remote testing

- Startup script for remote students
- Script made for Linux environments
  - May need modifications to work with Windows/Mac
  - Passwordless ssh: https://www.cs.colostate.edu/~info/faq.html#4.08

```
jar_path=<path_to_jar>
user=<cs_department_username>
domain=cs.colostate.edu
registry_host=<registry_hostname>
registry_port=<registry_server_socket_port>
machine_list=./machine_list

for machine in `cat $machine_list`
do
   gnome-terminal -x bash -c "ssh -t $user@$machine.$domain 'java -cp $jar_path cs455.overlay.node.MessagingNode $registry_host $registry_port'"
done
```

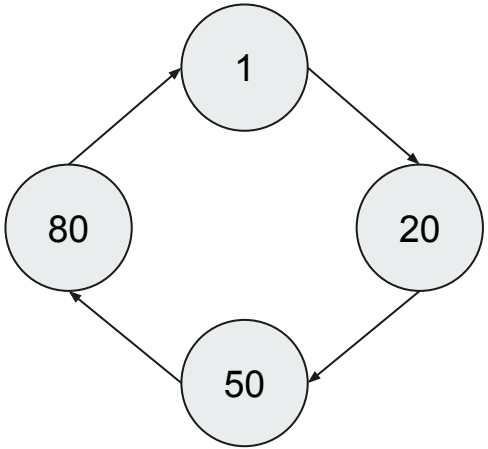
FAQ - remote testing

- VNC
- https://www.cs.colostate.edu/~info/vnc.txt
- Gives you a GUI into a department machine from home
- Set up VNC server on department machines
- Use a VNC client on your own machine to connect
  - TigerVNC
  - RealVNC

FAQ

- Threaded vs. Non-threaded sender
  - Access to outgoing sockets must be serialized, causes threads to block
  - Receive buffer at a node may fill up
- NIO vs. regular sockets
  - NIO = non blocking I/O
  - Allows server to handle multiple connections on a single thread
- Singleton pattern vs. Static Class

FAQ



- Exception handling
  - SocketException
    - Thrown when the remote connection is forcefully and unexpectedly closed
  - IOException
    - Thrown when the first byte cannot be read or the underlying stream is closed
- Test parameters for routing table / node entries
  - For N routing table entries, you need 2^(N-1)+1 nodes minimum so entries don’t wrap around

Logistics

- Milestone 3 : You should be able to use the routing tables at each messaging node to send and relay messages fed into the overlay. You should be able to track the summation counts for the messages and the contents of these messages.
- Piazza
- Office hours
    - Jason 2-4 p.m. Monday and Wednesday
    - Brandon 2-4 p.m. Tuesday and Thursday

Questions?

- Infospaces
- Assignments 1 / 2
- Other course details