True or False?

Informal Quiz 3

T F

- ❑ ❑ Forwarding works in the control plane whereas routing works in the data plane
- ❑ ❑ A routing protocol summarizes global information to setup a local next-hop entry in the forwarding table
- ❑ ❑ Telephony uses simple alternate path routing partly because the core is fully connected and components are extremely reliable
- ❑ ❑ The Bellman-Ford algorithm/distance-vector protocol involves checking neighbors' distance vectors and updating its own distance vector.
- ❑ ❑ The link state method does not face the count-to-infinity problem because it has complete global information (a map in terms of link-states).
- ❑ ❑ Both the distance-vector and link-state approaches could lead to transient routing loops because the information maintained could be incomplete.
- ❑ ❑ Hierarchical addressing, and proper address assignment allows entire subnets to be viewed by interior routers as "virtual nodes", leading to routing scalability

- ❑ ❑ The throughput of a M/M/1 queue is simply $\rho = \lambda/\mu$
- ❑ ❑ It is the determinism in the M/M/1 queuing model which leads to queues and waiting times.
- ❑ ❑ A Bernoulli distribution can be studied by considering a sequence of N binomial trials, and counts the number of successes in N trials.
- ❑ ❑ In the experiment of tossing a die, the set X = {0,1,2} which denotes the possibility of the outcomes being 0, 1 or 2 is a random variable.
- ❑ ❑ A random variable (R.v.) models a measurement, whereas probability models an experiment, and r.v. is used when the measurement does not necessarily captures the set of all possible outcomes of the experiment.
- ❑ ❑ The Poisson distribution is a continuous-time approximation of the binomial distribution, derived by assuming $np = \lambda$, and n is very large.
- ❑ ❑ The M/M/1 system is stable when the number of times the system leaves a given state is equal to the number of times the system enters it.
- ❑ ❑ Splitting a M/M/1 system into k servers (of equal capacity μ/k) and equal average load (λ/k) results in the avg. waiting time to drop by a factor of k
- ❑ ❑ $P(X > k+t/X > t) = P(X > k)$ is the way of formulating the memoryless property.

❑ ❑ Slotted ALOHA has improved utilization since the window of vulnerability is halved compared to pure ALOHA.

❑ ❑ CSMA/CD is likely to be much better than CSMA when t_prop/t_trans >1

❑ ❑ The logical bus model used in Ethernet implies that the channel is used in a half-duplex mode, which is why hubs do not appear in Gigabit ethernet.

❑ ❑ Hubs connect two collision domains, whereas bridges connect two broadcast domains.

❑ ❑ Bridges and switches in Ethernet allow separation of collision domains, and reduce the degree of sharing of the physical media.

❑ ❑ 100Base-T was made possible because the maximum segment length necessary in UTP tree architectures was 100m.

❑ ❑ The smallest valid Type field in the Ethernet header is 0x0800 because of interoperability concerns with IEEE 802.3 which has a MTU of 1518 bytes

❑ ❑ The reason Ethernet has a minimum frame size is to guarantee detection of collision (or the lack of it) before the end of frame transmission

❑ ❑ The reason a collection of bridged collision domains do not scale is because the probability of broadcasts (by nodes or bridges) increases.

True or False?

Informal Quiz 3 (solns)

T F

❑ √ Forwarding works in the control plane whereas routing works in the data plane

√ ❑ A routing protocol summarizes global information to setup a local next-hop entry in the forwarding table

√ ❑ Telephony uses simple alternate path routing partly because the core is fully connected and components are extremely reliable

√ ❑ The Bellman-Ford algorithm/distance-vector protocol involves checking neighbors' distance vectors and updating its own distance vector.

√ ❑ The link state method does not face the count-to-infinity problem because it has complete global information (a map in terms of link-states).

❑ √ Both the distance-vector and link-state approaches could lead to transient routing loops because the information maintained could be incomplete.

√ ❑ Hierarchical addressing, and proper address assignment allows entire subnets to be viewed by interior routers as "virtual nodes", leading to routing scalability

- ❑√ The throughput of a M/M/1 queue is simply $\rho = \lambda/\mu$
- ❑ √ It is the determinism in the M/M/1 queuing model which leads to queues and waiting times.
- ❑ √ A Bernoulli distribution can be studied by considering a sequence of N binomial trials, and counts the number of successes in N trials.
- ❑ √ In the experiment of tossing a die, the set X = {0,1,2} which denotes the possibility of the outcomes being 0, 1 or 2 is a random variable.
- √ ❑ A random variable (R.v.) models a measurement, whereas probability models an experiment, and r.v. is used when the measurement does not necessarily captures the set of all possible outcomes of the experiment.
- √ ❑ The Poisson distribution is a continuous-time approximation of the binomial distribution, derived by assuming $np = \lambda$, and n is very large.
- √ ❑ The M/M/1 system is stable when the number of times the system leaves a given state is equal to the number of times the system enters it.
- ❑ √ Splitting a M/M/1 system into k servers (of equal capacity μ/k) and equal average load (λ/k) results in the avg. waiting time to drop by a factor of k
- √ ❑ $P(X > k+t/X > t) = P(X > k)$ is the way of formulating the memoryless property.

- √ ❑ Slotted ALOHA has improved utilization since the window of vulnerability is halved compared to pure ALOHA.
- ❑ √ CSMA/CD is likely to be much better than CSMA when t_prop/t_trans >1
- √ ❑ The logical bus model used in Ethernet implies that the channel is used in a half-duplex mode, which is why hubs do not appear in Gigabit ethernet.
- ❑ √ Hubs connect two collision domains, whereas bridges connect two broadcast domains.
- √ ❑ Bridges and switches in Ethernet allow separation of collision domains, and reduce the degree of sharing of the physical media.
- √ ❑ 100Base-T was made possible because the maximum segment length necessary in UTP tree architectures was 100m.
- √ ❑ The smallest valid Type field in the Ethernet header is 0x0800 because of interoperability concerns with IEEE 802.3 which has a MTU of 1518 bytes
- √ ❑ The reason Ethernet has a minimum frame size is to guarantee detection of collision (or the lack of it) before the end of frame transmission
- √ ❑ The reason a collection of bridged collision domains do not scale is because the probability of broadcasts (by nodes or bridges) increases.