

# ECSE-4670: Computer Communication Networks (CCN)

## Informal Quiz 2

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- 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
- The distance-vector protocol involves checking neighbors' distance vectors and updating its own distance vector.
- The poisoned reverse modification of DV algorithm is less effective in cases where the cost of a remote link (not the first or second) in a path increases.
- 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

- □ Translation is a good way to solve the internetworking problems of heterogeneity and scale
- □ The implications of an overlay internetworking model include address structure, fragmentation/reassembly and address resolution
- □ Address structure is required to recognize whether the destination is one-hop (directly connected) or multiple-hops (indirectly connected) away.
- □ Subnet mask allows flexible division of address bits into a network address part and a host address part.
- □ When the IP header checksum fails at a router, the packet is dropped and IP sends back a notification to the source
- □ 192.113.40.13 is a class B address
- □ 128.113.40.0/24 is a class B address
- □ A network configured with address 128.113.40.0 and a subnet mask of 255.255.255.0 has a 16-bit address space

- □ A 1510 byte packet can fit within an Ethernet MTU of 1518 bytes
- □ When a single TCP segment gets fragmented at the IP layer, the destination TCP it will maintain them in an out-of-order buffer and send partial acknowledgements to the source.
- □ Fragmentation is bad because every the overall packet loss probability increases dramatically
- □ 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  $N$  Bernoulli trials, and counting the number of successes in  $N$  trials.
- □ Taking a large bet with a probability of success 0.5 in a single experiment (like a lottery) is superior to taking smaller bets (with probability 0.01 each) in 50 repeated, identical experiments.
- □ 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 capture 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.
- □  $P(X > k+t | X > t) = P(X > k)$  is the way of formulating the memoryless property.
- □ In a Poisson arrival process, the average time since the occurrence of the last arrival is the same as the average time for the next arrival.

# Solutions

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