

資格考試科目：高等計算機網路

1. (15%) HTTP and SMTP
 - a. Briefly explain the differences between the GET and the Conditional GET commands?
 - b. Why HTTP/1.1 uses persistent TCP connection for web accessing?
 - c. Compare the data-access models between HTTP and SMTP

2. (10%) DNS
 - a. Why don't we have a centralized DNS?
 - b. Briefly explain how a host at cis.poly.edu will obtain the IP address for gaia.cs.umass.edu under the hierarchical architecture of DNS servers by using recursive query.

3. (10%) TCP slow start and TCP futures.
 - a. Describe the basic operation of TCP slow start. What are the main advantages of TCP slow start that have made it a success in Internet?
 - b. Why are new versions of TCP for high-speed transmission needed?

4. (10%) Switch and Hub.
 - a. What is "traffic isolation"? What is the difference between an Ethernet hub and an Ethernet switch?
 - b. Why could a switch be "plug-and-play"? How to do it?

5. (10%) Elaborate on three wireless link characteristics that make communication across wireless link much more "difficult"

6. (25%) Events, occurring according to a Poisson process with rate λ , are registered by a counter. However, each time an event is registered the counter becomes inoperative for the next b units of time and does not register any new events that might occur during that interval. Let $R(t)$ denote the number of events that occur by time t and are registered.
 - a. Find the probability that the first k events are all registered.
 - b. For $t \geq (n-1)b$, find $P\{R(t) \geq n\}$.

7. (20%) Consider a train station to which customers arrive in accordance with a Poisson process having rate λ . A train is summoned whenever there are N customers waiting in the station, but it takes K units of time for the train to arrive at the station. When it arrives, it picks up all waiting customers. Assuming that the train station incurs a cost at a rate of nc per unit time whenever there are n customers present, find the long-run average cost.