

**CPSC156a, Fall 2003**  
**Solution set for Exam 1**

**Question 1:**

- (a) (i)
- (b) 2<sup>nd</sup> line: It's the telephone network that has admission control and the Internet that is a best-effort network.
- (c) Innovation and entrepreneurship can take place on any layer. If an improvement or a new technology is introduced on layer L, it can be deployed directly if it does not require a change to the layer directly below L and allows L to continue to provide the necessary functionality to the layer directly above L. There is no need for a lengthy, painful redesign of the entire network as there often is in a network with a more centralized, monolithic architecture.
- (d) These claims are hard to reconcile with the "end-to-end arguments." Clark and Blumenthal think that the end-to-end arguments should be adapted to the needs of new stakeholders, not abandoned.

Two points were given for providing the right principle, and two points were given for saying that Clark and Blumenthal did not advocate complete abandonment. "Intelligence is at the endpoints" and other ways of describing decentralized control of the Internet received full credit as an answer to the "which principle" question.
- (e) Human communication
- (f) True

**Question 2:**

- (a) (ii)
- (b) False
- (c) The Netscape browser is a classic example of an information product that is *technically commoditizable*, (see 3(d) below for a definition of this term). Although lock-in to the functionality of a "browser" is strong, lock-in to any particular browser is almost non-existent; once you've learned how to use one browser, you can use them all. Thus, Microsoft was able to produce a browser that was basically functionally equivalent to the Netscape browser relatively quickly (because of technical commoditizability), and many users were just as willing to use it as they were to use the Netscape browser. Microsoft's browser interoperated with HTTP and HTML in the same way that Netscape's did.
- (d) Correct answers include but are not limited to:
  - eBay buyers and sellers
  - AOL Instant-messaging users
  - MS Office users
  - email users
  - Macintosh users
  - KaZaa users
- (e) A product or service exhibits *network effects* if its value to any single user is strongly positively correlated with the total number of users. Of the three companies listed, Amazon (iii) is the one least dependent on network effects.

### **Question 3:**

- (a) There are a variety of *retail channels* through which businesses sell goods to consumers, including but not limited to brick-and-mortar (B&M) stores, B2C Internet sites, television-based “shopping channels,” and printed catalogs (which consumers can use to order goods by mail, phone, fax, e-mail, *etc.*). When one business uses more than one such channel, it is engaging in *multi-channel retailing*.
- (b) Correct answers include but are not limited to:
- Giving away free samples (*e.g.*, a preview of part of a movie or a very short-term license to use a software product) in order to convince users to buy the entire product.
  - Giving away one product in the hope that it will stimulate demand for a complementary product that is not free (*e.g.*, giving away viewers and player applications in the hope that people will buy the software tools used to produce files in the formats needed for viewing and playing).
  - Giving away software in the hope of selling the associated support and training services.
  - Giving away the basic version of a product or service but selling the premium version.
  - Giving away software and requesting payment (shareware).
- (c) False
- (d) An information product or service is *technically commoditizable* if it is built using standard parts and/or protocols, and its functionality can be easily reproduced by competitors.
- (e) (iv)
- (f) (iv)

### **Question 4:**

- (a) (iii)
- (b) (i)
- (c) Physical layer ↔ Ethernet  
IP layer ↔ Routing  
Transport layer ↔ UDP Packets  
Application layer ↔ Web Pages  
DNS System ↔ Domain Hierarchy
- (d) (ii)
- (e) Self: It puts its own IP address in the source-address field of outgoing packets.  
DNS server: It has to be able to access the DNS system in order to translate domain names of destinations into IP addresses. Thus it needs the address of at least one DNS server.  
Router: Generally, in order actually to *send* packets to other hosts through a network (including, in some cases, the packets it sends to a DNS server to get the destination-address values for other packets), it needs to hand them off to a router. This router is the “first hop” in a path to the destination, and it will figure out where to send the packets next.

### **Question 5:**

- (a) Amazon
- (b) Google
- (c) Yahoo and Google
- (d) True
- (e) *Intermediaries* are parties that sit between the manufacturer and the consumer in the retail chain; examples include wholesalers and retailers. When B2C Internet-based commerce first became popular, some people believed that it would lead to near-total *disintermediation* and that consumers would order most of their goods directly from manufacturers. Instead, one of the things that happened in businesses in which traditional intermediaries disappeared or shrank in importance was *reintermediation*; the rise of new kinds of intermediaries, *e.g.*, “e-tailers” such as Amazon and portals such as Yahoo.
- (f) At this point in the evolution of the business model, portals consist of advertiser-supported “comprehensive services” for individual users and tools, customized portals, and services for businesses. Features that they all have in common include:
  - Providing Internet access
  - Web-based email
  - Internet messaging
  - Specialized searches and tools
  - Advertising
  - Fee-based premium content

### **Question 6:**

- (a) The PageRank method “relies on the democratic nature of the web by using its vast link structure as an indicator of an individual page’s value. In essence, Google interprets a link from Page A to Page B as a vote by Page A for Page B. And Google looks at more than the sheer volume of votes or links a page receives; it also analyzes the pages that cast the votes. Votes cast by pages that are themselves important weigh more heavily and help to make other pages important.” [as explained in the Google Press Reviewer’s Guide]. Note that the “Hub and Authority” framework is similar but not identical to PageRank.
- (b) False
- (c) Correct answers include:
  - In the list of results returned in answer to a user’s query, there may be links to pages that are inaccessible at the time the results are returned (*e.g.*, because the servers hosting those pages may be down). If the user clicks on one of those links, the statement that the page is inaccessible will be displayed by his browser. He will then have the option of going back to the list of search results and viewing a cached copy of the page.
  - It is the cached content of a webpage that is used to judge the relevance of the page to the query string.
- (d) False

(e) `<input type= "radio" name= "diet type" value= "veg">`  
Vegetarian  
`<br>`  
`<input type= "radio" name= "diet type" value= "meat">`  
Carnivore

(f) Correct answers include:

- GET
- HEAD
- PUT
- POST
- DELETE