

## CPSC155a: Solution Set for Final Exam

### Question 1:

- (a) Users have the freedom to:
- Run the software, for any purpose
  - Study how the program works and adapt it for their needs
  - Redistribute copies
  - Improve the program and release improvements to the public
- (b) False
- (c) Correct answers include: Linux, Apache, GNU Emacs, Sendmail, Perl, and BSD Unix.

### Question 2:

- (a) The “First-Sale Rule” of US Copyright law says that, when a copyright owner sells a copy of a work, he relinquishes control *over that copy* but not over the work. The work cannot be reproduced illegally, but the copy can be sold, loaned, or given away. This enables the existence of libraries, used-book stores, *etc.* The first-sale rule is effective for physically embodied works because it helps maintain balance between the rights of copyright owners and the constitutional goal of “promoting progress in science and the useful arts.” Physical objects such as books and CDs can be transferred among many people, thus promoting progress by giving many people access. However, each physical copy of a book or CD can be possessed by only one person at a time; because the owner retains the right to *make* copies, the First-Sale rule does not destroy his ability to profit from ownership. This logic breaks down in the digital world, where “content is liberated from medium.” There is no sensible way of giving someone the right to transfer a particular copy of a digital work without duplicating the bits.
- (b) False
- (c) According to most copyright lawyers, fair use, in the US, is a “defense,” not a “right.” Under this interpretation, for the Fair-Use Doctrine to be relevant, the following sequence of events has to take place: A copyrighted work has to be used; the copyright owner has to sue the user for infringement; both parties have to go to court; and the user has to defend himself by saying that his actions pass the Four Factors test of the Fair-Use Doctrine. Until a specific use is made and the user charged with infringement, “fair use” does not come into play. Thus, under this interpretation, if a copyright owner can use a TPS to prevent a specific use, no one has a “right” to make this use.

### Question 3:

- (a)
- |                 |
|-----------------|
| Application     |
| Transport       |
| IP (or Network) |
| Physical        |

- (b) i

(c) Netscape

Question 4:

- (a) The hope was the B2C “pure plays” could shrink the retail chain. They could eliminate intermediaries, storefront costs, some distribution costs, *etc.* and not introduce counteracting new costs. With overall costs lower, consumers could be offered lower prices.
- (b) False
- (c) False
- (d) iii

Question 5:

(a) As explained by Shapiro and Varian on page 13 of **Information Rules**, “when the value of a product to one user depends on how many other users there are, economists say that this product exhibits *network externalities* or *network effects*.” *De facto* standardization often happens as a result of the “positive feedback” that accompanies network effects; in Shapiro and Varian’s words, “as the installed base of users grows, more and more users find adoption worthwhile. Eventually, the product reaches critical mass and takes over the market.”

(b) Bundling is a specific form of “versioning” in which two or more *distinct* products are offered as a package for a single price. A prominent example of a bundle of information goods is Microsoft Office. Individual programs in the bundle, such as WORD and PowerPoint, are offered as separate products. The price of a bundle is usually less than the sum of the prices of the individual products in it.

(c) i

Question 6:

- (a) Correct answers include: academic research and peer review of academic research.
- (b) Correct answers include: Google, Amazon (for reviews), and Ultima Online.
- (c) iv
- (d) iii

Question 7:

- (a) Architecture, Law, Markets, and Norms
- (b) i
- (c) iv

Question 8:

(a) One basic advantage is efficiency: Information can be entered once by a user and then reused.

One basic disadvantage is the threat to privacy. Personal information and transaction data stored over time in many cookies can be collected and mined.

- (b) Correct answers include:
- Downward spiral
    - Banner ads are easy to ignore.

- Average click through has fallen to less than one in 200.
- Leads to creation of more “obnoxious” ads, *e.g.*, pop-ups.
- Entertaining?
  - Getting the “right” ads requires time, effort, and money.
  - Internet market is not big enough to justify it.
- Accountability: Advertisers can tell immediately whether their ads “worked.”
- High expectations: “Well targeted” ads cost up to 100 times as much as generic ads. But how precisely can one target?

(c) iii

(d) Correct answers include:

- Technology or industry background information
- Industry and analyst reports (*e.g.*, Gartner)
- Reference calls, *e.g.*, to beta users and clients
- Visits to the company
- Due diligence from previous rounds
- Gut instinct

#### Question 9.

(a) Original C2C auction business:

- Sellers pay a small fee (< \$2) per listed item.
- eBay takes a cut (~2.5%) of each sale.
  - Sellers are willing to pay this fee because it’s a very small price to pay compared to the global exposure they get.
- Although the percentage earned on any given item is small, this is profitable for eBay precisely because the market is global: over 500,000 new items are added to the site everyday.
- Buyers and sellers handle exchange and payment.
- eBay has no inventory, no transportation, *no costs at all* except website operation.

This is an *extremely* profitable business that provides a classic illustration of how to build something that can “grow to Internet scale.”

eBay has since added other services such as fixed-price sales, the BillPoint payment system, sales of distressed tech inventory, *etc.*

(b) False

(c) Napster

(d) False

#### Question 10.

(a) Vertical: Correct answers include Covisint and metalSite.

Horizontal: Correct answers include HotOfftheWire and equalFooting.

(b) B2B technology providers

(c) ii

(d) Correct answers include:

- Transaction Fees, *e.g.*
  - per transaction
  - flat, *e.g.*, monthly or yearly
  - value based
- Membership or subscription fees
- Value-added service fees (*e.g.*, logistics or financing)
- Advertising and marketing
- Sales of data and information

Question 11.

(a) ii

(b) Correct answers include:

- Veto or approval of any sale, acquisition, merger, or liquidation
- Veto or approval of budgets
- Veto or approval of executive firing or hiring
- Veto or approval of strategic or business-plan changes
- Right of first refusal on sale of shares (*e.g.*, by the founders)
- “Tag-along rights”: Follow the founders’ sale on a pro rata basis
- “Drag-along rights”: Right to force the sale of the company
- Liquidation preference
- “Non-compete” conditions on the founders
- Anti-dilution protection
- Right to participate in subsequent rounds

(c) Correct answers include:

- Governments claim to require the ability to wiretap
- Governments claim to require the ability to collect sales taxes
- Governments claim to require the ability to prevent circulation of illegal or classified material
- Parents claim to require the ability to block children’s access to “adult” material
- Copyright owners claim to require the ability to prevent illegal copying or at least to monitor traffic in order to track illegal copying

(d) Roughly speaking, a “business model” is a general strategy for taking an idea for a product or source and building it into a business; *part* of a constructing a business model is to identify one or more sources of revenue. For example, the revenue sources in Yahoo’s current business model are advertisers and companies that buy services and tools. A “revenue model,” on the other hand, identifies a specific circumstance under which money changes hands in the course of doing business. For example, revenue models for online ads include “advertiser pays the website for each impression displayed,” “advertiser pays the website for each click through,” and “advertiser pays the website for each click through that leads to a sale.” Revenue models for online content distribution include “pay per download” and “monthly subscription.”

Question 12.

(a) There are two main components:

- Sell “scalable search services” to owners of portals and websites. The flagship products are Google WebSearch™ and Google SiteSearch™.
- Sell advertising. The two main programs are *premium sponsorship*, which allows an advertiser to display a sponsored text link at the top of a list of search results, and *AdWords*, which allows an advertiser to display text ads to the right of the results for certain key words or phrases. No Banners, Pop-Ups, or Obnoxious Graphics!

(b) The PageRank algorithm “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.]

(c) iii

Question 13.

(a) The main products of RealNetworks are client and server software for streaming multimedia content over the Internet. Its main competitor is Microsoft.

(b) “Street Performer” is basically a proposal for moving away from per-unit compensation of artists and distributors, thus removing the need to control copying and distribution of digital works. For example, for novels, it would work as follows:

- Novelist gives chapter 1 to publisher and promises rest of book after she is paid \$X.
- Publisher posts chapter 1, collects payments, issues signed receipts to customers (“donors”).
- If publisher collects \$X+Y, he gets rest of book from novelist, posts it, gives \$X to novelist, and keeps \$Y.
- If he collects less than \$X+Y, he sends refunds to customers. Also, if novelist doesn’t deliver rest of book, she gets bad publicity and customers get refunds.
- Many variations:
  - New author gives first book away.
  - Non-anonymous big donors
  - Some publishers “edit” and choose, and some don’t.
  - Famous authors don’t have to deliver chapter 1 in advance.

(c) iv

Question 14.

(a) ii

(b) DRM technology has been developed because distributors of copyrighted works want to maintain control over their digital content after it has been

distributed to “untrusted” users. In web services, we have an analogous situation: Users would like to maintain control over their personal data after it has been transferred to “untrusted” servers.

- (c) Combine it with personalization and event-notification to create a web service that sends useful alerts to customers’ cell phones, hand-helds, and other favorite devices.