

CPSC156a: Fall 2003
Solution Set for Exam 2

Question 1

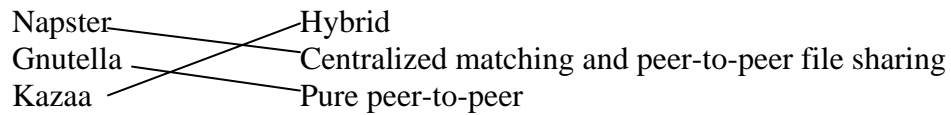
- (a) *Confidentiality* has been achieved when information cannot be read by someone not authorized to read it.
Integrity has been achieved when information cannot be modified by someone not authorized to modify it.
Availability has been achieved when everyone who is legitimately entitled to access a piece of information or a network service can in fact do so.
- (b) Access to a particular applicant's file over the Internet required only the applicant's name, Social Security number, and date of birth. This is information that the Princeton admissions office and many other organizations have.
- (c) False
(d) True
(e) iii

Question 2

- (a) The examples that were emphasized in class are eBay and Google. Other correct answers include Amazon (for reviews and for C2C sales), RedHat, and Ultima Online.
- (b) i
- (c) Shareware (which does not require payment but can be distributed as a traditional closed-source executable) and p2p distribution of pirated software (which usually involves neither payment nor license)
- (d) False (For example, public-domain source code is not governed by any license whatsoever, and there are open-source licenses, such as the BSD license from Berkeley, that are non-copyleft.)
- (e) Depending upon the project and the worker, incentives may include
- Desire to impress the other workers (one's "peer community")
 - Building up knowledge, skill, and professional reputation (which may lead to a well paying job down the road)
 - Social expectations ("others review your journal submissions, and so you owe it to the community to review others' submissions")
 - If the unit of work is small enough, *e.g.*, putting up a single web link, then not much incentive is needed
 - Inherent satisfaction (otherwise known as "because it's fun!")

Question 3

(a)



(b) iii

- (c) Kazaa or any other p2p file-sharing system can also be used in a non-infringing manner. For example, an author could use Kazaa to distribute his own paper on which he owns the copyright.
- (d) Copyright infringement is an unauthorized use of a copyright work that is not covered by the Fair-Use doctrine. DMCA violation is either (1) circumvention of an effective technological measure whose purpose is protection of a work's owner's rights or (2) distribution of circumvention tools. Thus copyright law governs the use of copyright works, and the DMCA (or at least the provisions of it that are relevant to Question 3d) governs the technical systems designed to manage copyright works.
- (e) Correct answers include:
- Sklyarov is a Russian citizen working for a Russian company (ElcomSoft), and the product he worked on is legal in Russia.
 - Sklyarov was presenting technical results at a research conference (DEFCON), and the DMCA supposedly exempts "encryption research."
 - The ElcomSoft "password-recovery software" that Sklyarov worked on could be used for fair use of Adobe eBooks, including the creation of backup copies and the text-to-speech translation of a book for visually impaired users.

Question 4

(a) ii

(b) Copyright law, the technical-protection system (TPS), and the business model

(c) iii

(d) Correct answers include

- DVD content is controlled by a TPS that includes content scrambling, copy-control marks, and Macrovision. The TPS is far from perfect, but it does deter some would-be pirates, and those who are not deterred can be prosecuted under the DMCA (and some have been). Music, by contrast, is stored unencrypted in digital form on CDs, and music CDs are readable by standard computers as well as CD players. This is one reason that piracy is easier and more common for music than movies.
- Digital music files read off CDs are easily convertible to *compact* MP3 files that can be transmitted quickly and easily to anyone using standard Internet protocols. As of now, there is no digital movie format in which entire movies can be stored in files that are small enough to be easily and quickly transmitted to residential Internet users, even those with comparatively high-bandwidth connections. This is another reason that piracy is easier and more common for music than movies.

- Consumers view movie DVDs at their current prices as a good deal but view music CDs at their current prices as a bad deal.
- For many consumers, the basic unit of music is a single song, and an album CD is essentially a bundle of goods that they would rather buy individually. (Indeed, when CDs were first marketed, the music industry stressed that they were better than LPs in part because one could easily skip to a particular track.) Once they have easy access to single songs via the Internet, it's hard to convince them to buy whole albums. There is nothing analogous for movie viewers; as of now, no one has successfully marketed single scenes of movies.

Question 5

- (a) True
- (b) OECD Fair Information principles include:

- Collection limitation
- Data quality
- Purpose specification
- Use limitation
- Security safeguards
- Openness
- Individual participation
- Accountability

The following are “simplified versions” of the above principles:

- Notice and disclosure
- Choice and consent
- Data security
- Data quality and access
- Recourse and remedies

- (c) iv
- (d) Public records used to be, in principle, open to inspection by anyone but, in practice, very inconvenient for most people to inspect. They were often stored by local governments on hard-to-search media. As a result, most people's records were rarely or never inspected, and people often had the chance to leave potentially damaging information about them behind when they moved to new locations or began new jobs or relationships. Now, governments are putting more and more public records on universally accessible web pages in standard, searchable formats. This trend has the positive effect of democratizing access to public records, *e.g.*, of giving ordinary people and small organizations access to information that has always been readily accessible by large organizations that could hire investigators, but it has also made abuse of this information easier. Abuses can range from the merely annoying, such as commercial profiling and targeted marketing, to the blatantly criminal, such as identity theft and blackmail.
- (e) The main advantage of making the purchase over the Internet is that the person can do it alone in his home without being seen. The main disadvantage is that the standard ways of buying things on the Internet leave trails of evidence in the form of cookies, billing and payment records (*e.g.*, credit-card or Paypal), a physical

address to which the item is delivered, and server-side records that the seller uses for marketing, inventory, personalization, *etc.* Thus, someone who suspects that the person made this purchase could later find evidence to confirm this suspicion. Some of these risks can be reduced, *e.g.*, by having the item delivered somewhere other than the buyer's home or office or by going through an Internet website like anonymizer.com, but it is difficult to impossible to eliminate them completely.

The main advantage of buying the item in a B&M store is that the buyer can pay with cash and carry the item home, thus avoiding the creation of an "order-fulfillment" trail of evidence. The main disadvantage is that he actually has to show up physically in the store, where he might be recognized. Even if he goes to a store far from his home where no one recognizes him, there may be a surveillance camera in use to thwart shoplifting.

Question 6

- (a) "To Promote Progress of Science and the Useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."
- (b) Correct answers include
 - to reproduce the copyrighted work
 - to prepare derivative works
 - to distribute copies through sales, rental, lease, or lending
 - to perform the copyrighted work publicly (this applies, *e.g.*, to plays)
 - to display the copyrighted work publicly (this applies, *e.g.*, to sculpture)
- (c) The first-sale rule is a limitation on the copyright owner's exclusive right to distribute the work; it says that "the owner of a particular copy or phonorecord...is entitled, without the authority of the copyright owner, to sell or otherwise dispose of the possession of that copy or phonorecord."
- (d) In the world of analog works, in which content is bound to and delivered in a physical object, the first-sale rule helps maintain balance, because it simultaneously (1) allows libraries, second-hand book and record stores, and friends who give or lend books and records to each other to disseminate works and, as the Constitution says, to "promote progress of science and the useful arts," and (2) by restricting the set of copies that the same parties can sell or lend, prevents these parties from destroying the ability of the copyright owner to profit from his work. These parties who do not own the copyright are not allowed to *make* copies; once such a party has transferred a particular copy, he no longer possesses it. The only (legal) way for a particular copy to get into circulation in the first place is for the copyright owner to put it there. The only (legal) way for more copies to come into existence is for the copyright owner to produce them, at nonzero unit cost. The fact that each copy is possessed by exactly one party at any given time and that unit production costs are nonzero are crucial to the first-sale rule. It is because analog works are bound to and delivered in physical objects that both of these facts hold. This logic breaks down in the digital world in which "content is liberated from medium."
- (e) iv