

## NOTES

- <sup>1</sup> I have seen estimates ranging up to \$500,000 for the average, some from computer security firms, which have an incentive to exaggerate. It is difficult to get precise figures, in part because victims are reluctant to report losses.
- <sup>2</sup> Eric S. Raymond, ed., *New Hacker's Dictionary*, MIT Press, 1993.
- <sup>3</sup> Quoted in J. D. Bierdorfer, "Among Code Warriors, Women, Too, Can Fight," *New York Times*, June 7, 2001, pp. 1, 9.
- <sup>4</sup> Brian Reid, "Reflection on Some Recent Widespread Computer Break-Ins," *Communications of the ACM*, Feb. 1987, 30:2, pp. 103–105; reprinted in Peter J. Denning, ed., *Computers Under Attack: Intruders, Worms, and Viruses*, Addison-Wesley, 1990, pp. 145–149.
- <sup>5</sup> "Politicians and the Net," *Wired*, Feb. 1995, p. 46. John R. Wilke, "In the Arcane Culture of Computer Hackers, Few Doors Stay Closed," *Wall Street Journal*, Aug. 22, 1990, pp. A1, A4. David L. Wilson, "Crackers: a Serious Threat," *The Chronicle of Higher Education*, Aug. 17, 1994, pp. A23–A24. Jared Sandberg, "Security Breach at the Internet Raises Worries," *Wall Street Journal*, Feb. 7, 1994, p. B5.
- <sup>6</sup> John Simons, "How a Cyber Sleuth, Using a 'Data Tap,' Busted a Hacker Ring," *Wall Street Journal*, Oct. 1, 1999, pp. A1, A6.
- <sup>7</sup> All the quotes are from Wilke, "In the Arcane Culture of Computer Hackers, Few Doors Stay Closed."
- <sup>8</sup> "Is Computer Hacking a Crime?" *Harper's Magazine*, March 1990, pp. 45–57. The quotation is on p. 57.
- <sup>9</sup> Wilson, "Crackers: a Serious Threat."
- <sup>10</sup> Katie Hafner and John Markoff, *Cyberpunk: Outlaws and Hackers on the Computer Frontier*, Simon & Schuster, 1991.
- <sup>11</sup> The early but widely repeated estimate of 6000 infected computers was calculated from an MIT staff member's guess of a 10% infection rate at MIT the day after the worm struck and an estimate of 60,000 Internet hosts at the time. A lower estimate, 2000–3000, was reported later. Jon A. Rochlis and Mark W. Eichin, "With Microscope and Tweezers: The Worm from MIT's Perspective," *Communications of the ACM*, 32:6, June 1989, pp. 689–698.
- <sup>12</sup> W. Wayt Gibbs, "Profile: Dan Farmer," *Scientific American*, Apr. 1997, pp. 32, 34. Attrition.org, viewed May 25, 2001. Jared Sandberg, "Holes In the Net," *Newsweek*, Feb. 21, 2000, pp. 46–49.
- <sup>13</sup> Lee Gomes and Ted Bridis, "FBI Warns of Russian Hackers Stealing U.S. Credit-Card Data," *Wall Street Journal*, Mar. 9, 2001, p. A4. Nancy McPoland, "Extortion Attempt Exposes Credit Info Online," *net4TV Voice*, Dec. 17, 2000, www.net4TV.com/voice, viewed May 17, 2001. Brad Stone, "Busting the Web Bandits," *Newsweek*, July 16, 2001, p. 55.
- <sup>14</sup> "Withdrawal Ordered for U.S. Pentagon Hackers," *San Jose Mercury News* (Reuters), Nov. 5, 1998.
- <sup>15</sup> Lev Grossman, "Attack of the Love Bug," *Time*, May 15, 2000, pp. 48–56.
- <sup>16</sup> See grc.com/dos/grcdos.htm for a first-hand report by the victim that covers technical, sociological, and social aspects of the attack, including e-mail from the boy who launched it; viewed June 3, 2001.
- <sup>17</sup> Jonathan Napack, "Cyberthreats Rising in the East," *Wired*, Mar. 2001, p. 74.
- <sup>18</sup> John J. Fialka, "The Latest Flurries At Weather Bureau: Scattered Hacking," *Wall Street Journal*, Oct. 10, 1994, pp. A1, A6.
- <sup>19</sup> Mark Manion and Abby Goodrum, "Terrorism or Civil Disobedience: Toward a Hacktivist Ethic," in Richard A. Spinello and Herman T. Tavani, eds., *Readings in CyberEthics*, Jones and Bartlett, 2001, pp. 463–473.
- <sup>20</sup> Many documents about the Randall Schwartz case are at www.lightlink.com/spacenska/fors.
- <sup>21</sup> *State v. McGraw*, 1985.
- <sup>22</sup> Some books on computer forensics are in the list at the end of the chapter. Many computer-forensics businesses can be found on the Web.
- <sup>23</sup> Ted Bridis, "FBI Unit Fails to React on Time To Electronic Threats, Report Says," *Wall Street Journal*, May 22, 2001, p. A28.
- <sup>24</sup> John Perry Barlow, "Crime and Puzzlement," *The Whole Earth Review*, Fall, 1990, pp. 44–57. (This article describes and comments on several hacker cases.) Wilke, "In the Arcane Culture of Computer Hackers, Few Doors Stay Closed."
- <sup>25</sup> Dorothy Denning, "The United States vs. Craig Neidorf," *Communications of the ACM*, March 1991, 34:3, pp. 23–32. Other published accounts of the case, including one in the *New York Times*, state that the government and/or BellSouth gave the document's value as more than \$77,000. I am using the lower figure, and other factual material, from Denning's article; she participated in Neidorf's trial. Some additional information is from John Perry Barlow, "Crime and Puzzlement."
- <sup>26</sup> David Friedman and William Sjostrom, "Hanged for a Sheep: The Economics of Marginal Deterrence," *Journal of Legal Studies*, University of Chicago, June 1993.
- <sup>27</sup> Bruce Sterling, *The Hacker Crackdown: Law and Disorder on the Electronic Frontier*, Bantam Books, 1992, pp. 13–14.
- <sup>28</sup> Craig Bromberg, "In Defense of Hackers," *The New York Times Magazine*, Apr. 21, 1991, pp. 45–49. Gary Wolf, "The World According to Woz," *Wired*, Sept. 1998, pp. 118–121, 178–185.
- <sup>29</sup> Richard P. Feynman, *Surely You're Joking, Mr. Feynman: Adventures of a Curious Character*, W. W. Norton, 1984, pp. 137–155.

- <sup>30</sup> *Information Security: Computer Attacks at Department of Defense Pose Increasing Risks*, GAO/AIMD-96-84, May 22, 1996. W. Wayt Gibbs, "Profile: Dan Farmer," *Scientific American*, Apr. 1997, pp. 32, 34. Robert Fox, "News Track: NASA Computer Security Lax," *Communications of the ACM*, July 1999, p. 10. Wade Roush, "Hackers," *Technology Review*, April 1995, pp. 32-40. Wilson, "Crackers': a Serious Threat." "Interior Department Bars Access to Internet Site," *New York Times*, Dec. 8, 2001, p. A11. Associated Press, "U.S. Review Finds Widespread Lapses In Computer Security," *Wall Street Journal*, Apr. 6, 2001, p. B6.
- <sup>31</sup> Paul Shukovsky, "Some Online Retailers Don't Protect Data," *San Diego Union-Tribune*, May 4, 1999, (ComputerLink) p. 12. Lee Gomes, "Silicon Valley's Open Secrets," *Wall Street Journal*, Apr. 27, 2001, pp. B1, B3.
- <sup>32</sup> Reported in Rachel Emma Silverman, "Intrusion Detection Systems Sniff Out Digital Attacks," Feb. 4, 1999, p. B6, and Keith Johnson, "Around the World, Hackers Are Drawn to 'Honey pots'," Dec. 19, 2000, p. A18, both *Wall Street Journal*.
- <sup>33</sup> Ted Eisenberg, David Gries, Juris Hartmanis, Don Holcomb, M. Stuart Lynn, Thomas Santoro, "The Cornell Commission: On Morris and the Worm," *Communications of the ACM*, June 1989, 32:6, pp. 706-709.
- <sup>34</sup> Larry Lange, "Corporate America: Beware Inside Job," *Electronic Engineering Times*, Jan. 15, 1996, pp. 20, 22. Jared Sandberg, "AOL Tightens Security after Hackers Foil the Service with Fake Accounts," *Wall Street Journal*, Sept. 8, 1995, p. B3.
- <sup>35</sup> Reported in *Risks Digest*, 21:24, Feb. 15, 2001; from the *New York Times*, Feb. 14, 2001.
- <sup>36</sup> Paul Wallich, "Wire Pirates," *Scientific American*, Mar. 1994, pp. 90-101.
- <sup>37</sup> CERT Advisory CA-95:06, "Security Administrator Tool for Analyzing Networks (SATAN)," Apr. 3, 1995.
- <sup>38</sup> From the SATAN documentation, quoted in Ted Doty, "Test Driving SATAN," Chapter 15 in Dorothy E. Denning and Peter J. Denning, eds., *Internet Besieged: Countering Cyberspace Scofflaws*, Addison-Wesley, 1998.
- <sup>39</sup> Peter Tippett, quoted in Kim Zetter, "Freeze! Drop That Download!" *PC World*, Nov. 16, 2000; [www.pcworld.com/resource/printable/article/0,aid,34406,00.asp](http://www.pcworld.com/resource/printable/article/0,aid,34406,00.asp). The article includes pros and cons of criminalizing virus writing and a discussion of other means of reducing viruses.
- <sup>40</sup> Linda Harrison, "US Lawyer and Pals Indicted for Shill Bidding on eBay," *The Register*, Apr. 18, 2001, [www.theregister.co.uk/content/6/18354.html](http://www.theregister.co.uk/content/6/18354.html), viewed Apr. 18, 2001.
- <sup>41</sup> Daniel Kadlec, "Crimes and Misdemeanors," *Time*, Oct. 2, 2000, pp. 52-54.
- <sup>42</sup> Barbara Carton, "An Unsolved Slaying of an Airline Worker Stirs Family to Action," *Wall Street Journal*, June 20, 1995, p. A1, A8.
- <sup>43</sup> Steven Peisner, quoted in "Credit-card Scams Bedevil E-Stores," *Wall Street Journal*, Sept. 19, 2000, pp. B1, B4.
- <sup>44</sup> "Theft of Identity' Rises to Thousands a Day," *Privacy Journal*, Feb. 1996, 22:4, pp. 1, 4. "Credit, SSN Fraud Victims," *Privacy Journal*, Apr. 1996, p. 6.
- <sup>45</sup> The Identity Theft and Assumption Deterrence Act of 1998, 18 U.S.C. §1028, [www.consumer.gov/idtheft](http://www.consumer.gov/idtheft).
- <sup>46</sup> Jeffrey Rothfeder, *Privacy For Sale*, Simon & Schuster, 1992, pp. 113-116.
- <sup>47</sup> Elizabeth Attebery, "2 Suspects Held in Phony ATM Scam," *San Diego Union-Tribune*, June 30, 1993, p. C2. F. Barry Schreiber, "The Future of ATM Security," *Security Management*, March 1994, 38:3, p. 18A.
- <sup>48</sup> Matt Barthel, "Bank Worker Gets Kudos for Cracking ATM Scam," *The American Banker*, Oct. 25, 1993, p. 24.
- <sup>49</sup> Saul Hansell, "U.S. Workers Stole Data on 11,000, Agency Says," *New York Times*, Apr. 6, 1996, p. 6.
- <sup>50</sup> Steve Bodow, "The Money Shot," *Wired*, Sept. 2001, pp. 86-97.
- <sup>51</sup> *Webster's Third New International Dictionary*.
- <sup>52</sup> Tom Forester and Perry Morrison, *Computer Ethics: Cautionary Tales and Ethical Dilemmas in Computing*, 2nd ed., MIT Press, 1994, p. 34.
- <sup>53</sup> William M. Carley, "As Computers Flip, People Lose Grip In Saga of Sabotage at Printing Firm," *Wall Street Journal*, Aug. 27, 1992, p. A7.
- <sup>54</sup> Forester and Morrison, *Computer Ethics*, p. 37.
- <sup>55</sup> "Like a Virgin," *Security Insider Report*, Feb. 1993, p. 5. William M. Carley, "Did Northwest Steal American's Systems? The Court Will Decide," *Wall Street Journal*, July 7, 1994, p. A1. Scott McCartney, "System Breach Is Stirring Up Airline Rivalry," *Wall Street Journal*, June 27, 2000, p. B1.
- <sup>56</sup> Peter G. Neumann et al., "Risks to the Public in Computers and Related Systems," *Software Engineering Notes*, Apr. 1988, 13:2, pp. 7-8.
- <sup>57</sup> "Beware of a Blizzard of Fake Documents" (letter to the editor), *New York Times*, Aug 16, 1991, pg. 12.
- <sup>58</sup> Doug McClellan, "Desktop Counterfeiting," *Technology Review*, Feb./Mar. 1995, pp. 32-40.
- <sup>59</sup> Robert Fox, "News Track: Everybody Must Get Cloned," *Communications of the ACM*, Aug. 2000, 43:8, p. 9. Lisa Guernsey, "Software Is Called Capable of Copying Any Human Voice," *New York Times*, July 31, 2001, pp. A1, C2.
- <sup>60</sup> D. J. Stout, quoted in Jacques Leslie, "Digital Photos and Photo(shop) Realism," *Wired*, May 1995, pp. 108-113. Michael W. Robbins, "The Apple of Visual Technology," *Audubon*, July/Aug. 1994, p. 4.
- <sup>61</sup> *NAACP v. Alabama*, 1958.
- <sup>62</sup> Andrea Gerlin, "Electronic Smut's Spread Raises Questions," *Wall Street Journal*, May 27, 1994, p. B3.
- <sup>63</sup> David Banisar, quoted in Will Rodger, "Trans-Atlantic Treaty Would Authorize Close Monitoring of Internet Usage," *Privacy Journal*, June

2001, p. 1. The text of the treaty is at [conventions.coe.int/Treaty/EN/projects/FinalCybercrime.htm](http://conventions.coe.int/Treaty/EN/projects/FinalCybercrime.htm).

<sup>64</sup> In Donn Seeley, "Password Cracking: A Game of Wits," *Communications of the ACM*, June 1989, 32:6, pp. 700–703, reprinted in Peter J. Denning, ed., *Computers Under Attack: Intruders, Worms, and Viruses*, Addison-Wesley, 1990, pp. 244–252.

<sup>65</sup> George C. Brown, assistant general counsel, SEC, quoted in Michael Moss, "SEC's Plan to Snoop for

Crime on Web Sparks a Debate over Privacy," *Wall Street Journal*, Mar. 28, 2000, pp. B1, B4.

<sup>66</sup> This exercise is a simplified and modified version of a scenario used in a mock hearing presentation at the Computers, Freedom, and Privacy conference, San Francisco, 1993, in a session chaired by Don Ingraham.

## BOOKS AND ARTICLES

- "Is Computer Hacking a Crime?" *Harper's Magazine*, March 1990, pp. 45–57. Transcript of an online discussion among several well-known hackers and others.
- Kenneth Brower, "Photography in the Age of Falsification," *The Atlantic Monthly*, May 1998, pp. 92–111. Explores views of well-known nature photographers on the ethics of altering photos.
- Dorothy E. Denning, *Information Warfare and Security*, ACM Press/Addison-Wesley, 1999.
- Dorothy E. Denning and Peter J. Denning, eds., *Internet Besieged: Countering Cyberspace Scofflaws*, ACM Press/Addison-Wesley, 1998. An excellent collection of articles on hacking and Internet security.
- S. Furnell and M. Warren, "Computer Hacking and Cyberterrorism: The Real Threats in the New Millennium," *Computers & Security*, 1999, v. 18, pp. 28–34.
- Katie Hafner and John Markoff, *Cyberpunk: Outlaws and Hackers on the Computer Frontier*, Simon & Schuster, 1991.
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