

Exam 1
Answer Key
Fall 2006

Multiple Choice.

1. c
2. b
3. a
4. d
5. c
6. b
7. c
8. b
9. a, b, c, or d
10. a

True or False.

11. T
12. F
13. F
14. F
15. T
16. T or F
17. F
18. T
19. F
20. T or F
21. T
22. T or F
23. F
24. T
25. T
26. F
27. F
28. F

Laugh if you're a geek.

29. Binary numbers represent values using only 0s and 1s. Whereas decimal numbers have a “1s’ place,” a “10s’ place,” a “100s’ place,” and so forth, binary numbers have a “1s’ place,” a “2s’ place,” a “4s’ place,” and so forth. Accordingly, each digit in a binary number represents 0 times some power of two or 1 times some power of two. And, so, 100 in binary does, in fact, represent the number we know as four:

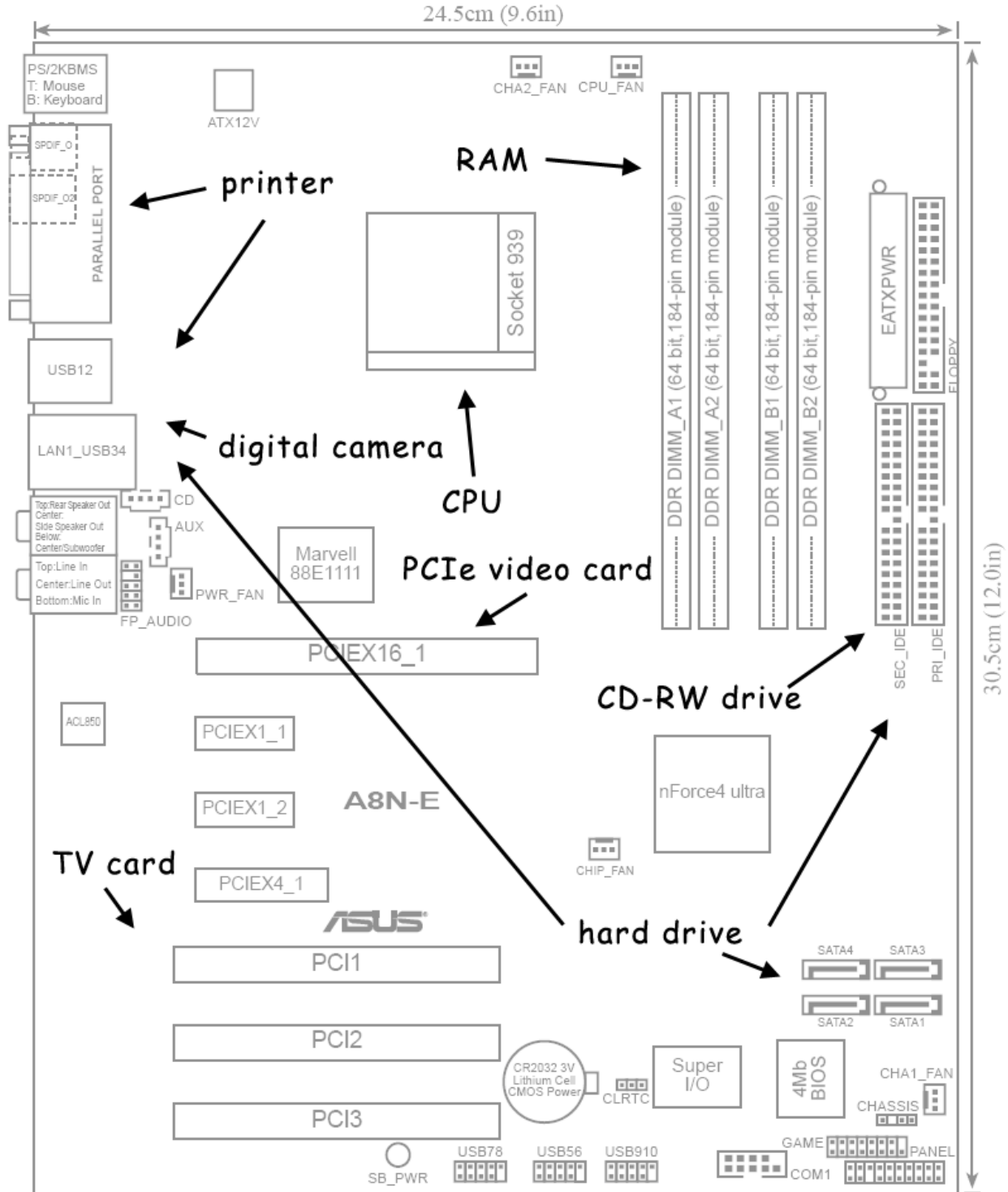
$$\begin{array}{r} 4s \ 2s \ 1s \\ 100 = 1 \times 4 + 0 \times 2 + 0 \times 1 = 4 \end{array}$$

The same road to Harvard as last year.

30. Line 7’s measurements represent the amount of time it took three separate packets (“pings”) to travel from the apartment in Somerville to the router (presumably in New York City) called 290.ATM6-0.XR2.NYC1.ALTER.NET. The first of those measurements (41.740 ms) is probably slightly higher than the other two because of network congestion somewhere between the two locations.

Connect the Dots Hardware.

31. The figure below shows most (if not all) possible answers.



Just the other day...

32. David doesn't know what he's talking about. CPUs, not HDDs, can have dual cores.
33. Turns out Dan knows what he's talking about on both accounts!
34. Eugenia doesn't know what she's talking about. Today's cable modems only operate at a few megabits per second (*e.g.*, 8 Mbps), not gigabits.
35. Rei doesn't know what he's talking about. The Internet is a physical infrastructure on top of which services like the World Wide Web run.

Know what you're talking about?

The capacities and speeds below are not hard lower and upper bounds but, rather, ranges representative of what exists or is popular today; other answers may be possible.

36. 384 Kbps – 30 Mbps
37. 650 MB – 700 MB; 4x – 52x
38. 800 MHz – 4 GHz
39. 33.6 Kbps – 56 Kbps
40. 128 Kbps – 24 Mbps
41. 4.7 GB; 8.54 GB; 1x – 16x
42. 20 GB – 500 GB
43. 32 KB – 1 MB
44. 256 KB – 2 MB
45. 128 MB – 4 GB; 100 MHz – 1 GHz
46. 11 Mbps – 54 Mbps

Rapid Fire.

47. A podcast is a feed of audio, video, and/or other files that users can subscribe to so that their computer automatically displays or downloads newly released content.
48. If the hard drive is fragmented or the files are spread out across the drive, the drive's read/write head has move around a lot.
49. URLs cannot have ampersands.
50. 2^8 equals 256, 2^{16} equals roughly 65 thousand, and 2^{32} equals roughly 4 billion.
51. Most people know that www or .com implies a website (and thus use of HTTP).

52. Clicking such links informs the spammer that your email address is, in fact, valid, thereby inviting yet more spam.
53. It's entirely the prerogative of a website (and its system administrators) whether or not its URL begins with `www`. Well-designed sites, though they might redirect visitors from one to the other, support both `www.domain.tld` and `domain.tld`.
54. Possible characters include a period (`.`), an underscore (`_`), a plus (`+`), and a minus (`-`).
55. Each packet is addressed with a destination IP address. A router simply looks up that IP address (or a prefix thereof) in its routing table to determine the packet's next hop. Such routing tables are either configured manually by humans or constructed dynamically by software.

Extra Credit.

56. 00000000000000010110000001100010
57. A computer could check if the email's `From:` address or origin IP address is on some blacklist. A computer could check the email for words indicative spam (*e.g.*, "Viagra"). A computer could check whether the email contains suspicious HTML (*e.g.*, white text on a white background).
58. Harvard's Science Center at 1 Oxford Street in Cambridge, Massachusetts.