SOLUTIONS FOR CHAPTER 9 (1)

SECTION 9.1 (1.1): 8088 MICROPROCESSOR

1. The 8088 has only pins AD0 - AD7, whereas the 8086 has AD0 - AD15. Furthermore, only the 8086 has the BHE pin. They are not interchangeable.
2. output
3. $2^{20} = 1,048,576$ bytes, since the 8088 has only 20 bits for address pins
4. input
5. output for address, and both input and output for data
6. maximum
7. true
8. all of them
9. It uses less pins and consequently has a smaller package.
10. one extra clock for every data byte access
11. in the first T state
12. Due to the fact that it has a 16-bit external data bus, it requires more wire strips on the printed circuit board.
13. to low (ground)
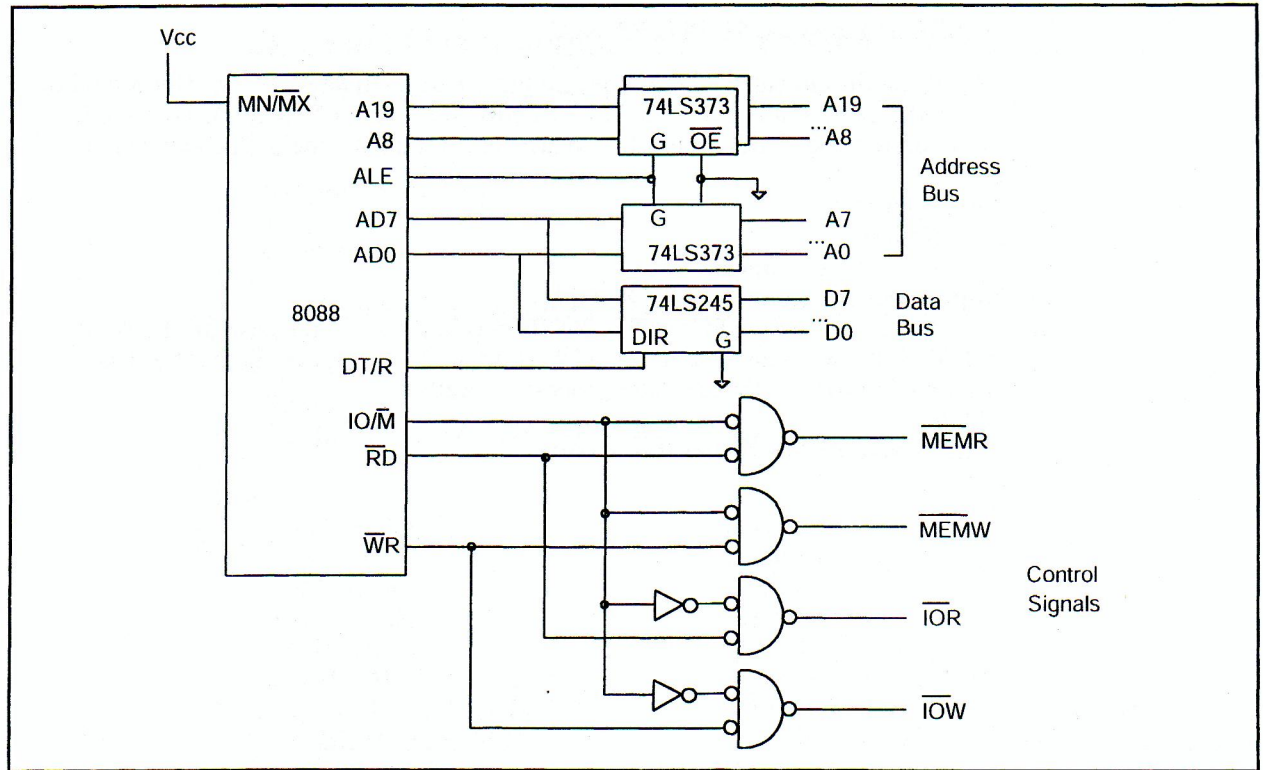14. IP=0000 and CS=FFFFH
15. b
16. c
17. a

SECTION 9.2 (1.2): 8284 AND 8288 SUPPORTING CHIPS

18. 8288
19. all except RESET and NMI
20. b
21. c
22. a

SECTION 9.3 (1.3): 8-BIT SECTION OF ISA BUS

23. 8088
24. 3
25. the 8088; When AEN=1, DMA is in control of all the buses on the system board.
26. (a) 74LS245   (b) 74LS244
27. d

28. The following is the diagram.

29. low
30. DIR = 1 and G = 0
31. DIR = 0 and G = 0
32. the Hi-Z (impedance) bus state, since the 74LS245 is not activated and therefore no transfer of data happens for either direction
33. data
34. G = 1 and OE = 0; The data is latched when G goes from high to low.

SECTION 9.4 (1.4): 80286 MICROPROCESSOR

35. true
36. No, this person is wrong. The 80286 is a byte-addressable processor, meaning that each address location holds one byte of data and not two bytes. Therefore, we have $2^{24} \times 1 = 16,777,216 = 16$ megabytes.
37. both high and low bytes: D0 - D7 and D8 - D15
38. even
39. true
40. False, only the 1M.
41. real
42. CS = F000H, IP = FFF0H and all the rest are 0000.
43. FFFFF0H
44. Since CS = F000H and IP = FFF0, we have A19 - A0=FFFF0H; A23 -A20 = 1111. That makes the physical address FFFFF0H for the first memory location upon activation of the RESET pin in the 80286.

SECTION 9.5 (1.5): 16-BIT ISA BUS

45. 62-pin and 36-pin parts. The A side and the B side each have 31 pins (for a total of 62 pins). The C and D side each have 18 pins (for a total of 36 pins). The A side of the 62-pin and C side of the 36-pin are the component side on the expansion card.
46. the 36-pin part
47. the 36-pin part
48. to make it PC/XT compatible
49. 36-pin since it is part of the 80286 CPU
50. The physical address is FC480H + 7652H = 103AD2H. In the case of the 8088 and 8086, the wrap-around makes A19 - A0 = 03AD2H, meaning that the 1 is dropped, but for the 286 and later processors A20 =1.
51. 80286
52. MEMW and MEMR on the 36-pin part
53. true
54. true