

CHAPTER 0: INTRODUCTION TO COMPUTING

SECTION 0.1: NUMBERING AND CODING SYSTEMS

1.
 - (a) $12_{10} = 1100_2$
 - (b) $123_{10} = 0111\ 1011_2$
 - (c) $63_{10} = 0011\ 1111_2$
 - (d) $128_{10} = 1000\ 0000_2$
 - (e) $1000_{10} = 0011\ 1110\ 1000_2$
2.
 - (a) $100100_2 = 36_{10}$
 - (b) $1000001_2 = 65_{10}$
 - (c) $11101_2 = 29_{10}$
 - (d) $1010_2 = 10_{10}$
 - (e) $00100010_2 = 34_{10}$
3.
 - (a) $100100_2 = 24_{16}$
 - (b) $1000001_2 = 41_{16}$
 - (c) $11101_2 = 1D_{16}$
 - (d) $1010_2 = 0A_{16}$
 - (e) $00100010_2 = 22_{16}$
4.
 - (a) $2B9_{16} = 0010\ 1011\ 1001_2, 697_{10}$
 - (b) $F44_{16} = 1111\ 0100\ 0100_2, 3908_{10}$
 - (c) $912_{16} = 1001\ 0001\ 0010_2, 2322_{10}$
 - (d) $2B_{16} = 0010\ 1011_2, 43_{10}$
 - (e) $FFFF_{16} = 1111\ 1111\ 1111\ 1111_2, 65535_{10}$
5.
 - (a) $12_{10} = 0C_{16}$
 - (b) $123_{10} = 7B_{16}$
 - (c) $63_{10} = 3F_{16}$
 - (d) $128_{10} = 80_{16}$
 - (e) $1000_{10} = 3E8_{16}$
6.
 - (a) $1001010 = 0011\ 0110$
 - (b) $111001 = 0000\ 0111$
 - (c) $10000010 = 0111\ 1110$
 - (d) $111110001 = 0000\ 1111$
7.
 - (a) $2C+3F = 6B$
 - (b) $F34+5D6 = 150A$
 - (c) $20000+12FF = 212FF$
 - (d) $FFFF+2222 = 12221$

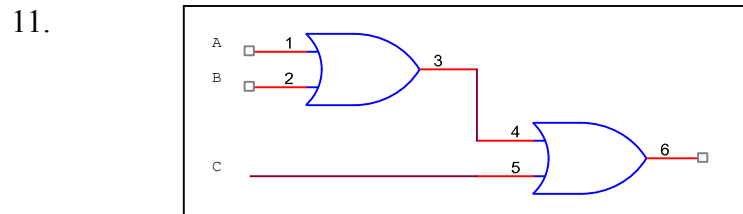
8. (a) $24F-129 = 126_{16}$
 (b) $FE9-5CC = A1D_{16}$
 (c) $2FFFF-FFFF = 30000_{16}$
 (d) $9FF25-4DD99 = 5218C_{16}$
9. (a) Hex: 30, 31, 32, 33, 34, 35, 36, 37, 38, 39
 (b) Binary: 11 0000, 11 0001, 11 0010, 11 0011, 11 0100, 11 0101, 11 0110, 11 0111, 11 1000, 11 1001.

	<u>ASCII (hex)</u>	<u>Binary</u>
0	30	011 0000
1	31	011 0001
2	32	011 0010
3	33	011 0011
4	34	011 0100
5	35	011 0101
6	36	011 0110
7	37	011 0111
8	38	011 1000
9	39	011 1001

10. 000000 22 55 2E 53 2E 41 2E 20 69 73 20 61 20 63 6F 75
 000010 6E 74 72 79 22 0D 0A 22 69 6E 20 4E 6F 72 74 68
 000020 20 41 6D 65 72 69 63 61 22 0D 0A

"U.S.A. is a country".."in North America"..

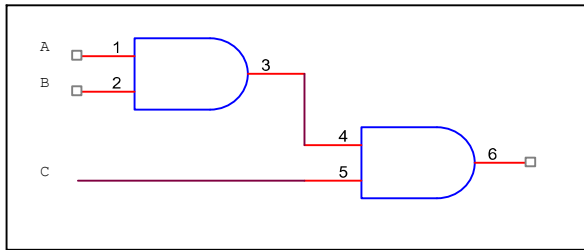
SECTION 0.2: DIGITAL PRIMER



12.

A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

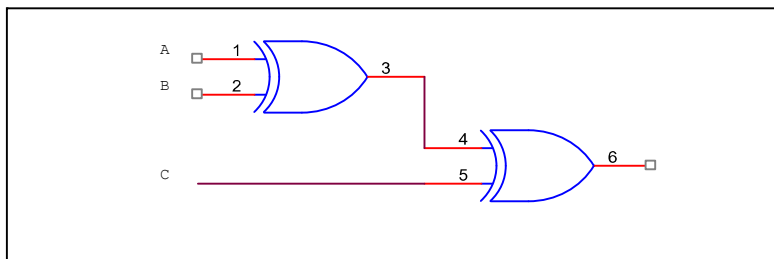
13.



14.

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

15.



A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

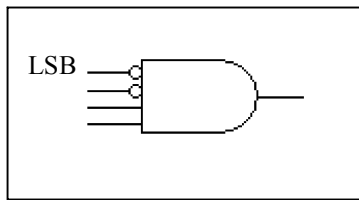
16.

A	B	C	Y
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

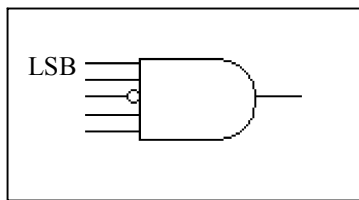
17.

A	B	C	Y
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

18.



19.



20.

CLK	D	Q
No	X	NC
Yes	0	0
Yes	1	1

SECTION 0.3: INSIDE THE COMPUTER

21.

- (a) 4
- (b) 4
- (c) 4
- (d) 1 048 576, 2^{20}
- (e) 1024K
- (f) 1 073 741 824, 2^{30}
- (g) 1 048 576 K
- (h) 1024M
- (i) 8388608, 8192K

22.

Disk storage capacity / size of a page = $(2 \cdot 2^{30}) / (25 \cdot 80) = 1$ million pages

23. (a) $9\text{FFFFh} - 10000\text{h} = 8\text{FFFFh} = 589\,824$ bytes
(b) 576 kbytes
24. $2^{32} - 1 = 4\,294\,967\,295$
25. (a) FFh, 255
(b) FFFFh, 65535
(c) FFFF FFFFh, 4 294 967 295
(d) FFFF FFFF FFFF FFFFh, 18 446 744 073 709 551 615
26. (a) $2^{16} = 64\text{K}$
(b) $2^{24} = 16\text{M}$
(c) $2^{32} = 4096$ Mega, 4G
(d) $2^{48} = 256$ Tera, 262144 Giga, 268435456 Mega
27. Data bus is bidirectional, address bus is unidirectional (exit CPU).
28. PC (Program Counter)
29. ALU is responsible for all arithmetic and logic calculations in the CPU.
30. Address, control and data