

Digital Storage – Binary and ASCII**Data Storage – Binary**

1. Complete the table, below.

Decimal	Octal	hexadecimal	binary
0	0	0	0000
1	1	1	0001
2	2	2	0010
3	3	3	0011
4	4	4	0100
5	5	5	0101
6	6	6	0110
7	7	7	0111
8	10	8	1000
9	11	9	1001
10	12	A	1010
11	13	B	1011
12	14	C	1100
13	15	D	1101
14	16	E	1110
15	17	F	1111
16	20	10	10000

2. Complete the binary addition, then convert each line into hexadecimal.

a)

binary	hexadecimal
1011	0x B
+ 0001	+ 0x 1
<u>01100</u>	0x 0C

b)

binary	hexadecimal
1110	0x E
+ 1011	+ 0x B
<u>11001</u>	0x 19

3. Complete the binary multiplication, then convert each line into hexadecimal.

a)

binary	hexadecimal
1110	0x E
× 101	0x 5
<u>1110</u>	0x 0E
0000	0x 00
111000	0x 38
<u>1000110</u>	0x 46

b)

binary	hexadecimal
1110	0x E
× 111	0x 7
<u>1110</u>	0x 0E
11100	0x 1C
111000	0x 38
<u>1100010</u>	0x 62

Data Storage – ASCII Characters

4. Convert the binary into hexadecimal, then use the table to convert to characters.

Binary	Hex	ASCII
01000100	44	D
01101111	6F	o
01101110	6E	n
00100111	27	'
01110100	74	t
00100000	20	
01100011	63	c
01101111	6F	o
01110000	70	p
01111001	79	y
00100001	21	!

ASCII Character Set (0x20-0x7F)											
hex	char	hex	char	hex	char	hex	char	hex	char	hex	char
20	space	30	0	40	@	50	P	60	`	70	p
21	!	31	1	41	A	51	Q	61	a	71	q
22	"	32	2	42	B	52	R	62	b	72	r
23	#	33	3	43	C	53	S	63	c	73	s
24	\$	34	4	44	D	54	T	64	d	74	t
25	%	35	5	45	E	55	U	65	e	75	u
26	&	36	6	46	F	56	V	66	f	76	v
27	'	37	7	47	G	57	W	67	g	77	w
28	(	38	8	48	H	58	X	68	h	78	x
29	)	39	9	49	I	59	Y	69	i	79	y
2A	*	3A	:	4A	J	5A	Z	6A	j	7A	z
2B	+	3B	;	4B	K	5B	[	6B	k	7B	{
2C	,	3C	<	4C	L	5C	\	6C	l	7C	
2D	-	3D	=	4D	M	5D	]	6D	m	7D	}
2E	.	3E	>	4E	N	5E	^	6E	n	7E	~
2F	/	3F	?	4F	O	5F	_	6F	o	7F	delete

5. Using the ASCII table, above, convert each character of the string “Hello Chris!” to hexadecimal, then to binary.

ASCII	hex	binary
H	48	1001000
e	65	1100101
l	6C	1101100
l	6C	1101100
o	6F	1101111
space	20	100000

ASCII	hex	binary
C	43	1000011
h	68	1101000
r	72	1110010
i	69	1101001
s	73	1110011
!	21	100001

6. Write your Chinese name using pinyin, then convert each character to hexadecimal then binary.

Pinyin

Hexadecimal

Binary

1

2

3

4

5

6

7

8

9

A

B

C

D

E

F