Fractional Powers of 2

Given a 7-bit binary number with 3 fractional bits, what is the weight of each bit position?

X X X X X X X

Floating-Point Problems

What common decimal fraction cannot be exactly represented in binary floating point representation?

Precision vs Range

What is the precision and range of each of the below **6-bit** binary formats?

Representation	Precision	Range
Unsigned integer		
Unsigned fixed-point with 1 fractional bit		
Unsigned fixed-point with 2 fractional bits		
Unsigned floating-point with 2 exponent bits		
Unsigned floating-point with 3 exponent bits		

Fixed- vs. Floating-Point

Problems with floating-point	Problems with fixed-point

HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR
00	**NUL**	10	**DLE**	20	space	30	0	40	@	50	P	60	`	70	p
01	**SOH**	11	**DC1**	21	!	31	1	41	A	51	Q	61	a	71	q
02	**STX**	12	**DC2**	22	"	32	2	42	B	52	R	62	b	72	r
03	**ETX**	13	**DC3**	23	#	33	3	43	C	53	S	63	c	73	s
04	**EOT**	14	**DC4**	24	$	34	4	44	D	54	T	64	d	74	t
05	**ENQ**	15	**NAK**	25	%	35	5	45	E	55	U	65	e	75	u
06	**ACK**	16	**SYN**	26	&	36	6	46	F	56	V	66	f	76	v
07	**BEL**	17	**ETB**	27	'	37	7	47	G	57	W	67	g	77	w
08	**BS**	18	**CAN**	28	(	38	8	48	H	58	X	68	h	78	x
09	**HT**	19	**EM**	29	)	39	9	49	I	59	Y	69	i	79	y
0A	**LF**	1A	**SUB**	2A	*	3A	:	4A	J	5A	Z	6A	j	7A	z
0B	**VT**	1B	**ESC**	2B	+	3B	;	4B	K	5B	[	6B	k	7B	{
0C	**FF**	1C	**FS**	2C	,	3C	<	4C	L	5C	\	6C	l	7C	|
0D	**CR**	1D	**GS**	2D	-	3D	=	4D	M	5D	]	6D	m	7D	}
0E	**SO**	1E	**RS**	2E	.	3E	>	4E	N	5E	^	6E	n	7E	~
0F	**SI**	1F	**US**	2F	/	3F	?	4F	O	5F	_	6F	o	7F	**DEL**

Do not memorize ASCII codes!!! You will <u>always</u> be given a chart if needed.

ASCII

What is the character associated with ASCII code $4A_{16}$?

How are the following characters and strings represented?

'3'

"ASCII"

"123"

How do we display multi-digit numbers in decimal using ASCII codes?