Note Title 1/31/2009

Homework Problems

HW 2 due 2009-02-06 (Fri)

X = 0 1 1 0 1 0 1 1

Y = 0 0 1 0 1 0 1 0

1. Calculate (a) X+Y given above an 8-bit, two's complement number system. Show all your 2's complement conversion steps. Check your results in decimal arithmetic. Identify any overflow conditions that occur and tell how you detected them. (40 pts)

2. Calculate X−Y given above using an 8-bit, two's complement number system. Remember that X−Y is computed as = X+ ("−"Y), where "−" Y" is the (2's complement of Y). Show all your 2's complement conversion steps. Check your results in decimal arithmetic. Identify any overflow conditions that occur and tell how you detected them. (40 pts)

3. Express the decimal number 1950 in the BCD code. (10 pts)

4. Express the string *Cat* in the ASCII code. (10 pts)

4. Dog is represented as $(44\ 69\ 67)_{16} = (01000100\ 01101001\ 01100111)_2$

$(64\ 111\ 103)_{10} =$

ASCII stands for American Standard code for Information Interchange

ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol
0	0	NUL	16	10	DLE	32	20	(space)	48	30	0
1	1	SOH	17	11	DC1	33	21	!	49	31	1
2	2	STX	18	12	DC2	34	22	"	50	32	2
3	3	ETX	19	13	DC3	35	23	#	51	33	3
4	4	EOT	20	14	DC4	36	24	$	52	34	4
5	5	ENQ	21	15	NAK	37	25	%	53	35	5
6	6	ACK	22	16	SYN	38	26	&	54	36	6
7	7	BEL	23	17	ETB	39	27	'	55	37	7
8	8	BS	24	18	CAN	40	28	(	56	38	8
9	9	TAB	25	19	EM	41	29	)	57	39	9
10	A	LF	26	1A	SUB	42	2A	*	58	3A	:
11	B	VT	27	1B	ESC	43	2B	+	59	3B	;
12	C	FF	28	1C	FS	44	2C	,	60	3C	<
13	D	CR	29	1D	GS	45	2D	-	61	3D	=
14	E	SO	30	1E	RS	46	2E	.	62	3E	>
15	F	SI	31	1F	US	47	2F	/	63	3F	?

ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol
64	40	@	80	50	P	96	60	`	112	70	p
65	41	A	81	51	Q	97	61	a	113	71	q
66	42	B	82	52	R	98	62	b	114	72	r
67	43	C	83	53	S	99	63	c	115	73	s
68	44	D	84	54	T	100	64	d	116	74	t
69	45	E	85	55	U	101	65	e	117	75	u
70	46	F	86	56	V	102	66	f	118	76	v
71	47	G	87	57	W	103	67	g	119	77	w
72	48	H	88	58	X	104	68	h	120	78	x
73	49	I	89	59	Y	105	69	i	121	79	y
74	4A	J	90	5A	Z	106	6A	j	122	7A	z
75	4B	K	91	5B	[	107	6B	k	123	7B	{
76	4C	L	92	5C	\	108	6C	l	124	7C	|
77	4D	M	93	5D	]	109	6D	m	125	7D	}
78	4E	N	94	5E	^	110	6E	n	126	7E	~
79	4F	O	95	5F	_	111	6F	o	127	7F	□

3. $(1813)_{10} = (0001\ 1000\ 0001\ 0011)_{BCD}$ BCD representation of $(1813)_{10}$.

Digit	BCD 8 4 2 1	Excess-3 or Stibitz Code	BCD 2 4 2 1 or Aiken Code	BCD 8 4 −2 −1	IBM 702 IBM 705 IBM 7080 IBM 1401 8 4 2 1	ASCII 0000 8421	EBCDIC 0000 8421
0	0000	0011	0000	0000	1010	0011 0000	1111 0000
1	0001	0100	0001	0111	0001	0011 0001	1111 0001
2	0010	0101	0010	0110	0010	0011 0010	1111 0010
3	0011	0110	0011	0101	0011	0011 0011	1111 0011
4	0100	0111	0100	0100	0100	0011 0100	1111 0100
5	0101	1000	1011	1011	0101	0011 0101	1111 0101
6	0110	1001	1100	1010	0110	0011 0110	1111 0110
7	0111	1010	1101	1001	0111	0011 0111	1111 0111
8	1000	1011	1110	1000	1000	0011 1000	1111 1000
9	1001	1100	1111	1111	1001	0011 1001	1111 1001

Table from:

http://en.wikipedia.org/wiki/Binary_coded_decimal