Convert the number of days in a leap year
366_{10} to Base 2

Part A

X n	number	count	remainder	running total	binary	running total
2^8	256	1	110	256	100000000	100000000
2^7	128	0	110	256	000000000	000000000
2^6	64	1	46	320	001000000	101000000
2^5	32	1	14	352	000100000	101100000
2^4	16	0	14	352	000000000	101100000
2^3	8	1	6	360	000001000	101101000
2^2	4	1	2	364	000000100	101101100
2^1	2	1	0	366	000000010	101101110
2^0	1	1	0	367	000000001	101101111

2nd 45,000 to binary = 1010111111001

2st 366_{10} to binary = 1011010111

X n	number	count	remainder	running total	binary	running total
2^{15}	32768	1	12232	32768	1000000000	1000000000
2^{14}	16384	0	12232	32768	0000000000	1000000000
2^{13}	8192	1	4040	40960	0010000000	1010000000
2^{12}	4096	0	4040	40960	0000000000	1010000000
2^{11}	2048	1	1992	38912	0001000000	1010001000
2^{10}	1024	1	968	37888	0000010000	1010011100
2^{9}	512	1	456	37776	0000000100	1010011100
2^{8}	256	1	200	37120	0000000010	1010011110
2^{7}	128	1	72	37048	0000000001	101001110000
2^{6}	64	1	8	37040	0000000000	10100111000
2^{5}	32	0	8	37040	0000000000	1010011111000
2^{4}	16	0	8	37040	0000000000	1010011111000
2^{3}	8	1	0	37040	0000000001	1010011111001
2^{2}						
2^{1}						
2^{0}						

Number Representation

Convert the number 181336782^{10}

2.

Xn	Number	count	remainder	Running total
16^7	268435456	0	181336782	0
16^6	16777216	A (10)	13564622	167772160
16^5	1048576	C (12)	981518	180,355070
16^4	65,536	F (14)	67206	181,272576
16^3	4096	F (15)	2766	181234,816
16^2	256	A (10)	216	181,336784
16^1	16	D (18)	0	181,336,782
16^0	1			

= ACEFAD8

2. Convert the number COFF.EE$_{16}$ to Base10 directly

$C = 12 \times 16^5 = 12 \times 1048576 = 12582912$

$0 = 0 \times 16^4 = 0 \times 65836 = 0$

$F = 15 \times 16^3 = 15 \times 4096 = 61440$

$F = 15 \times 16^2 = 15 \times 256 = 3840$

$E = 14 \times 16^1 = 14 \times 16 = 224$

$E = 14 \times 16^0 = 14 \times 1 = 14$

COFFE^{16} to base 10	
	$(c \times 16^5) + (0 \times 16^4) + (F \times 16^3) + (4 \times 16^2)$ $+ (c \times 16^1) + (E \times 16^0) + (12 \times 16^5) + (0 \times 16^4) +$ $+ (15 \times 16^3) + (15 \times 16^2) + (14 \times 16^1) + (14 \times 16^0)$
	$12582912 + 0 + 61440 + 3840 + 224$ $+ 14 = 12648430^{10}$

Part C

~~Convert number~~

What is the Base 16 value of 8 bit 2's complement
number 1001 0101?

2. ~~1001 0101~~

$(1 \times 2)^7$ $(\times 0)^6$ $(1 \times 0)^5$, $(1 \times 2)^4$, $(1 \times 0)^3$, (1×2)
, $(1 \times 0)^1$ $(2 \times 1)^0$

~~128~~ $\times 0 + 0 \times 16 + 0 + 4 + 0 + 1 = 149_{10}$

~~Correct~~

7 1001 0101^2

0110 1010

Add +1 =   0110 1010
                              1
            ─────────────
            0110 1011

0110 = 6
1011 = B   = 6B

2 (13) = 0000 1101
  (42) = 0010 1010

0000   1101
0010   1010
─────────────
0 010   1010

0 0 1 1 0 1
  1 6 1 0 1 0
────────────
(1) 1 0 1 1 1
override

0010   1010
              1
────────────
00 10 1011

D 2 61 =   111101   flip
     32 =   100000   011111
     _____
                          100000

     111101
   + 100000
   ┌─────────
   │1011101
   └

   Obt otrange

2 46 =   1011110   flip
   4 =   000100   111011
   _____
                           +1
                           111100

     101110
   + 111100
   ┌──────────
   │11000010
   └