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CPE301 Dr. Egbert

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Homework 1

Description of purpose:

This homework's objective is to get us familiar with previously learned topics and embedded systems. We are to learn what the term, "embedded system," is and to apply that knowledge when we look up the features of the Arduino system. For example, input/output devices, type of microprocessor/microcontroller used, software required and even the price of the Arduino itself.

Problems 1-5 were completed on paper. I took a picture and added to the document.

HW 01

(1.5) given $\{0111\ 0110\ 1101\ 0001\ 1001\ 1011\ 1111\ 0000\}_2$.
determine equivalent # in each base
a). Decimal
b). hexidecimal

* recall $\overset{8}{1}\overset{4}{0}\overset{2}{1}\overset{1}{0}$ $\rightarrow 8020 = 8+0+2+0 = 10 = \boxed{A}$

Bin → Hex

0111	0110	1101	0001	1001	1011	1111	0000
7	6	D	1	9	B	F	0

$\boxed{(76D19BF0)_{16} = (0111\ 0110\ 1101\ 0001\ 1001\ 1011\ 1111\ 0000)_2}$

* recall ex. write Binary # ; list powers of 2 Right to left

0	1	1	0	1	1	0	1	0	0	1	1	0	0	1	1	0	1	1	1	1	0	0	0	0
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	2^3	2^2	2^1	2^0

Bin → Dec

$1\times2^{30} + 1\times2^{29} + 1\times2^{28} + 1\times2^{26} + 1\times2^{25} + 1\times2^{23} + 1\times2^{22} + 1\times2^{20}$ .... calculator

$= \boxed{(1993948432)_{10}}$

Hex → Dec

(1.6) (6) $(24687531)_{16}$ (7 6 5 4 3 2 1 0)

$2\times16^7 + 4\times16^6 + 6\times16^5 + 8\times16^4 + 7\times16^3 + 5\times16^2 + 3\times16^1 + 1\times16^0$

$(24687531)_{16} = (616825521)_{10}$

Hex → Binary

(5)

2	4	6	8	7	5	3	1
0010	0100	0110	1000	0111	0101	0011	0001

$(24687531)_{10} = (0010\ 0100\ 0110\ 1000\ 0111\ 0101\ 0011\ 0001)_2$