Assignment #2

1). a. 0x CAFE < 0 Because C can be represented by 1100_2

$= -0x3502 = -(3\times16^3+5\times16^2+0\times16^1+2\times16^0) = -13570$

b. 0x 4DAD > 0 Because 4 can be represented by 0100_2

$= 4\times16^3+13\times16^2+10\times16^1+13\times16 = 19885$

c. 0x FACE < 0 Because F can be represented by 1111_2

$= -0x532 = -(5\times16^2+3\times16^1+2\times16^0) = -1330$

2). a. $d_0 = 1779\%16 = 3$, quotient $= \frac{1779}{16} = 111$

$d_1 = 111\%16 = F$, quotient $= \frac{111}{16} = 7$

$d_2 = 6\%16 = 6$, quotient $= \frac{6}{16} = 0$

$\Rightarrow -0x06F3 = 0xF90D$

b. $d_0 = 2020\%16 = 4$, quotient $= \frac{2020}{16} = 126$

$d_1 = 126\%16 = E$, quotient $= \frac{126}{16} = 7$

$d_2 = 7\%16 = 7$, quotient $= \frac{7}{16} = 0$

$\Rightarrow$ 0x 07E4

3). a. $-0.1875 = -\frac{3}{16} = -1\times1.1_2\times2^{-4} = -1.1\times2^{-3}$

S = 1

Fraction $= 10000..00_2 = (1\times2^{-1}+0\times2^{-2}+\cdots)$

Exponent $= -3+127 = 124 = 01111100$

$\Rightarrow$ 10111110 10000...00

b. $0.46875 = \frac{15}{32} = 1 \times 1111 \times 2^{-5} = 1 \times 1.111 \times 2^{-2}$

$S = 0$

Fraction $= 111000\ldots00$

Exponent $= -2 + 127 = 125 = 01111101$

$\Rightarrow$ $00111110111000\ldots00$

4). a. $3F400000$

$= 00111111000000\ldots00_2$

$S = 0$

Exponent $= 01111110 = 126 = -1 + 127$

Fraction $= 100000\ldots00$

$\Rightarrow$ $1.1_2 \times 2^{-1} = 1\frac{1}{2} \times 2^{-2} = \frac{3}{4} = 0.75$

b. BE000000

$= 10111110000000\ldots00$

$S = 1$

Exponent $= 01111100 = 124 = -3 + 127$

Fraction $= 00000\ldots00$

$\Rightarrow$ $-1.0 \times 2^{-3} = -0.001_2 = -\frac{2}{16} = -0.125$

5). As shown below, the string is represented by an array of character.
Each character corresponding to a unique ASCII code and can be represented in Hexadecimal value in memory and occupy 8 bits or 1 byte per character. The "Null" value indicates the end of the string.

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)
0x10010000	0x656d6f43	0x61207374	0x67206572	0x74616572	0x00000021

0x656d6f43 => emoC

0x61207374 => a st

0x67206572 => g er

0x74616572 => t aer

0x00000021 => null null !