Lab1 Exercise

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1. Given 16 bits, what are the Signed-magnitude, 1’s complement and 2’s complement representation for -59? Write the answers in Hexadecimal.

* Signed Magnitude: 803B
  + In 16-bit binary, +59 is represented as 0000 0000 0011 1011.
  + -59 would be 1000 0000 0011 1011.
  + Converting to hexadecimal: 803B.
* 1’s Complement: FFC4
  + Invert all bits of 1000 0000 0011 1011, resulting in 1111 1111 1100 0100.
* 2’s Complement: FFC5
  + Add 1 to the 1’s complement representation: 1111 1111 1100 0100 + 1 = 1111 1111 1100 0101.

1. What is the corresponding decimal form for the single point precision floating number?

1101 1011 0101 0000 0010 0000 0110 0000

* This binary representation in IEEE 754 format converts to -5.858239e16 approximately.
  + Sign = -1
  + Exponent = (-127) + 182 = 55
  + Fraction = 1 + 2^ (-1) + 2^ (-2) + 2^ (-4) + 2^ (-11) + 2^ (-18) + 2^ (-19) = 1.6259880065917969
  + Value = (-1) \* (1.6259880065917969) \* 2 ^ (55) = -5.858239 \* 10 ^ 16

1. What is the single point precision floating number of -45.875 in computer system? Write the answers in Hexadecimal.

* Hexadecimal: C2378000
  + Sign = +1
  + Exponent = (-127) + 132 = 5 =
  + Fraction = 1 + 0.43359375 = 3637248
  + Binary Representation = 1100 0010 0011 0111 1000 0000 0000 0000
  + Hexadecimal Representation = C2378000

1. What is the ASCII representation for “5”, ‘t’ and ‘T’ in decimal?

* ‘5’ in ASCII decimal: 53
* ‘t’ in ASCII decimal: 116
* ‘T’ in ASCII decimal: 84

1. What is the Unicode representation for “您好” in hexadecimal?

* Unicode for “您”: 60A8
* Unicode for “好”: 597D
* Combined: 60A8 597D