

CS250 HW#1

① a) $+47_{10} \rightarrow 8\text{-bit } 2\text{s complement integer rep in binary and hex}$

$$00101111_2 = 47_{10} \xrightarrow{\text{hex}} 0x2F$$

~~complement + 1~~

~~01000011₂ hex 0x43~~

b)

b) $-13_{10} \rightarrow 8\text{-bits } 2\text{ complement integer rep in binary and hex}$

$$00001101_2 = 13_{10}$$

~~complement + 1~~

$$11110011_2$$

~~hex 0x2B~~ $\xrightarrow{\text{hex}} 0xF3$

c) $+47.0_{10} \rightarrow 32\text{-bit IEEE float rep in binary and hex}$

$$101111.0 = 47.0_{10}$$

$$1.01111 \cdot 2^5$$

$$\text{Exponent} = 127 + 5 = 132_{10} = 10000100$$

Sign Exponent

$$0 \quad 10000100 \quad 0111100 \quad 0000 \quad 0000 \quad 0000 \quad 0000$$

$$0x423C0000$$

d) $-0.375_{10} \rightarrow 32\text{-bit IEEE float rep in binary and hex}$

$$-0.375_{10}$$

$$0.011_2 = -0.375_{10}$$

$$1.1_2 \cdot 2^{-2}$$

$$\text{Exponent} = 127 - 2 = 125 = 01111101$$

$$1 \quad 01111101 \quad 10111101100 \quad 0000 \quad 0000 \quad 0000 \quad 0000$$

$$0xBEC00000$$

$$10111101100, 0000 \quad 0000 \quad 0000 \quad 0000 \quad 0000 \rightarrow 0xBEC00000$$

e) String for 250! in hex

$$0x537472696E6720666F722032353021$$

f) $2, 147, 483, 649_{10} > 2^{31}$

\downarrow

$$1000 \quad 0000 \quad 0000 \quad 0000 \quad 0000 \quad 0000 \quad 0000 \quad 0001$$

33 bits

② a) a. stack

b. stack

c. heap

d. ~~static data~~ global data

e. ~~reserved~~ stack

b) at address a, lives 1.2

e-ptr points to address a
foo takes in deviance of e-ptr.

1.2 < 7+4

so returns foo returns 11

11 > 10.5

man() returns 0

③

time ./myProgramOpt : 0.22s ~~user~~ user 0.00s system 48% cpu 0.450 total

time ./myProgramUnopt: 0.50s

user 0.01s system 87% cpu 0.574 total