CS250 HW #1

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

$00101111_2 = 47_{10}$ → hex → 0x2F

↓ complement +1

11010001_2 → hex → 0xD1

b) -13_{10} → 8 bits 2 complement integer rep in binary and hex

$00001101_2 = 13_{10}$

↓ complement +1

11110011_2 → hex → 0xF3

c) $+47.0_{10}$ → 32 bit IEEE float rep in binary and hex

$101111.0 = 47.0_{10}$

$1.01111 \cdot 2^5$ Exponent = $127+5 = 132_{10} = 10000100$

Sign | Exponent

0 | 1000 0100 | 0111 1000 0000 0000 0000 0000

0x423C0000

d) -0.375_{10} → 32 bit IEEE float rep in binary and hex

$0.011_2 = -0.375_{10}$

$1.1_2 \cdot 2^{-2}$ Exponent = $127-2 = 125 = 01111101$

1 | 0111 1101 | 1000 0000 0000 0000 0000 0000

0xBEC00000

e) String for 250! in hex

0x537472696E6720666F722032353021

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

1000 0000 0000 0000 0000 0000 0000 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 dereference of e_ptr.

1.2 < 7+4

so ~~returns~~ foo returns 11

11 > 10.5

main() 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

myProgramOpt is significantly faster than myProgramUnopt