Lab 4 conversion
Khadiza Akter → cse-17A → 48290

⊞ 0.125_{10} convent to both NASA and IEEE 754 format

$0.125_{10} \rightarrow 0.2_{16} \rightarrow 0.0010_2$

$.125 \times 16 = 2 \qquad \rightarrow 0.0010 \times 2^0$

Key Binary Nasa float: $\underline{0.1 \times 2^{-2}} \rightarrow$ 2's complement

```
  0000 0010
  1111 1101
       + 1
  ---------
  1111 1110
```

$\underbrace{0.1\,0000\,00}_{4 \quad 0} | \underbrace{00\,00\,0000}_{0 \quad 0} | \underbrace{00\,00\,0000}_{0 \quad 0} | \underbrace{1\,1\,1\,1\,1\,1\,1\,0}_{F \quad E}$

Exponent

[Now convent to IEEE 754]

$0.1 \times 2^{-2} = \underline{1.0 \times 2^{-3}} \rightarrow$ bias by 127

the exponent -3 becomes $127 - 3 = 124$

Exp

sign ↗

$\underbrace{0\,\,011\,1111\,0}_{3 \quad E}|\underbrace{0\,000\,0000}_{0 \quad 0}|\underbrace{00\,000\,000}_{0 \quad 0}|\underbrace{00\,000\,000}_{0 \quad 0}$

⊞ 0.3_{10} convent to both Nasa and IEEE 754 format

$0.3_{10} \rightarrow 0.4\underline{12}_{16} \rightarrow 0.4\underline{C}_{16} \rightarrow 0.0100\,1100_2 \nearrow$ 2's complement

$.3 \times 16 = 4.8$
$.8 \times 16 = 12.8$
$.8 \times 16 = 12.8$

Key binary NASA float: $\underline{0.1001100 \times 2^{-1}}$

```
  0000 0001
  1111 1110
       + 1
  ---------
  1111 1111
```
EXP

$\underbrace{0.1001100}_{4 \quad c}|\underbrace{11001100}_{c \quad c}|\underbrace{11001100}_{c \quad c}|\underbrace{11111111}_{F \quad F}$

[NOW convent to IEEE 754]

$0.100\,1100 \times 2^{-1} = \underline{1.001100 \times 2^{-2}} \rightarrow$ bias by 127, exponent becomes $(127-2) = 125$

sign   Exp
↗

$\underbrace{0\,\,011\,1111\,0}_{3 \quad E}|\underbrace{1.0011001}_{9 \quad 9}|\underbrace{10011001}_{9 \quad 9}|\underbrace{10011001}_{9 \quad 9}.$

↑
A (rounding up)

$3 \quad E \qquad 9 \quad 9 \qquad 9 \quad 9 \qquad 9 \quad A$ (rounding up)

Final result:

Base 10	NASA Hex format	IEEE 754 Hex format
.125	40 00 00 FE	3E 00 00 00
.3	4C CC CC FF	3E 99 99 9A