Phillip Mai Essay Quiz

$63/64 = 0.984375$

① 5.75

5] 2 r 1
2] 1 r 0
1] 0 r 1

→ 101.11

$0.75 \times 2 = 1.5 \rightarrow 0.5 \times 2 = 1.0$

$0.984375 \times 2 = 1.96875$
$0.96875 \times 2 = 1.9375$
$0.9375 \times 2 = 1.875$
$0.875 \times 2 = 1.75$
$0.75 \times 2 = 1.5$
$0.5 \times 2 = 1.0$

$\approx$ 0.111111

9.8125

9] 4 r 1
4] 2 r 0
2] 1 r 0
1] 0 r 1

→ 1001.1101

$0.8125 \times 2 = 1.625 \rightarrow .625 \times 2 = 1.25 \rightarrow 0.25 \times 2 = 0.5 \times 2 = 1.0$

② 34.890625

34] 17 r 0
17] 8 r 1
8] 4 r 0
4] 2 r 0
2] 1 r 0
1] 0 r 1

→ 00100010.11100 1 → $1.0001011100 1 \times 2^5$ → $127 + 5 = 132$
$= 10000100$

sign exp mant

= 0 10000100 00010111001 0000 0000 0000

$0.890625 \times 2 = 1.78125 \rightarrow 0.78125 \times 2 = 1.5625 \rightarrow 0.5625 \times 2 = 1.125 \rightarrow .125 \times 2 = 0.25 \rightarrow 0.5 \rightarrow 1.0$

③

| sign | exp | mant. |
|---|---|---|
| 0 | 01111011 | 000—0 |

$01111011 = 2^6 + 2^5 + 2^4 + 2^3 + 2^1 + 2^0 = 123 - 127 = -4$

$1.0 = 2^{-4} =$ 0.0625

(4) The denormalized numbers in floating point respresentation is a value that have a significand with a leading digit of zero. Basically, if a number bias is $2^{126}$ to $2^{-146}$ it denormalized and normalized if it $2^{-126}$ to $2^{127}$.

To convert decimal to binary we use denormalized for bigger numbers and normalized for smaller numbers