How to convert a decimal value into the binary format using the IEEE floating point arithmetic standard:

Example. Convert the number 27.56640625 into the binary floating point format.

(step 1) Convert the integer portion (i.e. 27) into binary.

```
2|27
2|13 — 1   (i.e.  27 = 2·13 + 1)
2|6  — 1   (etc.)
2|3  — 0
  1  — 1
```

Thus, $27 = 1 + 2^1 + 2^3 + 2^4 = 11011$

(step 2) Convert the decimal portion (i.e. 0.56640625) into binary

```
  0.56640625
×          2
 (1).13281250
×          2
  0.26562500
×          2
  0.531250
×          2
 (1).06250
×          2
  0.1250
×          2
  0.250
×          2
  0.50
×          2
 (1)0
```

(step 3) Combine integer & decimal portions of steps 1 and 2.

Therefore,

27.56640625

$= 11011.10010001$ (base 2)

$= 1.101110010001 \times 2^4$ (normalize)

(step 4) Apply the formula

$(-1)^s \, 2^{(c-1023)} (1+f)$

$s = 0$, $c = 1023 + 4 = 1027 = 10000000011$ (base 2)

$f = 101110010001$

Thus, $0.56640625 = 1\cdot\frac{1}{2} + 0\cdot(\frac{1}{2})^2 + 0\cdot(\frac{1}{2})^3 + 1\cdot(\frac{1}{2})^4 + 0\cdot(\frac{1}{2})^5 + 0\cdot(\frac{1}{2})^6 + 0\cdot(\frac{1}{2})^7 + 1\cdot(\frac{1}{2})^8 = 0.10010001$ (base-2)

Answer: 0 10000000011 101110010001 (40 zeros followed)