CPSC 250 - Big Program Step 5

$$1.\overbrace{001101011101}^{\text{mantissa}} \times 2^{\overbrace{7}^{\text{exponent}}}$$

Two Cases:

(i) Positive Exponents.

$$\overbrace{\underset{\uparrow}{1}0011010}^{\text{front\_bin}}.\overbrace{11101}^{\text{back\_bin}}$$

This will always be a 1 !!

$$\text{exponent} = \underbrace{\text{len(front\_bin)}}_{8} - 1$$

$$= 7 \checkmark$$

$$\text{mantissa} = \underset{\text{"0011010"}}{\text{front bin[1:]}} + \underset{\text{"11101"}}{\text{back\_bin}}$$

$$= \text{"001101011101"}$$

mantissa_truncated =

mantissa[0:23]

(ii) Negative Exponents

$$0.\overbrace{001011011101}^{\text{back\_bin}}$$

↑ this will always be zero!

need to search back_bin to find the first "1".

```
exponent = ∅
keep-going = True
while keep-going:
    if back_bin[-exponent] == "1"
        keep-going = False
        exponent = exponent + 1
    exponent = exponent - 1
exponent = exponent - 1

mantissa_truncated = back_bin[-exponent:]
```

back_bin = " $001\underbrace{0110111101}_{}$ "

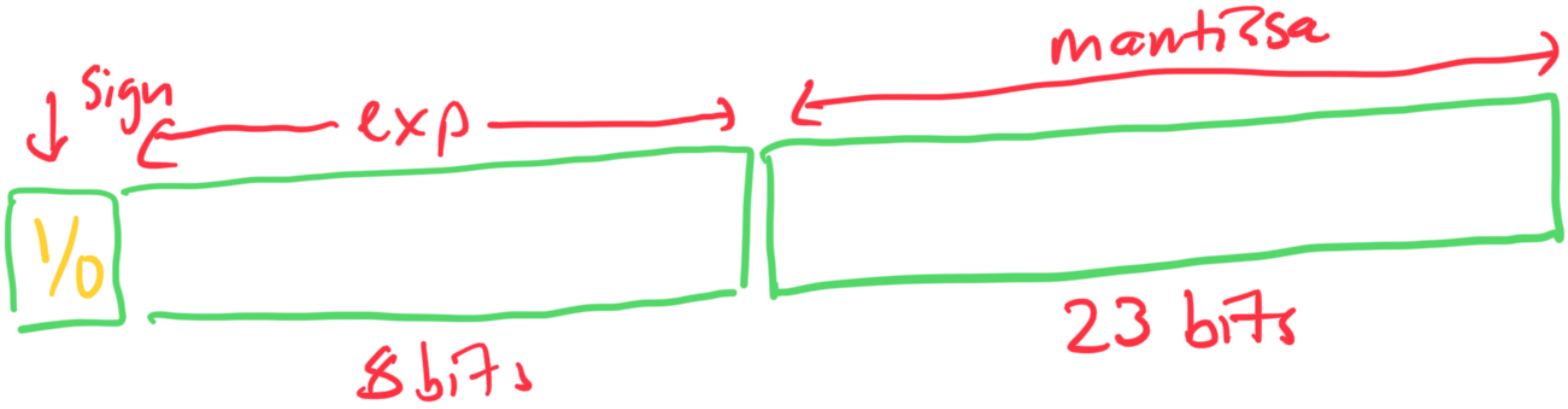
exponent	keep_going	Loop It.
0	True	1 back_bin [0] = "0"
-1	True	2 back_bin [1] = "0"
-2 ↓ -1 ↓ -2 → -3	True ↓ False	3 back_bin [2] = "1"

Loop ends

exponent = -3 , mantissa_truncated = 0110111101

Step 6 : Convert to 32-bit floating point rep.

```
(i)   if   int (front) < 0 :
             bit1 = "1"
      else :
             bit1 = "Ø"
```



```
(ii)  exp = int (exponent) + 127

      exp-binary-rep = convert-int-to-binary (exp)

      if len (exp_binary_rep) < 8 :
             exp-binary-rep = "Ø" + exp-binary-rep


(iii) if   len (mantissa_truncated) < 23 :
```

```
mantissa_truncated = mantissa_truncated
        + (23 - len(mantissa_truncated))
            * "0"
```

pad → with zeroes

```
if len(mantissa_truncated) > 23:
    mantissa_truncated =
        mantissa_truncated[0:23]
```