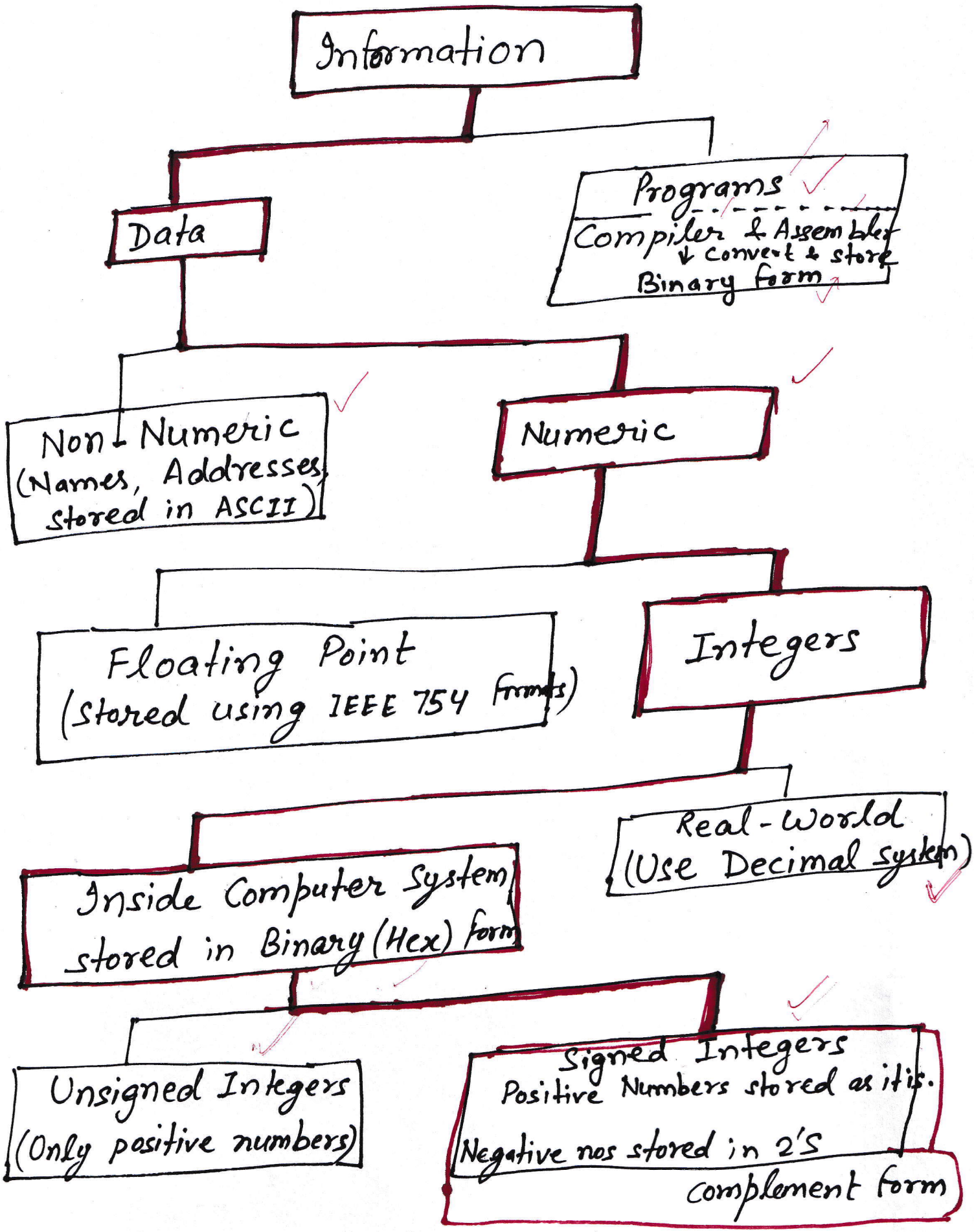
→ Information stored in memory can be :



Number Representation

Unsigned Numbers

decimal equivalent

Decimal $(25)_{10} = 10^1 \times 2 + 10^0 \times 5 = 25$

Binary $(1011)_2 = \underset{8}{2^3} \times 1 + \underset{0}{2^2} \times 0 + \underset{2}{2^1} \times 1 + \underset{1}{2^0} \times 1 = 11$

octal $(161)_8 = \underset{64}{8^2} \times 1 + \underset{48}{8^1} \times 6 + \underset{1}{8^0} \times 1 = 113$

hexadecimal $(AC)_{16} = 16^1 \times A + 16^0 \times C = \underset{160}{16^1 \times A} + \underset{12}{16^0 \times C} = 172$

ternary $(1022)_3 \longrightarrow ?$ $\underset{9}{3^3} \times 1 + \underset{0}{3^2} \times 0 + \underset{6}{3^1} \times 2 + \underset{2}{3^0} \times 2 = 35$

Base-5 $(413)_5 \longrightarrow ?$ 27

⋮

Base-r $(x_{k-1} \ldots x_2 x_1 x_0)_r =$

$$r^{k-1} * x_{k-1} + r^{k-2} * x_{k-2} + \ldots + r^2 * x_2 + r^1 * x_1 + r^0 * x_0$$

(Binary, octal, hexadecimal) conversion to (Decimal)

r.

$$(x_{k-1}\, x_{k-2} \ldots x_2\, x_1\, x_0)_r =$$

$$r^{k-1} * x_{k-1} + r^{k-2} * x_{k-2} + \ldots + r^2 * x_2 + r^1 * x_1 + r^0 * x_0$$

(Decimal to Binary/octal/hexadecimal Conversion)

① D to B $(11)_{10} = (1011)_2$

2	11	1 ↑
2	5	1
2	2	0
2	1	1

② D to O $(113)_{10} = (161)_8$

8	113	1
8	14	6 ↑
8	1	1

③ D to H $(172)_{10} = (AC)_{16}$

16	172	12
16	10	10 ↑

Binary to octal:

$(01100011)_2$

128 64 32 16 8 4 2 1

3 0 3

$(303)_8$

64 8 1

Decimal → $128+64+2+1 = 195$ ✓

Decimal → $64*3 + 1*3 = 195$ ✓

Binary to Hexadecimal:

$(0100\,1110\,0101)_2$

4 E 5

$(4E5)_{16}$

Verify it

octal to Binary:

$(303)_8$

$(011\,000\,011)_2$ ✓

Hexadecimal to Binary:

$(4E5)_{16}$ (?)10

$(0100\,1110\,0101)_2$ (?)10

4 E 5

octal to hexadecimal hexadecimal to octal	Do it yourself !