# 25: Software veiw on Hardware

a) i) Fractions are represented much like whole numbers, except they are $\frac{1}{2^n}$ rather than 2^n like whole numbers.
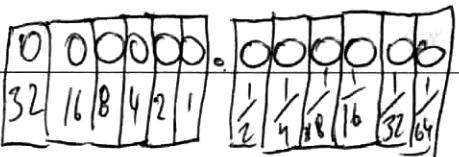
0	0	0	0	0	0	.	0	0	0	0	0	0

128 64 32 16 8 4 2 1 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$ $\frac{1}{32}$ $\frac{1}{64}$

To change to a precision floating point, move decimal to front, and then make the binary $\times 10^{-x}$ where x is the amount of shifts to the left the decimal made

$$1.00100 \times 10^{-3}$$

$$127 + 3 = 130 = 10000011$$

Sign = 0 for Pos, 1 for Neg:

additional O's.

0 10000011 00100 0000000..... to make 32 bits.

ii) $45_{10} \longrightarrow$ Binary 00101101_2

Bin to Hex = 2   D

0010	1101

$\therefore 45_{10} = 2D_{16}$

iii)   1110 – 0111   Ones comp -> 1000

Twos comp   1 +
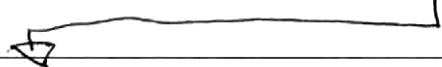
1001

1110 +
1001
_____

[1]0111
↳ overflow

1110 – 0111 =   Answ: | 0111 |

b) i) The function of a flip-flap is to store data so it can be accessed when called upon by the program. It does this by converting the data into binary and switching the value so it is constantly traveling through the circuit until called upon. | OR |

AND

ii)

A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

(Start)

/ Input A + B /

Does A = B

YES

NO

Does A=1

C = 0

C = 1

C = 1

YES

(STOP)

c) [Employee

↓ scans Finger

Door
Opened ← Verified → Central Computer
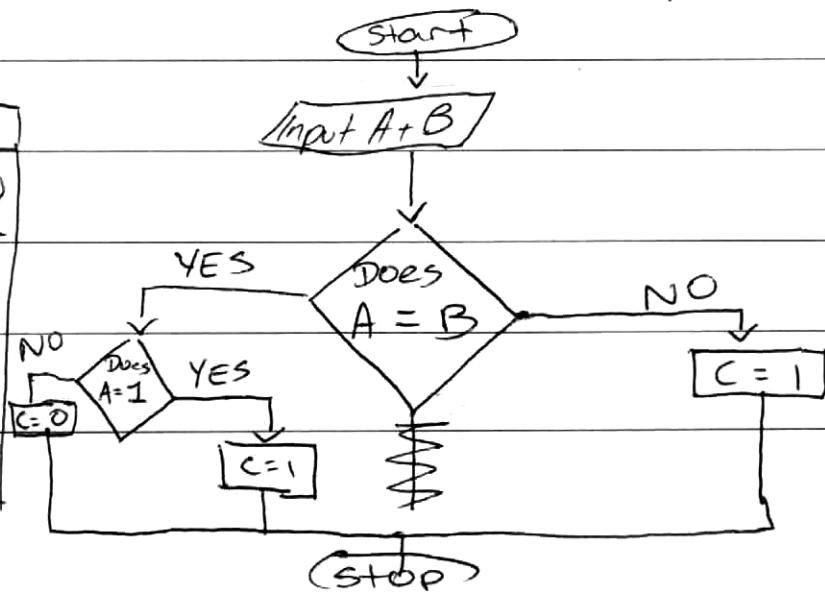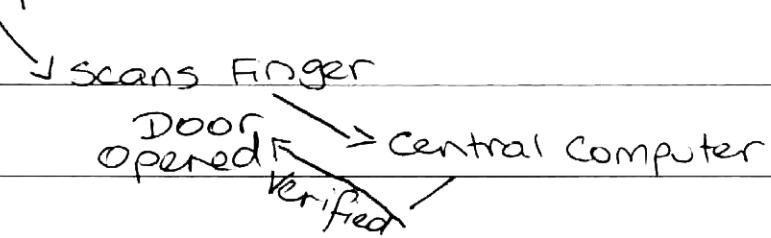
Both data streams, the one from scanner to computer and computer to door would have very similar headers and trailers, primarily indicating location, size etc. of course, the general size of the scanner to computer data stream would be significantly larger, as it has variable options. The computer to door stream on the other hand, would be a boolean data character, either true (1) or false (0). therefore, the size would be quite different.

Even though these sizes are different,

the data in the headers and trailers would be of similar size, as those contain information about the data characters.

Both of the trailers would be the same, as they indicate the end of a transmission.

the data characters of the scanner to computer would be quite complex, and may take several packets, whereas the computer to door will take only one packet, with only one or two bits.