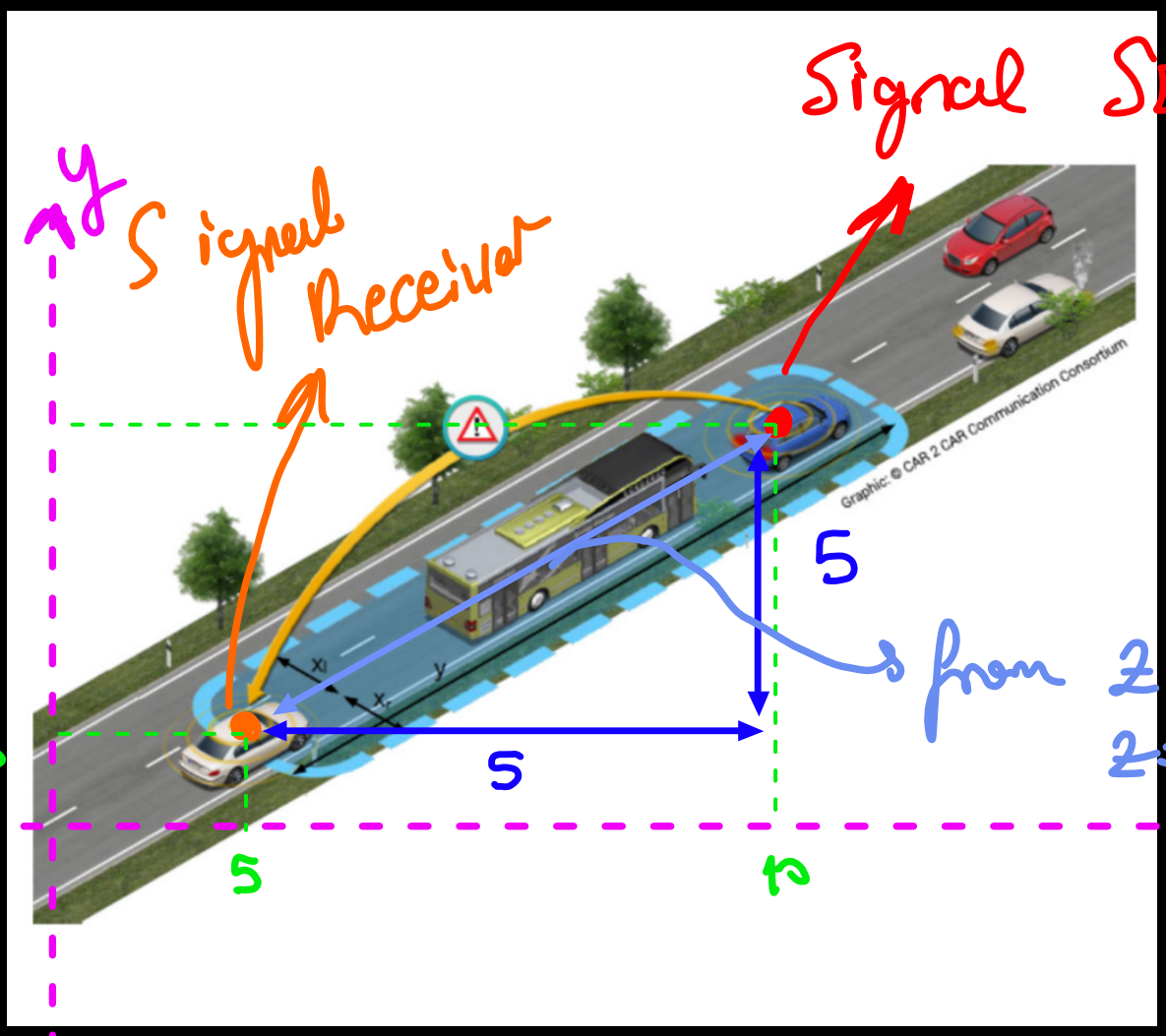
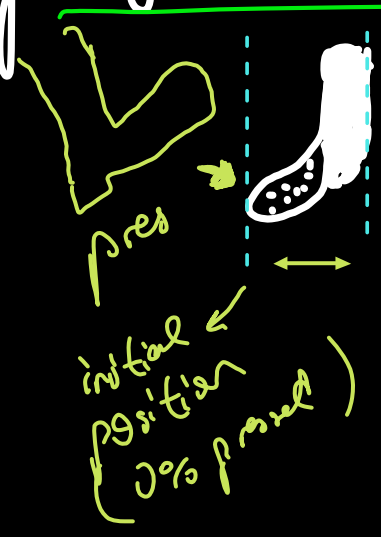


Emergency Situations



- if Brake Pedal has been pressed 100%

EMERGENCY WILL BE SENSED

- $\vec{x}$: position, $\vec{v}$: velocity, $\vec{a}$: acceleration

$$\vec{x} \cdot \frac{d}{dt} = \vec{v} \; ; \; \vec{v} \cdot \frac{d}{dt} = \vec{a}$$

$$\int a \cdot dt = \vec{v} \; ; \; \int \vec{v} \cdot dt = x$$

eq. 1

in every 200ms [5Hz] Brake position sensor reads its position and save it on circular buffer. The relation between Deceleration and Brake Pos. is;

↳ Range => 0 - 10 m/s^2 ↳ Range => 0 - 100%

=> Deceleration = Brake Position / 10

from eq. 1 we can obtain Velocity and its position. Therefore;

if the Deceleration Rate of Change is positive (increasing)

$$\frac{(\text{Current Decel} - \text{Last Decel})}{\Delta t \rightsquigarrow [200ms]} \Rightarrow \text{Rate of Change}$$

and

if Velocity Rate of Change is Negative (Decreasing)

and

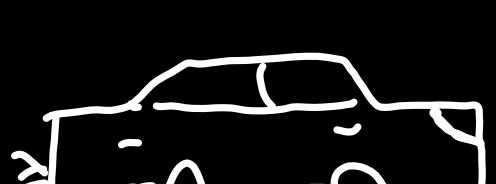
if Brake Position Rate of Change is Positive (increasing)

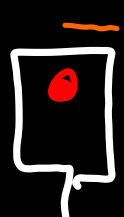
then

if (Pedal Position ≥ 70)

→ EMERGENCY WILL BE SENDED

Reason Why I put the Limit?





Red Light!

Assume the car is slowing down but there is no EEBL case because everyone can see the light and without Brake Position Limit at first case because of the Velocity ↓ Deceleration ↑ Brake Position ↑ ! without Pedal Limiter WARNING message may sended and this is an informed signal. Hence, there is no emergency case. So, purpose is increasing system reliability.

Work Flow

Read Sensor 5 Hz → (in real life it's much more vigilant.)

↓

identify EEBL Case → MAX EMERG. / NO EMERG. / EMERGENCY

↓

copy current specifications to
(speed, deceleration, position, ect)

u8 buffer

↓

send data over Network

All of the car have this system
so we should implement system
to both case

Listen EEBL EVENT OVER NETWORK

Have EEBL

NO EEBL

info to the DRIVER

Read Sensor (Brake Action)

NO EEBL

process other events

EEBL EVENT

COPY DATAS

SEND OVER NETWORK