6.1: Identify if an absolute or interval timer would be needed for:

a) Alarm monitoring - Absolute. Need to know when a break-in occurred

b) Climate Control system - Absolute. Need to be able to set different controls for times of day, weekends, holidays, etc.

c) Elevator doors - Interval. Only needs to know how long the door has been open for during the current instance.

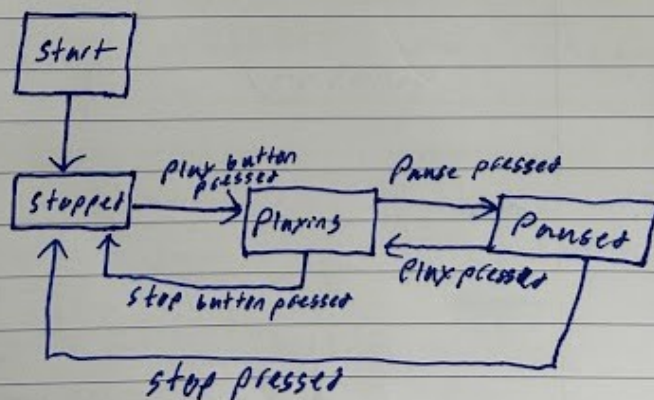6.2: Resolution & max interval for a 16 bit counter & a 1MHz clock

$$Res = \frac{1}{F} = \frac{1}{10^6} = 1 \mu s$$

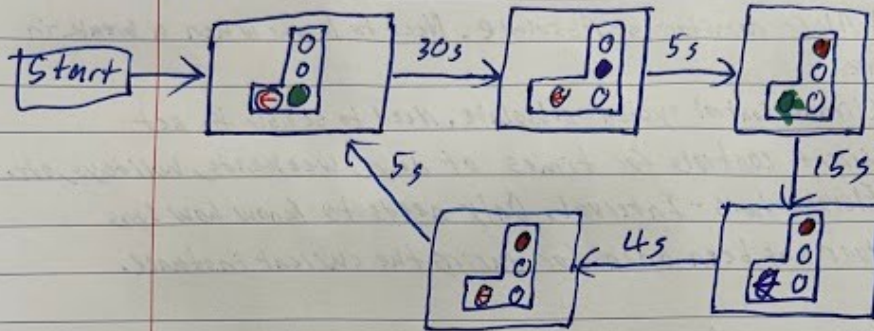$$max\ interval = max\ count \cdot Res = (2^{16}-1)(10^{-6}) = 65.535\ ms$$

6.6: Events that could occur during garage door operation.
- Button pressed
- upper limit reached
- lower limit reached
- blockage detected

6.4:

☐ = yellow

6.12:

Start → [traffic light] —30s→ [traffic light] —5s→ [traffic light]

—15s→

[traffic light] ←4s— [traffic light]

←5s

6.13:

Start → [gate is down] —button→ [gate moves upward] —Upper limit hit→ [gate is open]

[gate is down] —card swipe→ [gate moves upward]

[gate is open] —time elapsed→ [gate moves down]

[gate is open] —Vehicle Clear→ [gate moves down]

[gate moves down] —proximity sensor tripped→ [gate moves upward]

[gate moves down] —lower limit hit→ [gate is down]