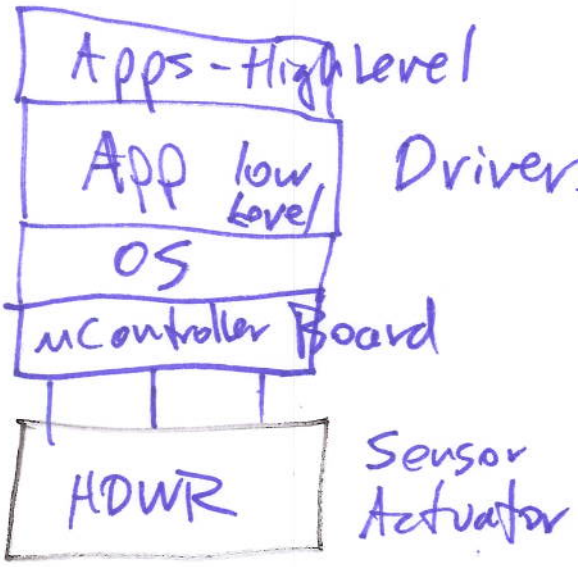
LECTURE- 18

ECGR 4101
5101

State machines



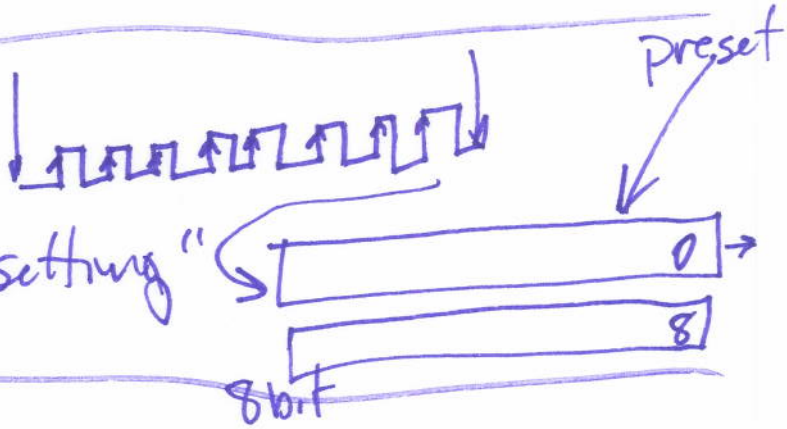
App of the day

Sanitary Device

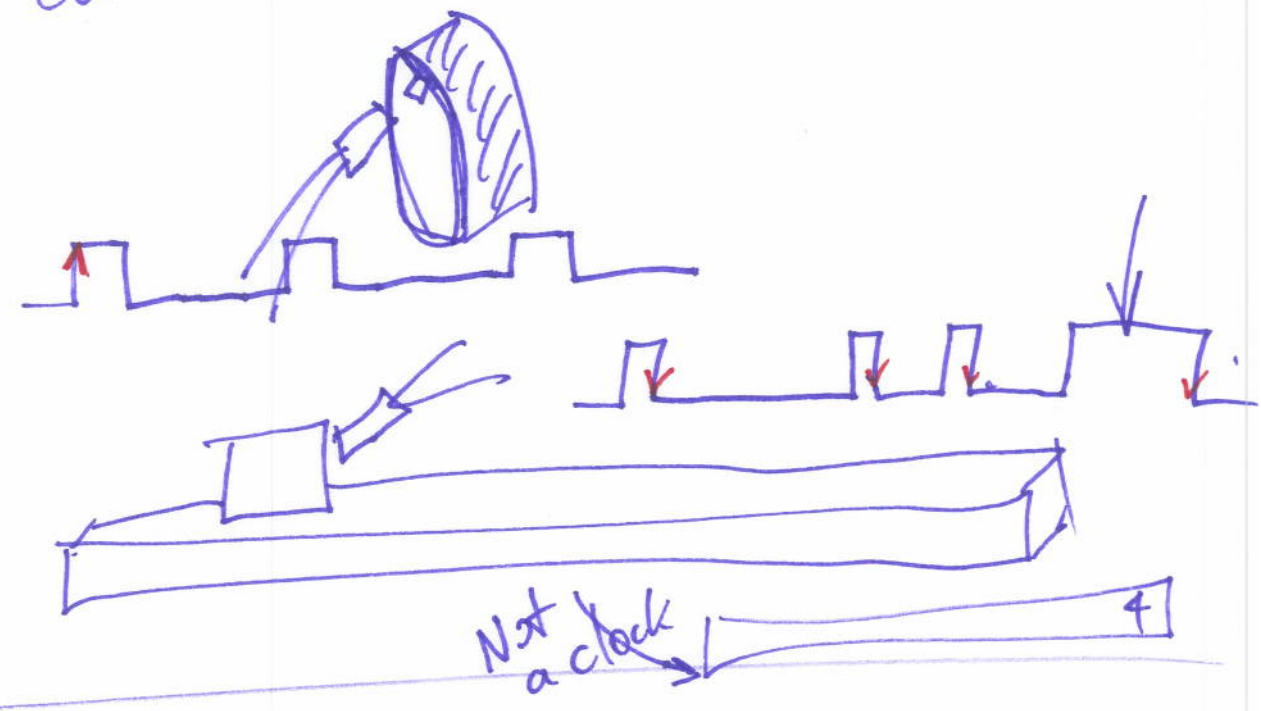
ECGR4101/5101 - LECTURE 18

CDMA cell phone communications
1.024 seconds → phone listens for a "page" from base station

Timer needs:
clock
Counter/"alarm clock setting"



Event counter:



ECGR 4101/5101 – LECTURE 18

24 MHz clock PCLK

/8192

New Frequency? $\frac{24000000\ Hz}{8192} = 2929.6875\ Hz$

.0003413 seconds

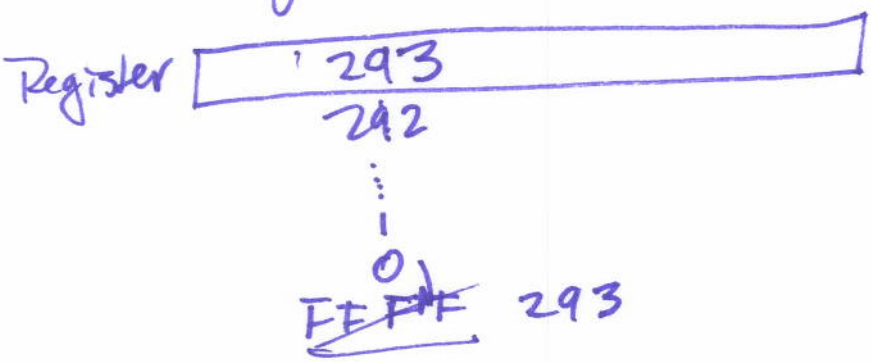
---

100 ms = how many "ticks"

$\frac{.100\ seconds}{.0003413\ seconds} = 292.96875$

$\frac{293*}{2929.6875} = .1000106\overline{}$

Running at PCLK/8192 →
Count out 293 "ticks" to
equal 0.100 seconds



count down

How big is register?

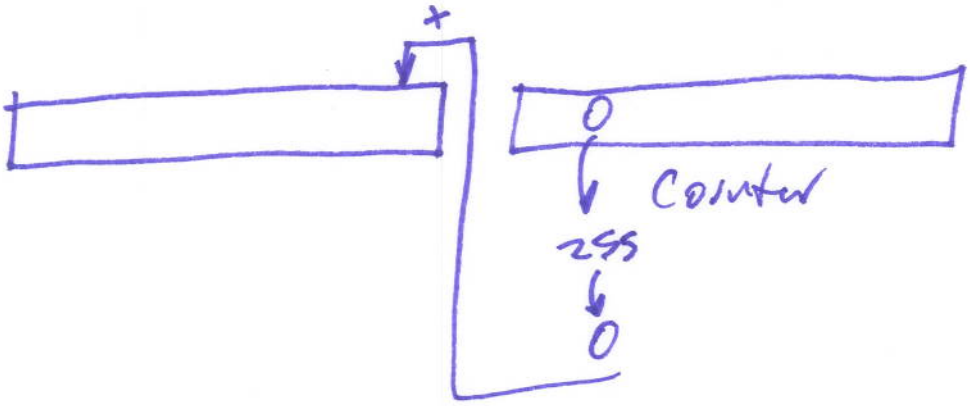
Need a bits

use 2 – eight bit regs

ECGR 4101/5101 LECTURE 18

Timers

8 bits (4 available)
16 bits (2 available)



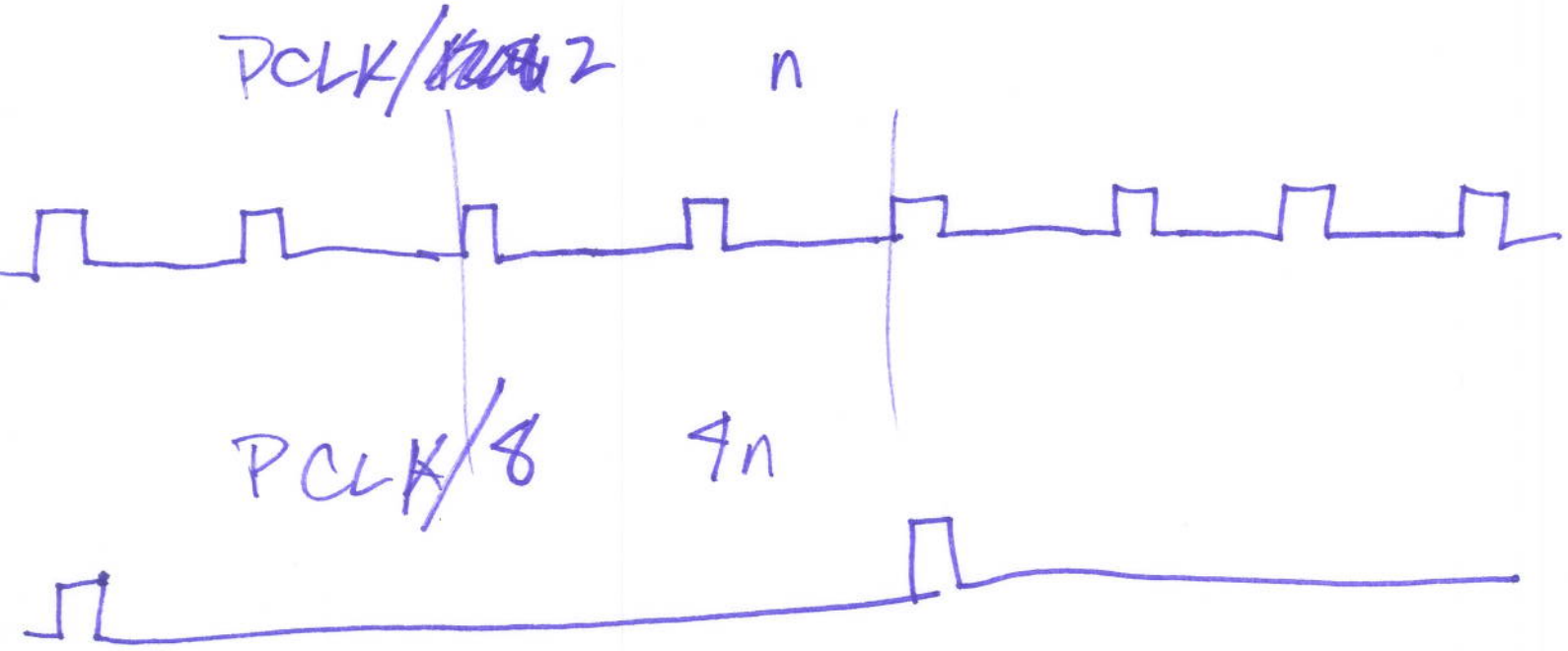
ECGR 4101/5101 — LECTURE 18

Work →

I want 1ms →

PCLK?

Value in 16-bit register



$$\frac{1}{24\,MHz_{PCLK}} * \frac{n\ (clock\ DIV)}{1} * \frac{m\ (counts)}{1} = .001$$

$$mn = 0.001\,sec * 24\,MHz$$

$$= 24000.000$$

n	m
1	24000
2	12000
4	3000
8	750
32	375 ←
64	

(6)

$$\text{Period} = \frac{1}{f}$$

$$f = \frac{1}{\text{Period}} = \frac{1}{0.002 \text{ seconds}} = 500 \text{ Hz}$$

PCLK = PCLK/8

```
TMR0.TCORA =0x55; //Freq
TMR0.TCORB= 0x20; //Duty Cycle
```

n = 8

TCORA = 0x55 = 85_{10} m

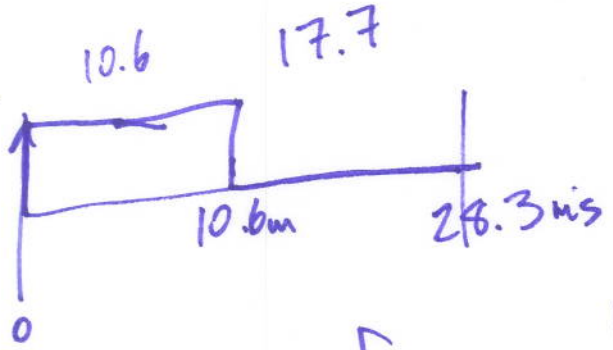
TCORB = 0x20 = 32_{10} m

$m \cdot n = 24000$

$m = 3000$

$\frac{85}{3000} = 28.3\text{ms}$

$\frac{32}{3000} = 10.6\text{ms}$



37.4% duty Cycle

$\text{freq} = \frac{1}{28.3\text{ ms}} = 35.3 \text{ Hz}$