10: Watchdog timers

Project matching form is out!

Instructions on Ed

You will get your groups by Monday

What are some reasons (software bugs or external causes) that embedded software might hang?

Watchdog timers

Special timer peripheral that counts down to 0 on a clock that can't be powered off

Can be reset by writing a value to a special register ("petting" the watchdog)

If reaches 0, resets (or shuts down) entire system

Idea is to detect system hang

Petting the watchdog

Rules for watchdog timers

When to pet - before it reaches 0

- Have an estimate for how long your execution takes
- Make sure it can catch any task failure

How to pet - complex enough so that it’s not an accident

Anti-patterns for watchdogs

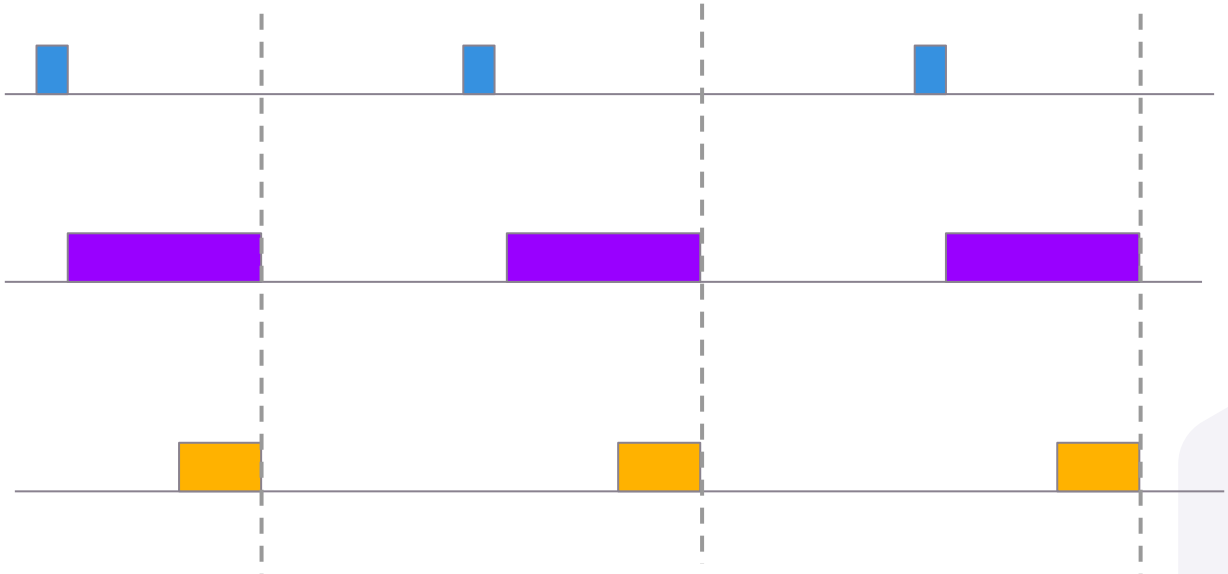
Petting in too many places

Using a timer to pet the watchdog

Turning the watchdog off in software

A preview: periodic tasks

n tasks each with a given period and worst case execution time (for now assume same period)



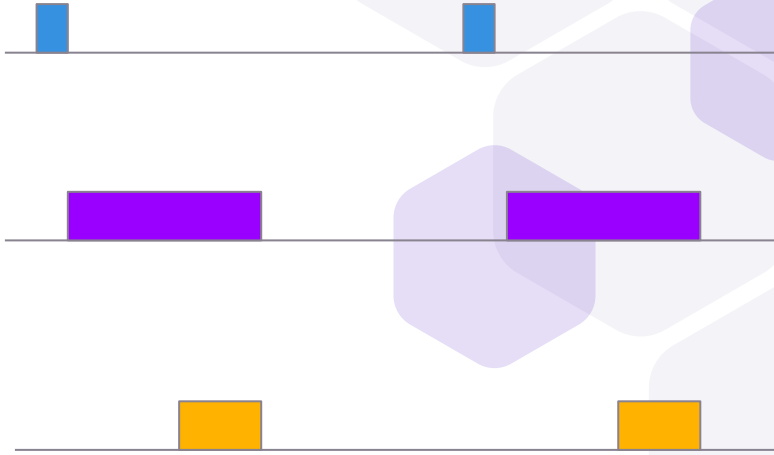
(read and store sensor)

(do complex computation on last sensor reading)

(log output to server)

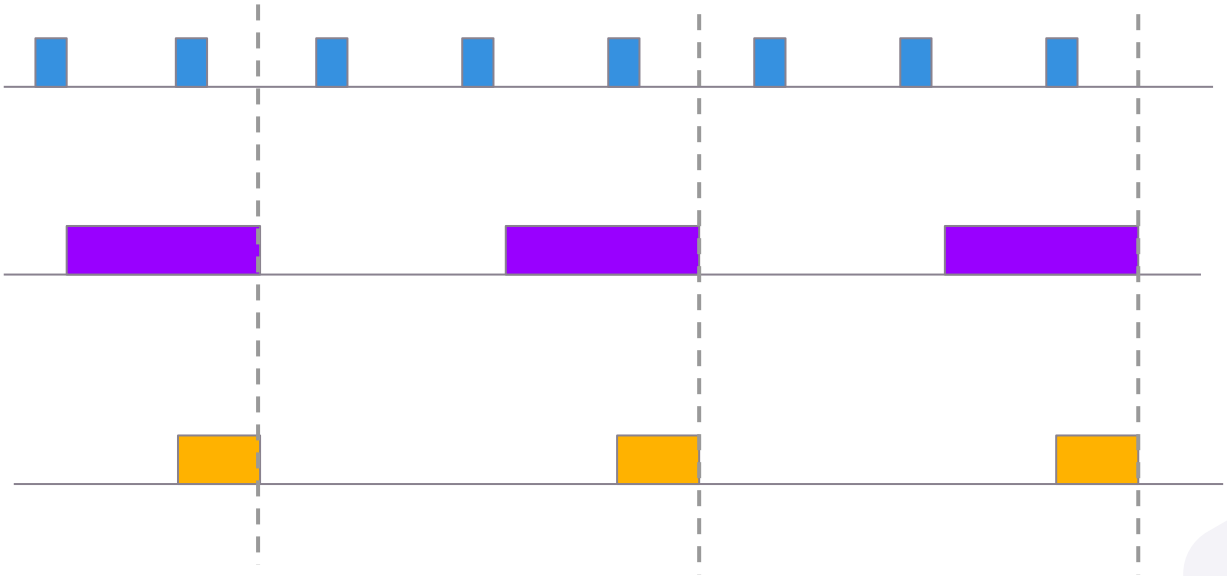
What's the problem with this?

```
blueTask {
    … do stuff; …
    pet_watchdog; }
purpleTask {
    … do stuff; …
    pet_watchdog; }
goldTask {
    … do stuff; …
    pet_watchdog; }
```



How would you pet the watchdog for a multitasked system?

Challenge mode 1



Challenge mode 2