5. Event and Trigger

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Outline

Based on

"Software Engineering for Embedded Systems. . .", R Oshana and M Kraeling, 2013

Real-time Systems

- real world - communicate, react
- real time - at the right time

- synchronize with event
- use trigger to work something at a given time

ISR (Interrupt Service Routine)

heavily loaded ISR can increase the interrupt latency time unless nested interrupts are allowed

- Non-nested Interrupt: during performing ISR, another interrupt must wait
- Neted Interrupt : priority based waiting

1. light weight ISR
2. only the work that cannot be deferred

Event System

1. handle quickly what cannot be deferred
   - ISR sets an event flag (light weight)
2. deferring what can wait
   - event hander process asynchronously (heavy work)

Reetntrancy

Mutual Exclusive Access to the flags

1. Disable/Enable Interrupts
   - simple, but does not preserve interrupt state
2. EnterCritical / ExitCritical
   - register saving macros, preserve the state of the interrupt
3. SemaphoreTake / SemaphoreGive
   - OS, might not be unavailable

Trigger

- a time-triggered fashion
- a hardware functionality
- Tick timer
  - a time base : tick counter
  - compare current tick counter value with a predefined value