Chapter 6

PROGRAMMING THE TIMERS

Lesson 4

Interrupt Service Intervals and Densities

Interrupt Service Latency

Case 1: Assumption No higher priority interrupt pending than present

2. Longest instruction execution period, T_{inst}

3. Wait for interrupt enabling, T_{enwait}

4. Ending Period,T_{end}, time taken in reassigning priorities, enabling and retrieving stack (context)

5. $T_{initial}$, Initial actions time, for disabling interrupt, and saving context

$$T_L \text{ latency period} = T_{inst} + T_{enwait} + \mathbf{T_{end}} + \mathbf{T_{initial}}$$

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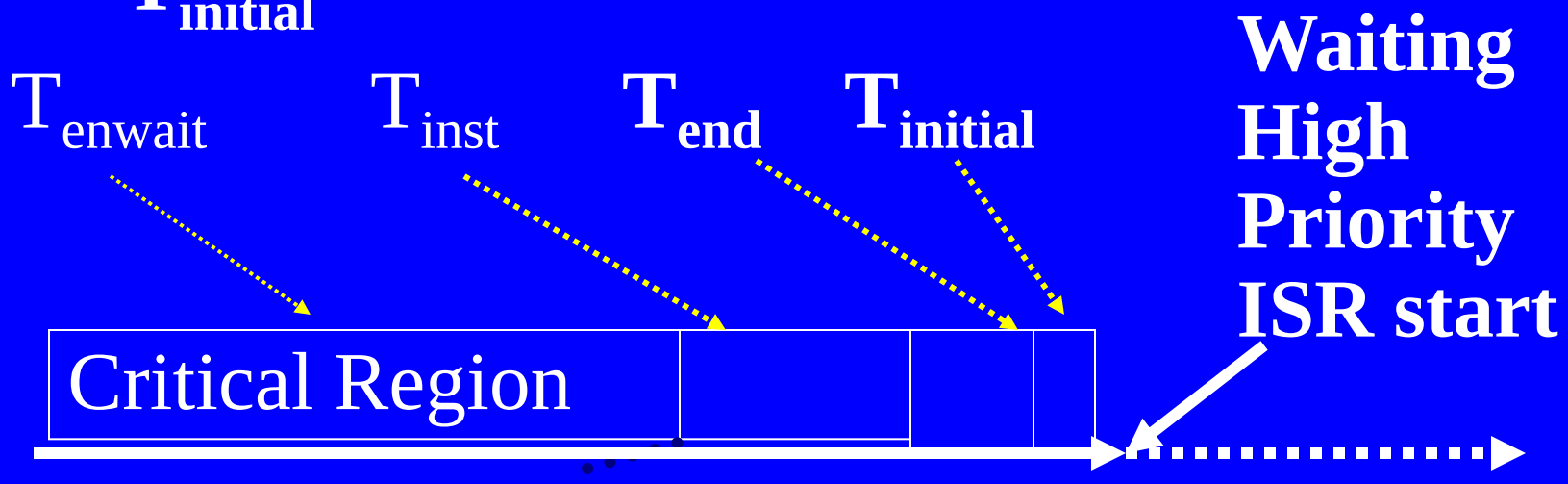


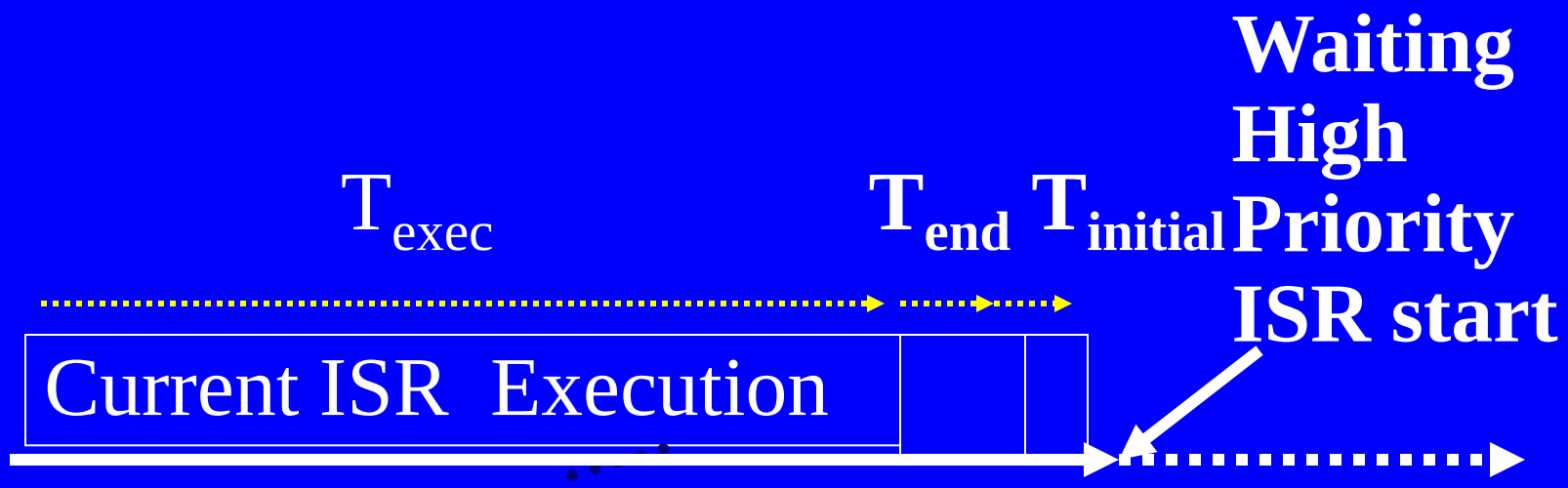
Case 2: Assumption higher priority than present interrupt pending

- Worst case T_L latency period = $T_{inst} + T_{enwait} + T_{end} + T_{initial} + T_H$;
- T_H = High priority ISR execution time

Interrupt Service Interval

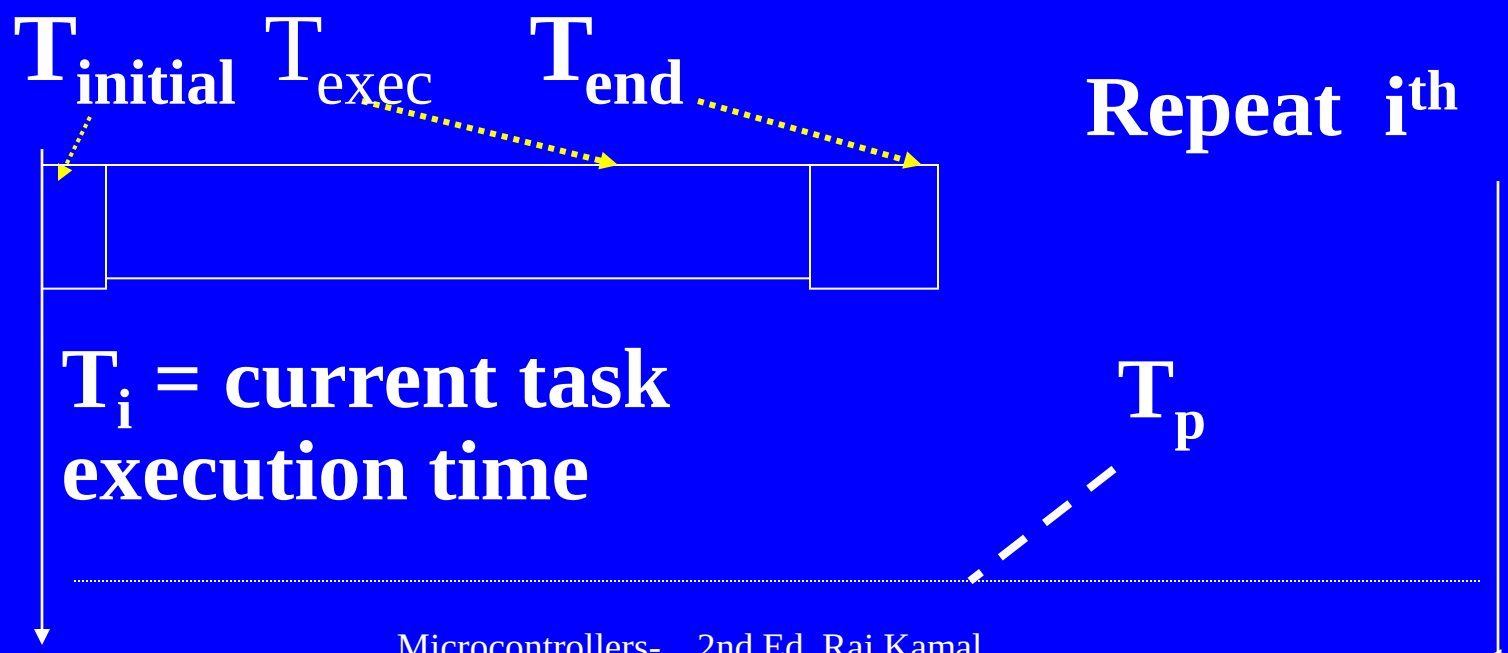
Case when Current ISR must finish and higher priority interrupt pending

T_L latency period = T_{inst} + $\mathbf{T_{end}}$ + $\mathbf{T_{initial}}$



Interrupt density and constraint

T_i/T_p =Fraction of time by CPU spent for specific ISR service with respect to period of re-occurrence of the service



Interrupt density = sum of T_i/T_p for all ISRs

Interrupt Constraints

Interrupt density < 1

Summary

We learnt

- Interrupt Service Interval
- Latency
- Worst Case Latency for an Interrupt Service
- Interrupt density
- Interrupt constraint