Embedded Software Engineering

3 Unit Course, Winter 2009

CS Department, Univ. of Salzburg

RT Scheduling

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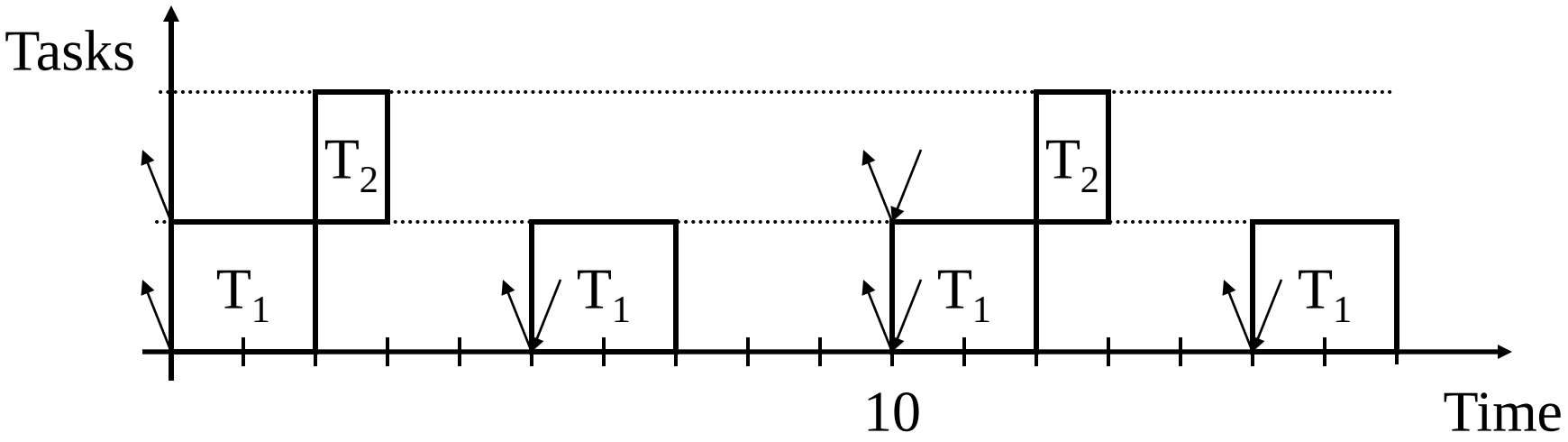
www.cs.uni-salzburg.at/~ck/teaching/ESE-Winter-2009

RMA Example

	T_1	T_2
C_i	2	1
p_i	5	10



Assume, then Guarantee for RMA

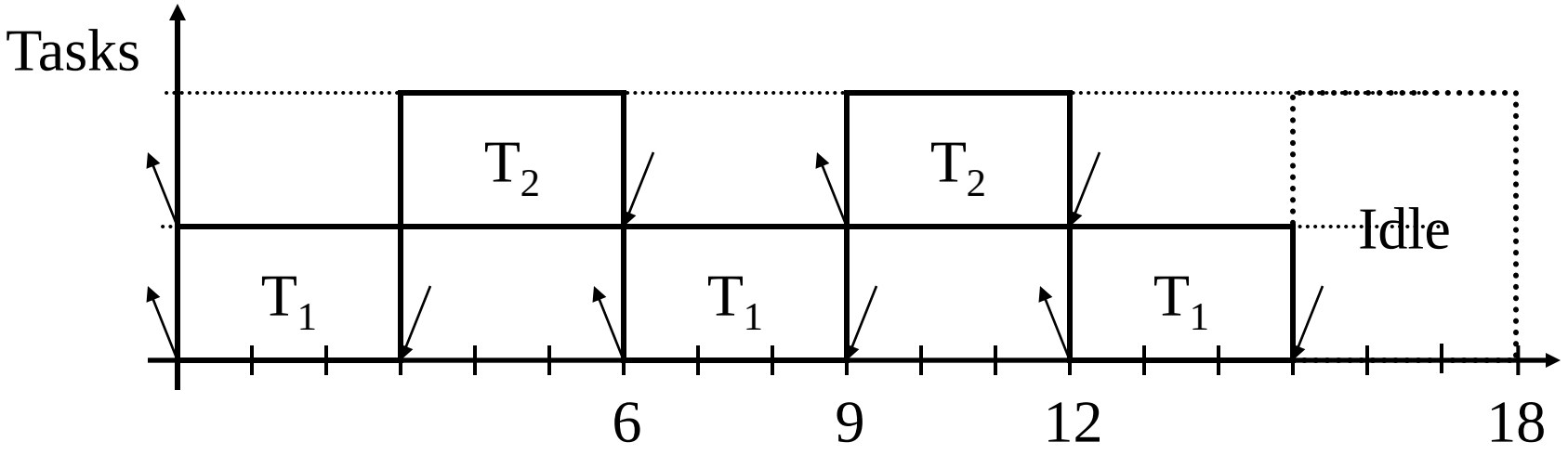
- *Resource* assumptions:
  - single processor
  - no administrative overhead
- *Task* assumptions:
  - *preemptive*
  - *independent*, i.e., no *precedence* constraints
  - *periodic*
  - WCET(T_i) = C_i given
  - deadlines equal to periods
- *Optimality* guarantee:
  - RMA is optimal wrt. *fixed-priority* feasibility

Utilization-Based Schedulability Tests

- EDF:
  - $\sum_{i=1}^{n} C_i / P_i \leq 1$
  - exact, but cannot be extended to more complex task models
- RMA:
  - $\sum_{i=1}^{n} C_i / P_i < n * (2^{1/n} - 1)$
  - sufficient but not necessary (for non-harmonic task sets)

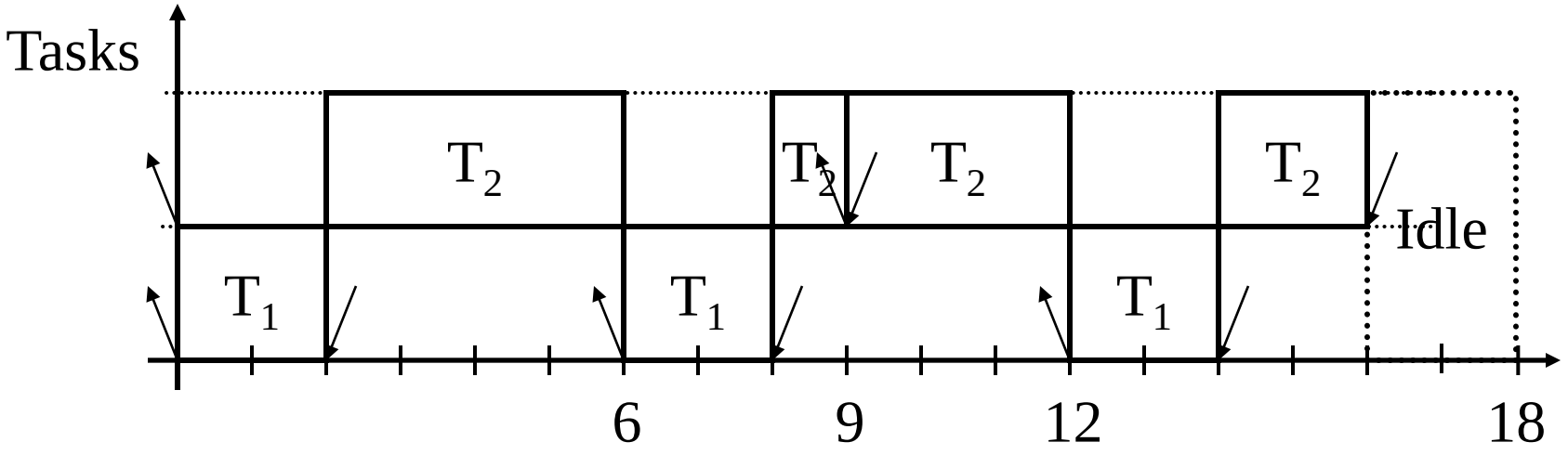
RMA: 84% Utilization (Test: < 82.8%)

	T_1	T_2
C_i	3	3
p_i	6	9



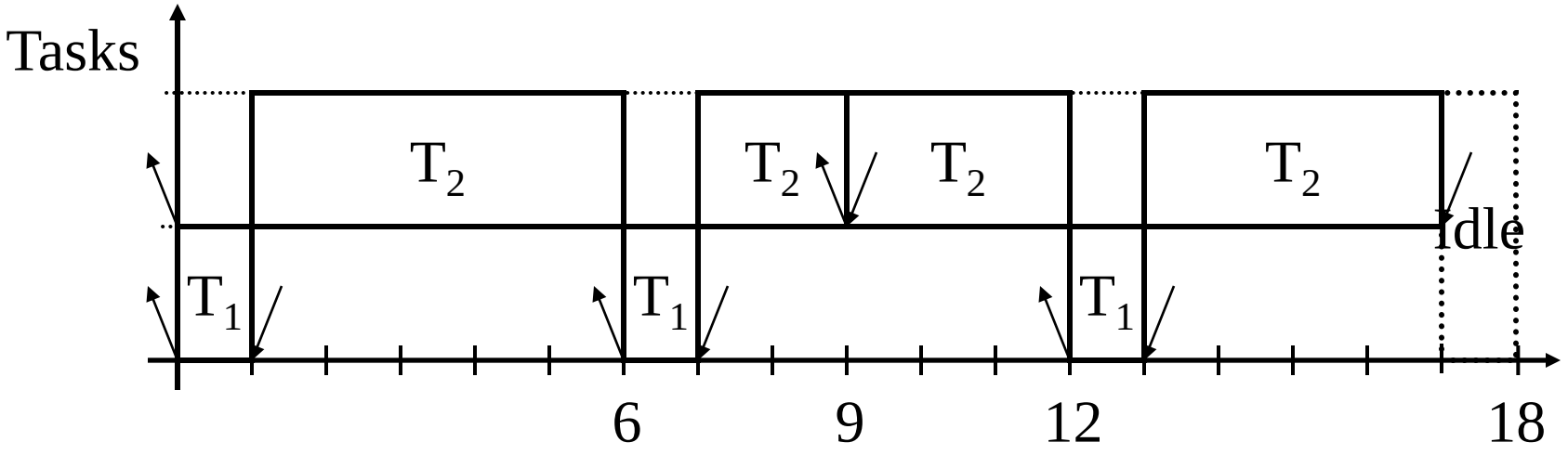
RMA: 89% Utilization

	T_1	T_2
C_i	2	5
p_i	6	9



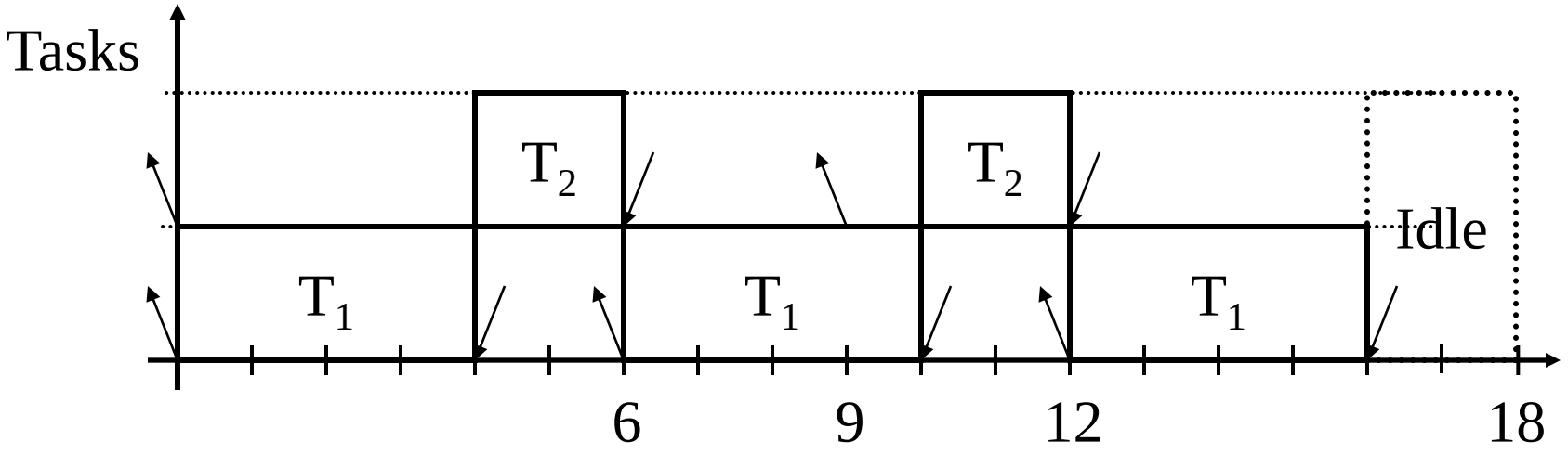
RMA: 95% Utilization

	T_1	T_2
C_i	1	7
p_i	6	9



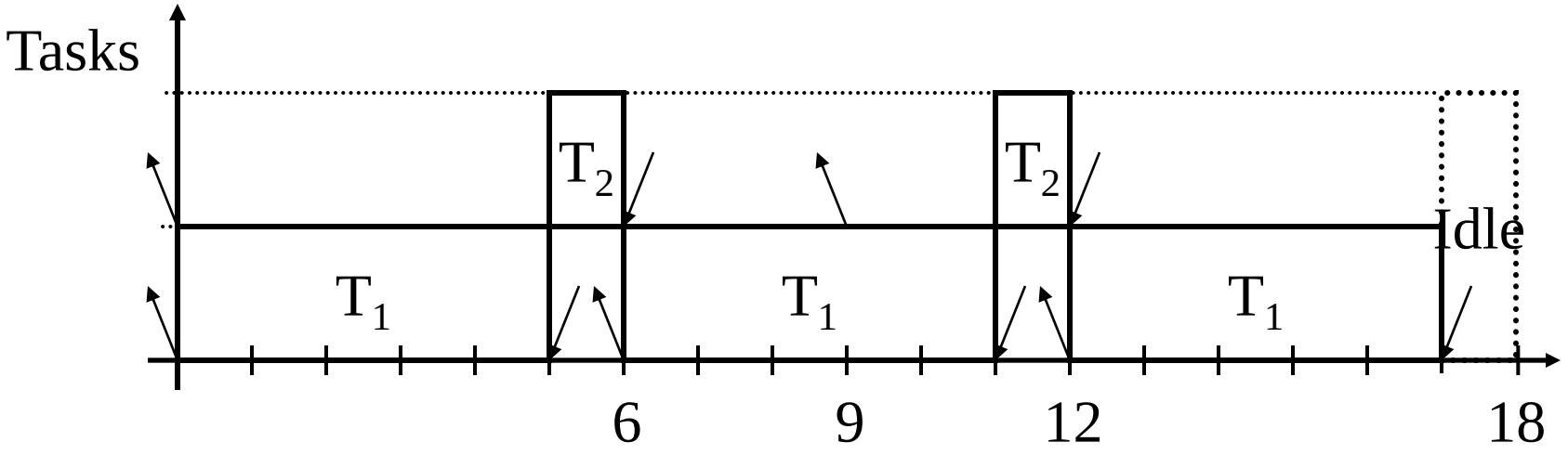
RMA: 89% Utilization

	T_1	T_2
C_i	4	2
p_i	6	9



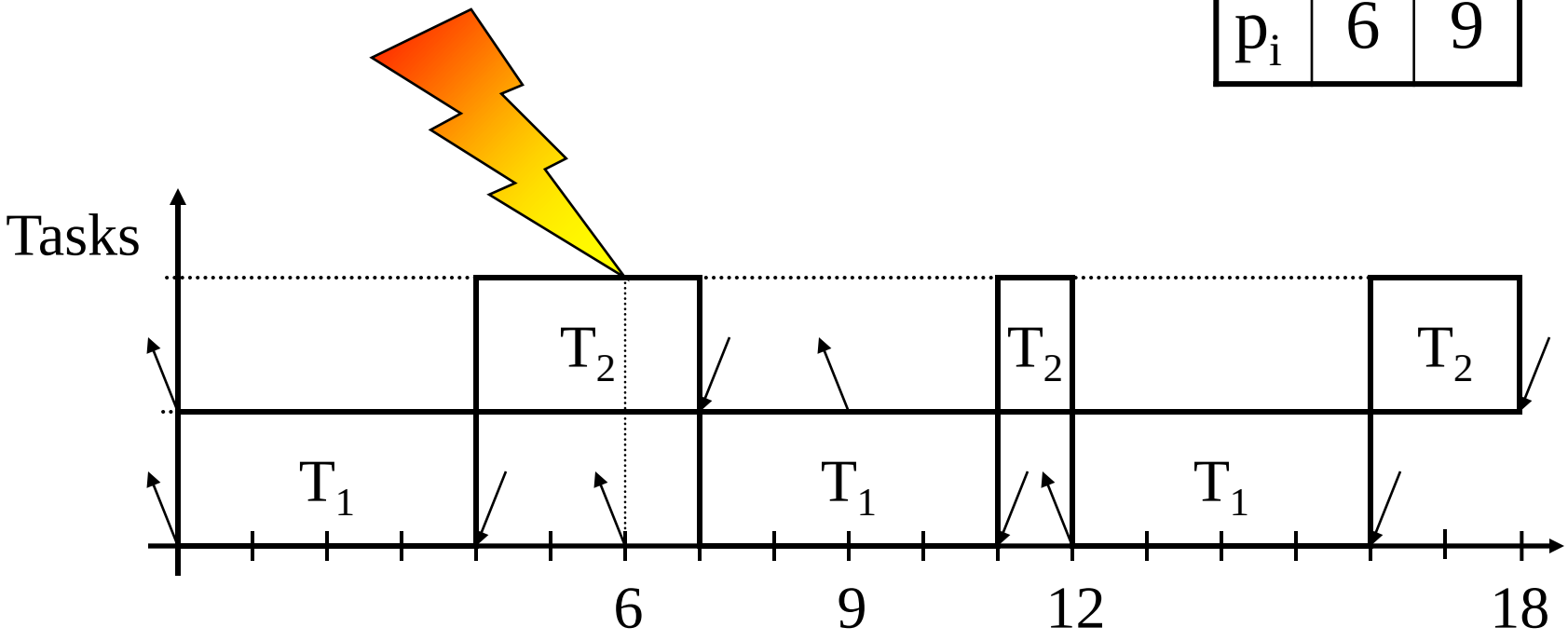
RMA: 95% Utilization

	T_1	T_2
C_i	5	1
p_i	6	9



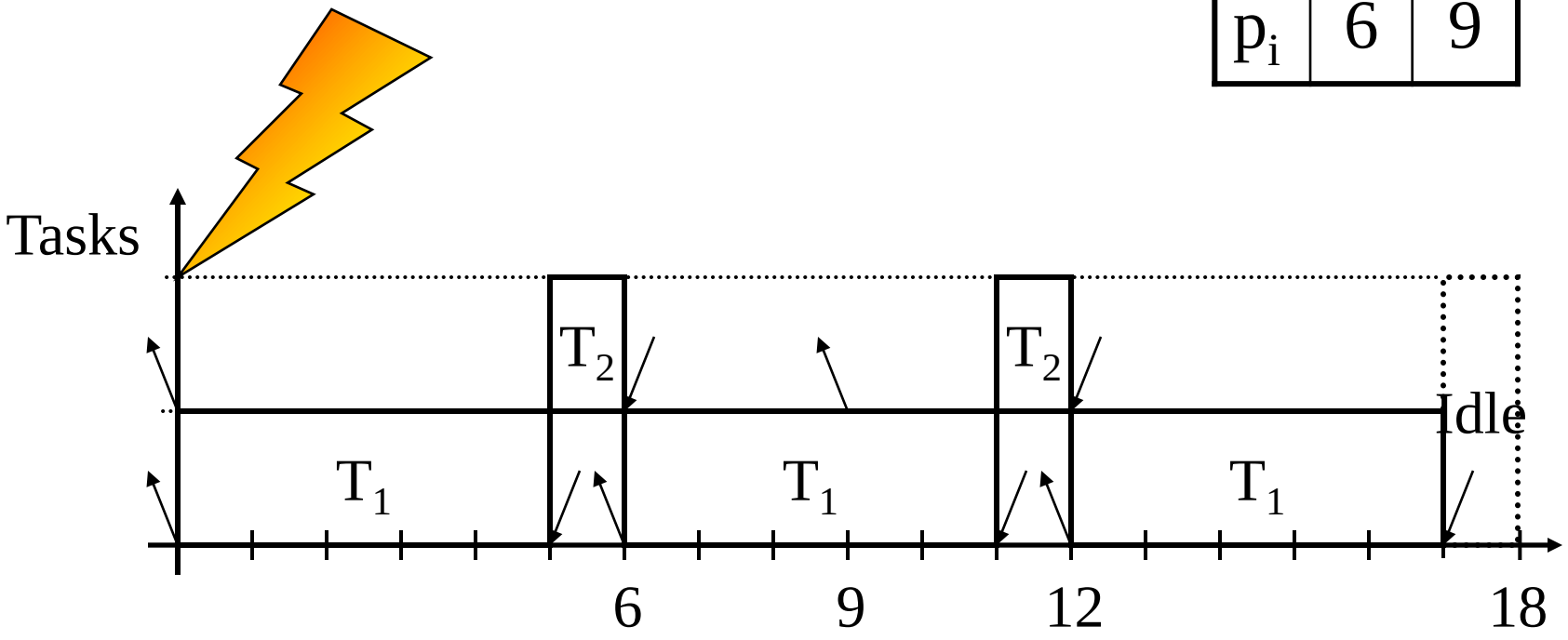
EDF: 100% Utilization

	T_1	T_2
C_i	4	3
p_i	6	9



RMA: The Critical Instant

	T_1	T_2
C_i	5	1
p_i	6	9



EDF: Response Times

	T_1	T_2
C_i	5	3
p_i	6	9