INFO-F-404 : Operating Systems II

1 Exercises

Exercise 1 : Audsley

Let's consider the system represented by Table 1. These are all *periodic*, *asynchronous* tasks with *constrained deadline*. We will consider the case where these tasks (and jobs) are *independent* and *preemptible*.

Task index	Release time	WCET	Deadline	Period
Task τ_1	100	10	20	30
Task τ_2	50	20	50	50
Task τ_3	0	30	100	150

Table 1: System of 3 periodic, asynchronous tasks with constrained deadline.

a) Find the study interval, use the expression $[O_{\max}, O_{\max} + 2 \cdot P]$.

b) Plot the scheduling of these 3 tasks in the interval $[0, 400]$ using Audsley. Each job takes its worst case execution time (WCET) to end. Use Figure 1.

c) Find the study interval, use the expression $[0, S_n + P]$.

Exercise 2 : Earliest Deadline First

Let's consider the system represented by Table 2. These are all *periodic*, *synchronous* tasks with *constrained deadline*. We will consider the case where these tasks (and jobs) are *independent* and *preemptible*.

Task index	Release time	WCET	Deadline	Period
Task τ_1	0	10	50	50
Task τ_2	0	20	40	80
Task τ_3	0	10	30	100
Task τ_4	0	50	150	200

Table 2: System of 4 periodic, synchronous tasks with constrained deadline.

a) Find the study interval for this system (for EDF algorithm).

b) Plot the scheduling of these 3 tasks in the interval $[0, 400]$ using EDF. Each job takes its worst case execution time (WCET) to end. Use Figure 1.

c) Find a system of periodic tasks that could be scheduled using EDF, but not using DM.

Exercise 3 : Least Laxity First

Let's consider the system represented by Table 3. These are all *periodic*, *synchronous* tasks with *constrained deadline*. We will consider the case where these tasks (and jobs) are *independent* and *preemptible*.

Task index	Release time	WCET	Deadline	Period
Task τ_1	0	10	50	50
Task τ_2	0	20	40	80
Task τ_3	0	10	30	100
Task τ_4	0	50	150	200

Table 3: System of 4 periodic, synchronous tasks with constrained deadline.

a) Plot the scheduling of these 4 tasks in the interval $[0, 200]$ using LLF. Consider the case when all priorities are recalculated every 10 time units. Each job takes its worst case execution time (WCET) to end. Use Figure 2.

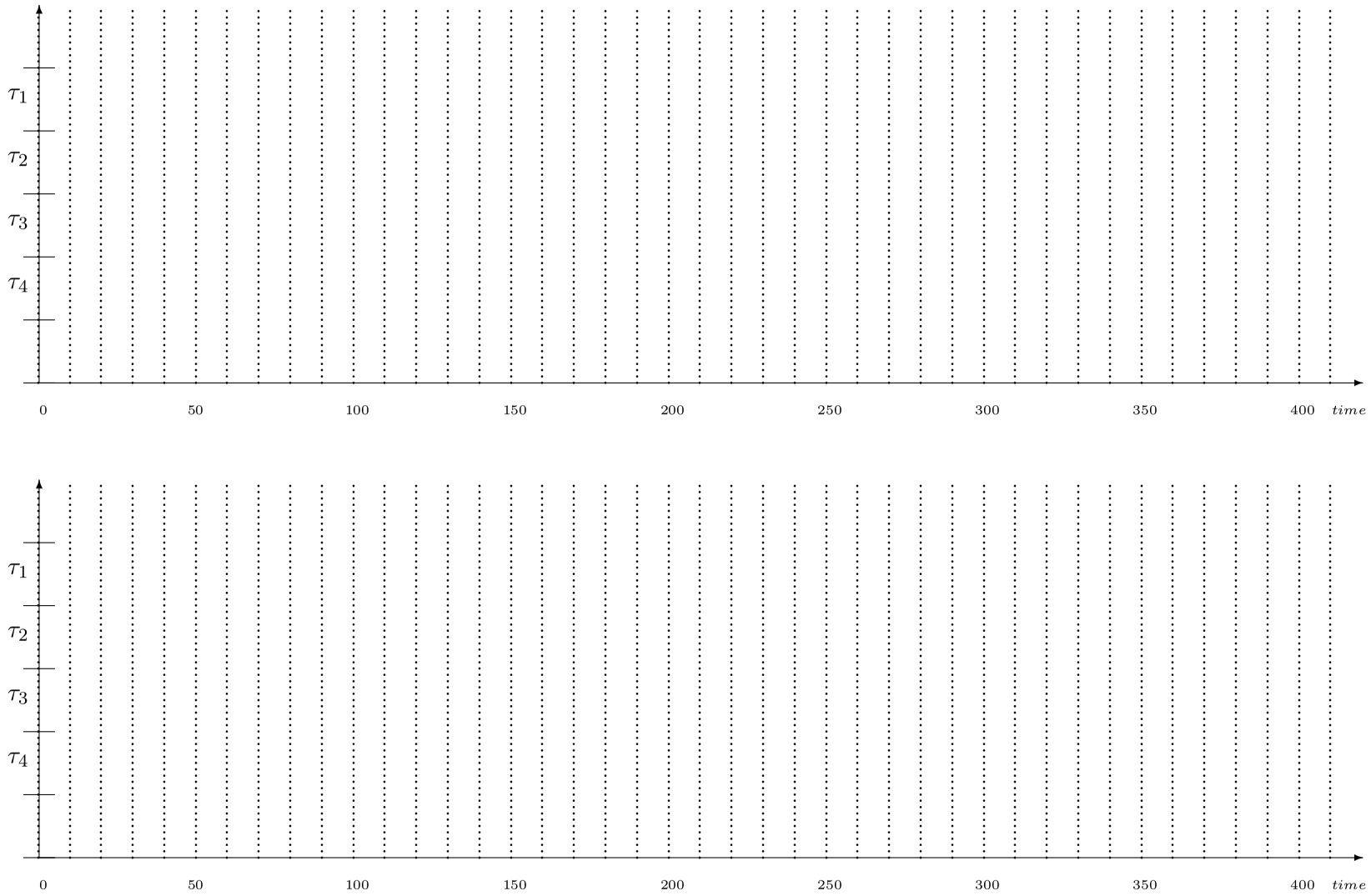

Figure 1: *Scheduling.*

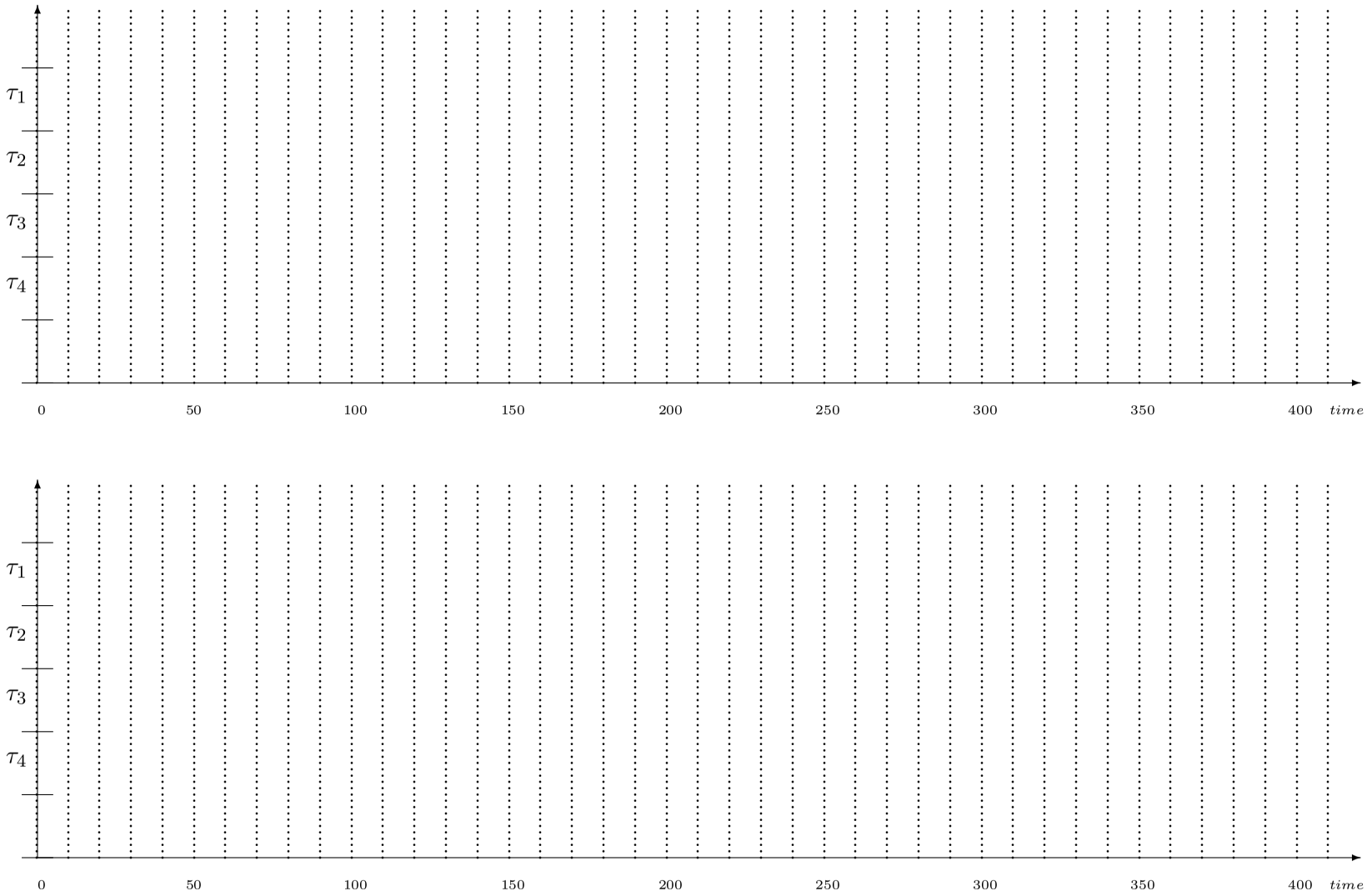

Figure 2: *Scheduling.*