Scheduling analysis

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System Requirement

Task

- **Task:** Schedule the following task set using rate-monotonic:

  T1 {P: 5, E: 2.5, D: 5}, T2 {P: 15, E: 4.5, D: 15}, T3 {P: 20, E: 3.5, D: 20}

  - Calculate the Urm.

  - Calculate the time-demand analysis.

  - Model the task set using Simso.

- **Provide a report with the above points using screenshots and comments on your results and analysis.**

Calculate the Urm:

Task 1: P: 5, E: 2.5, D: 5

Task 2: P: 15, E: 4.5, D: 15

Task 3: P: 20, E: 3.5, D: 20

- $U = (2.5/5) + (4.5/15) + (3.5/20) = 0.975$

- $Urm = 3*(2^{(1/3)}-1) = 0.799$

- $U > Urm$

- System needs more tests.

Calculate the time-demand analysis:

Task 1: P: 5, E: 2.5, D: 5

Task 2: P: 15, E: 4.5, D: 15

Task 3: P: 20, E: 3.5, D: 20

Assume that Task 1 has the highest priority:

- calculate time demand for T1 at time instant = D= 5:

W (5) = 2.5 +0 = 2.5.

W (5) < D = 2.5 < 5

- T1 is schedulable.

Assume that Task 2 has the second highest priority:

- calculate time demand for T2 at time instant = D= 15:

W (15) = 4.5 + (15/5) *2.5 = 12.

W (15) < D = 12 < 15

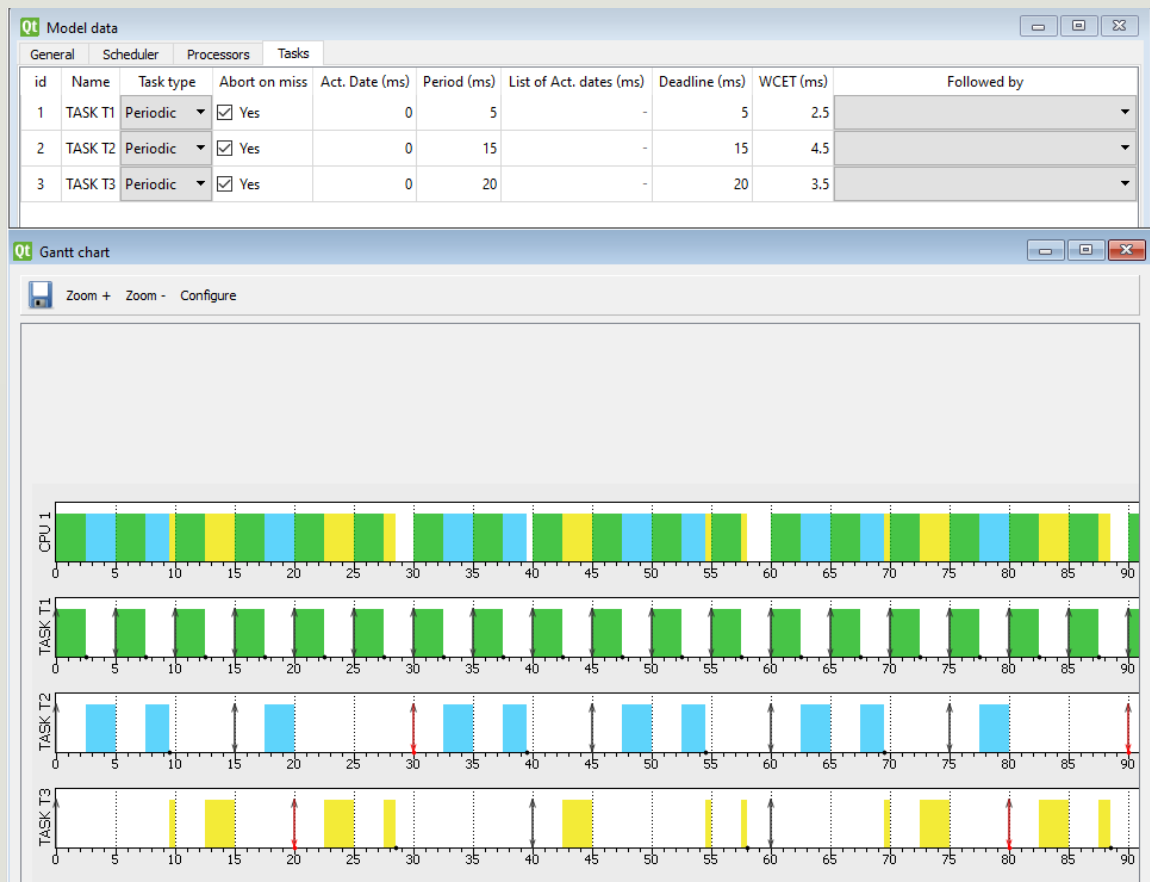- T2 is schedulable.

Assume that Task 3 has the lowest priority:

- calculate time demand for T3 at time instant = D= 20:

- W (20) = 3.5 + (20/15) *4.5+ (20/5) *2.5

$\qquad$ = 3.5 +2(round up)*4.5+4*2.5= 22.5

- W (20) > D = 22.5 >20

- T3 is not schedulable.

Modeling the system using Simso:

id	Name	Task type	Abort on miss	Act. Date (ms)	Period (ms)	List of Act. dates (ms)	Deadline (ms)	WCET (ms)	Followed by
1	TASK T1	Periodic	☑ Yes	0	5	-	5	2.5	
2	TASK T2	Periodic	☑ Yes	0	15	-	15	4.5	
3	TASK T3	Periodic	☑ Yes	0	20	-	20	3.5	

* The system is not schedulable, and it approves the analytical Rate-Monotonic utilization and time-demand analysis result as the system not schedulable at all of them.

* Task 2 and Task 3 missing deadlines.