

Earliest Deadline First (EDF)



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Table of Contents

Table of Contents.....	1
Overview	2
Tasks.....	2
Goals	2
Hyper-period	2
CPU load.....	2
URM Calculation	2
Time demand Calculation	3
Result	4
Simso Output	4

Overview

Schedule the following tasks set using rate-monotonic to calculate hyper-period CPU-load the Urm and time-demand analysis.

Tasks

T1{P:10E:5, D:10}

T2{P:20, E:0.026, D:20}

T3{P:50, E:0.014, D:50}

T4{50,0.014,50}

T5{P:100, E:0.022, D:100}

T6{P:100, E:12, D:100}

Goals

- Calculate the Hyper-period.
- Calculate the CPU load .
- Calculate the Urm.
- Calculate the time-demand analysis.
- Model the task set using Simso.

Hyper-period

H=100.

CPU load

$CPU = (0.014 \cdot 4) + 0.022 + (0.026 \cdot 5) + 50 + 12 = \%62.208$

URM Calculation

- $U = (0.014/50) + (0.014/50) + (0.022/100) + (0.026/20) + (5/10) = \%62.208$
- $U_{rm} = 6 \cdot (2^{1/6} - 1) = 0.73$
- $U < U_{rm}$

System is Schedulable .

Time demand Calculation

T1 (Highest priority) Calculations assuming no tasks are scheduled with a deadline of 10ms.

$$W(10) = 5 + 0 = 5$$

Since $5 < 10$ i.e. $T_n < T_p$ Therefore T1 is Schedulable.

T2 (taking into consideration already scheduled tasks) with a deadline of 20ms.

$$W(20) = 0.026 + (20/10)*5 = 10.026$$

Since $10.026 < 20$ i.e. $T_n < T_p$ Therefore T2 is Schedulable.

T3 (taking into consideration already scheduled tasks) with a deadline of 50ms.

$$W(50) = 0.014 + (50/20)*0.026 + (50/10)*5 = 0.014 + 0.078 + 25 = 25.092$$

Since $25.092 < 50$ i.e. $T_n < T_p$ Therefore T3 is Schedulable.

T4 (taking into consideration already scheduled tasks) with a deadline of 50ms.

$$W(50) = 0.014 + (50/50)*0.014 + (50/20)*0.026 + (50/10)*5 = 0.014 + 0.014 + 0.078 + 25 = 25.106$$

Since $25.106 < 50$ i.e. $T_n < T_p$ Therefore T4 is Schedulable.

T5 (taking into consideration already scheduled tasks) with a deadline of 100ms.

$$W(100) = 0.022 + (100/50)*0.014 + (100/50)*0.014 + (100/20)*0.026 + (100/10)*5 = 0.022 + 0.028 + 0.028 + 0.13 + 50 = 50.208$$

Since $50.208 < 100$ i.e. $T_n < T_p$ Therefore T5 is Schedulable.

T6 (taking into consideration already scheduled tasks) with a deadline of 100ms.

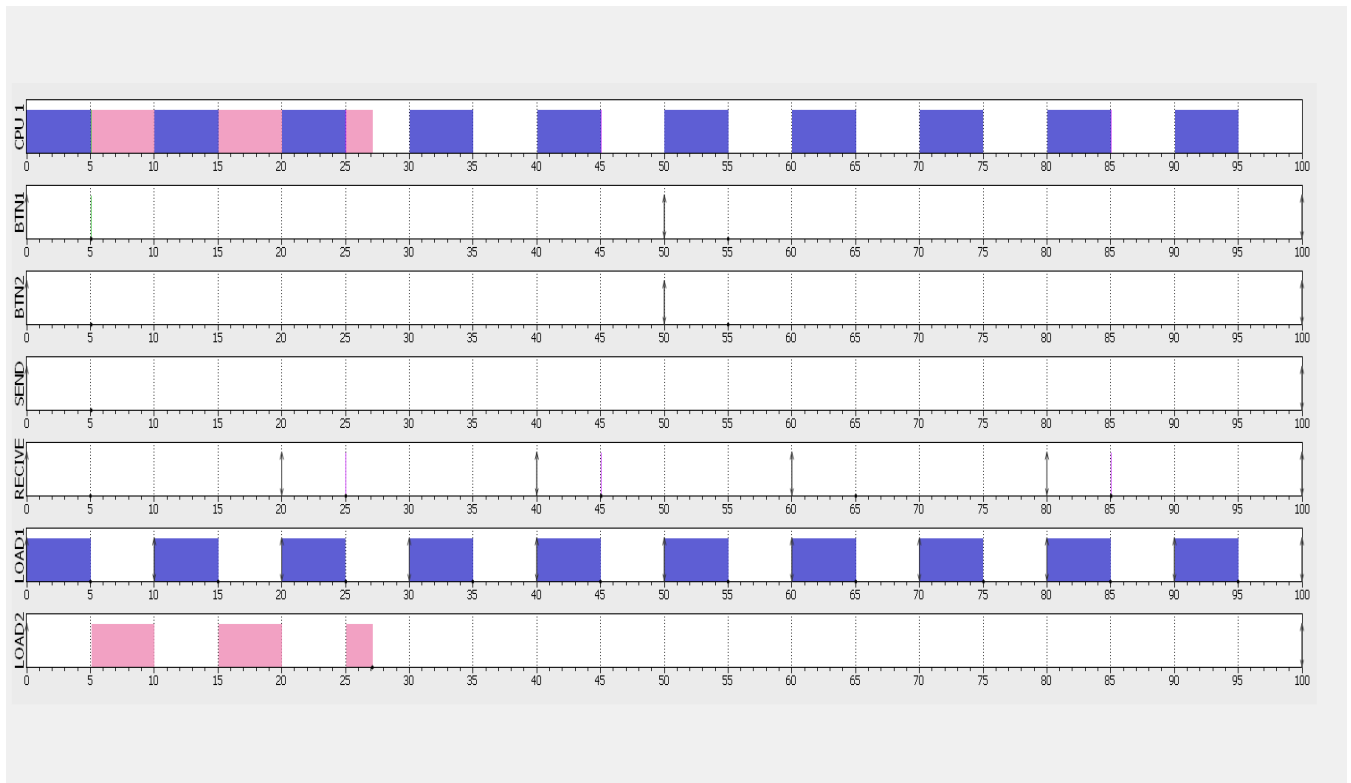
$$W(100) = 12 + (100/100)*0.022 + (100/50)*0.014 + (100/50)*0.014 + (100/20)*0.026 + (100/10)*5 = 12 + 0.022 + 0.028 + 0.028 + 0.13 + 50 = 62.208$$

Since $62.208 < 100$ i.e. $T_n < T_p$ Therefore T6 is Schedulable.

Result

After the URM calculation and Time demand calculation, we detected that our system is Schedulable.

Simso Output



Model data

id	Name	Task type	Abort on miss	Act. Date (ms)	Period (ms)	List of Act. dates (ms)	Deadline (ms)	WCET (ms)	Followed by
1	BTN1	Periodic	<input checked="" type="checkbox"/> Yes	0	50	-	50	0.014	
2	BTN2	Periodic	<input checked="" type="checkbox"/> Yes	0	50	-	50	0.014	
3	SEND	Periodic	<input checked="" type="checkbox"/> Yes	0	100	-	100	0.022	
4	RECIVE	Periodic	<input checked="" type="checkbox"/> Yes	0	20	-	20	0.026	
5	LOAD1	Periodic	<input checked="" type="checkbox"/> Yes	0	10	-	10	5	
6	LOAD2	Periodic	<input checked="" type="checkbox"/> Yes	0	100	-	100	12	

Edit data fields...

Remove selected task(s)

Results

General Logs Tasks Scheduler Processors

Observation Window:
from 0.00 to 100.00 ms Configure...

	Total load	Payload	System load
CPU 1	0.6221	0.6221	0.0000
Average	0.6221	0.6221	0.0000