Earliest Deadline First (EDF)

BY: TEAM5

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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*4)+0.022+(0.026*5)+50+12=%62.208

URM Calculation

- U = (0.014/50) + (0.014/50) + (0.022/100)+(0.026/20)+(5/10) =%62.208
- Urm = 6* (2^(1/6) -1) = 0.73
- U < Urm

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. Tn < Tp 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. Tn < Tp 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. Tn < Tp 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. Tn < Tp 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. Tn < Tp Therefore T5 is Schedulable.

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

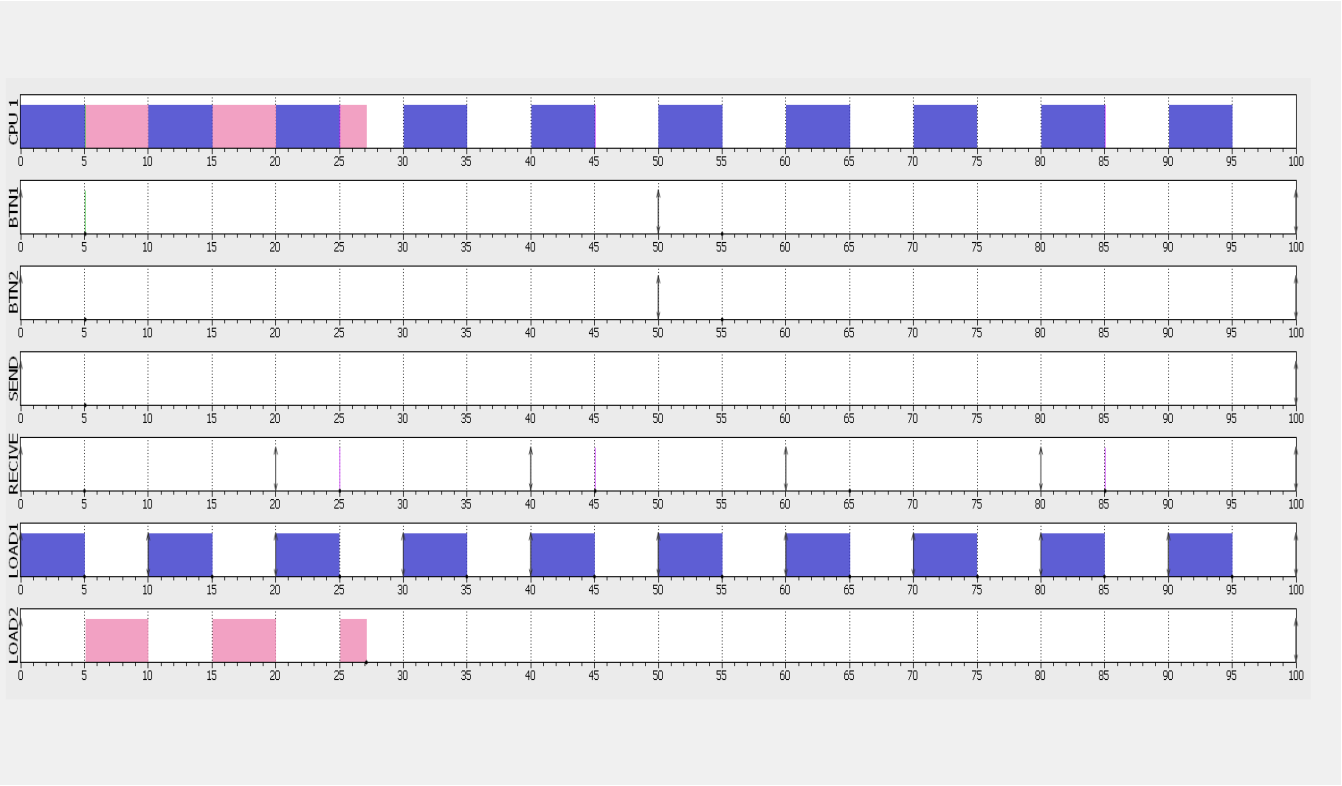
W(100) = 12 + (100/100)*0.022 +(100/50)*0.014 +(100/50)*0.014 +(100/20)*0.026 +(100/10)*5 = 12 + 0.022 + 0.028 + 0.028 + 0.13 + 50 = 62.208

Since 62.208 < 100 i.e. Tn < Tp Therefore T6 is Schedulable.

Result

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

Simso Output



Model data

General | Scheduler | Processors | Tasks

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	Yes	0	50	-	50	0.014	
2	BTN2	Periodic	Yes	0	50	-	50	0.014	
3	SEND	Periodic	Yes	0	100	-	100	0.022	
4	RECIVE	Periodic	Yes	0	20	-	20	0.026	
5	LOAD1	Periodic	Yes	0	10	-	10	5	
6	LOAD2	Periodic	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

Runtime Result