



Implementing EDF Scheduler Report

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Contents

1-System Hyperperiod	2
2-CPU Load	3
3-System Schedulability	4
4- SIMSO Offline Simulator	6
5-Kiel Simulation	7

1- System Hyperperiod

Task	Periodicity
Button 1 Monitor	50
Button 2 Monitor	50
Periodic Transmitter	100
Uart Receiver	20
Load 1 Simulation	10
Load 2 Simulation	100

Hyperperiod = Least common multiplier (50, 50, 100, 20, 10, 100)

Hyperperiod = 100ms

2- CPU Load

Task	Execution Time	Occurrence During Hyperperiod
Button 1 Monitor	25 uS	2
Button 2 Monitor	25 uS	2
Periodic Transmitter	89 uS	1
UART Receiver	100 uS	5
Load 1 Simulation	5 ms	10
Load 2 Simulation	12ms	1

$$U = ((25\mu * 2) + (25\mu * 2) + (89\mu * 1) + (100\mu * 5) + (5m * 10) + (12m * 1)) / 100ms \times 100\% = 62.289\%$$

3- System Schedulability

1- Using Rate Monotonic Utilization Bound

$$U \leq n(2^{1/n} - 1) \text{ And}$$

$$U = 0.62289$$

$$U_{rm} = 6(2^{1/6} - 1) = 0.7348 \text{ Therefore,}$$

$$U < U_{rm}$$

The system is feasible (Schedulable).

2-Using Time Demand Analysis

$$w_i(t) = e_i + \sum_{k=1}^{i-1} \left\lceil \frac{t - P_{t_k}}{P_k} \right\rceil e_k$$

Critical Instant = 100ms

Task	Execution Time	Periodicity
Button 1 Monitor	25 uS	50
Button 2 Monitor	25 uS	50
Periodic Transmitter	90 uS	100
UART Receiver	100 uS	20
Load 1 Simulation	5 ms	10
Load 2 Simulation	12 ms	100

For Task 1 : Load 1 Simulation

$$w_1(10) = 5m + 0 = 5, w(10) = 5 < 10$$

Therefore, Task 1 : Load 1 simulation is schedulable

For Task 2 : Uart Receiver

$$w_2(20) = 100\mu + (20/10) 5m = 10.03 \text{ ms}, w(20) = 10.03 < 20$$

Therefore, Task 2 : Uart Receiver is schedulable

For Task 3 : Button 1 Monitor

$$w_3(50) = 25\mu + (50/10) 5m + (50/20) 100\mu = 25.059 \text{ ms}, w(50) = 25.059 < 50$$

Therefore, Task 3 : Button 1 Monitor is schedulable

For Task 4 : Button 2 Monitor

$$w_4(50) = 25\mu + (50/10) 5m + (50/20) 100\mu + (50/50) 25\mu = 25.087 \text{ ms}$$

Therefore, Task 4 : Button 2 Monitor is schedulable $w(50) = 25.087 < 50$

For Task 5 : Periodic Transmitter

$$w_5(100) = 90\mu + (100/10) 5m + (100/20) 100\mu + (100/50) 25\mu + (100/50) 25\mu = 50.359 \text{ ms}$$

Therefore, Task 5 : Periodic Transmitter is schedulable $w(100) = 50.359 < 100$

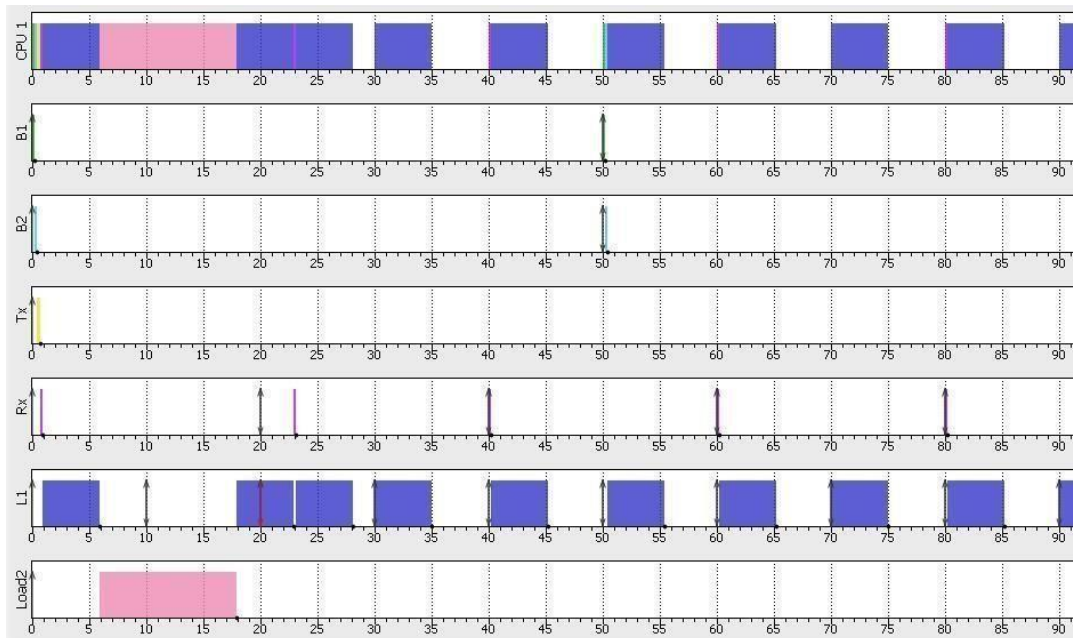
For Task 6 : Load 2 Simulation

$$w_6(100) = 12m + (100/10)5m + (100/20)100\mu + (100/50)25\mu + (100/50)25\mu + (100/100)90\mu$$

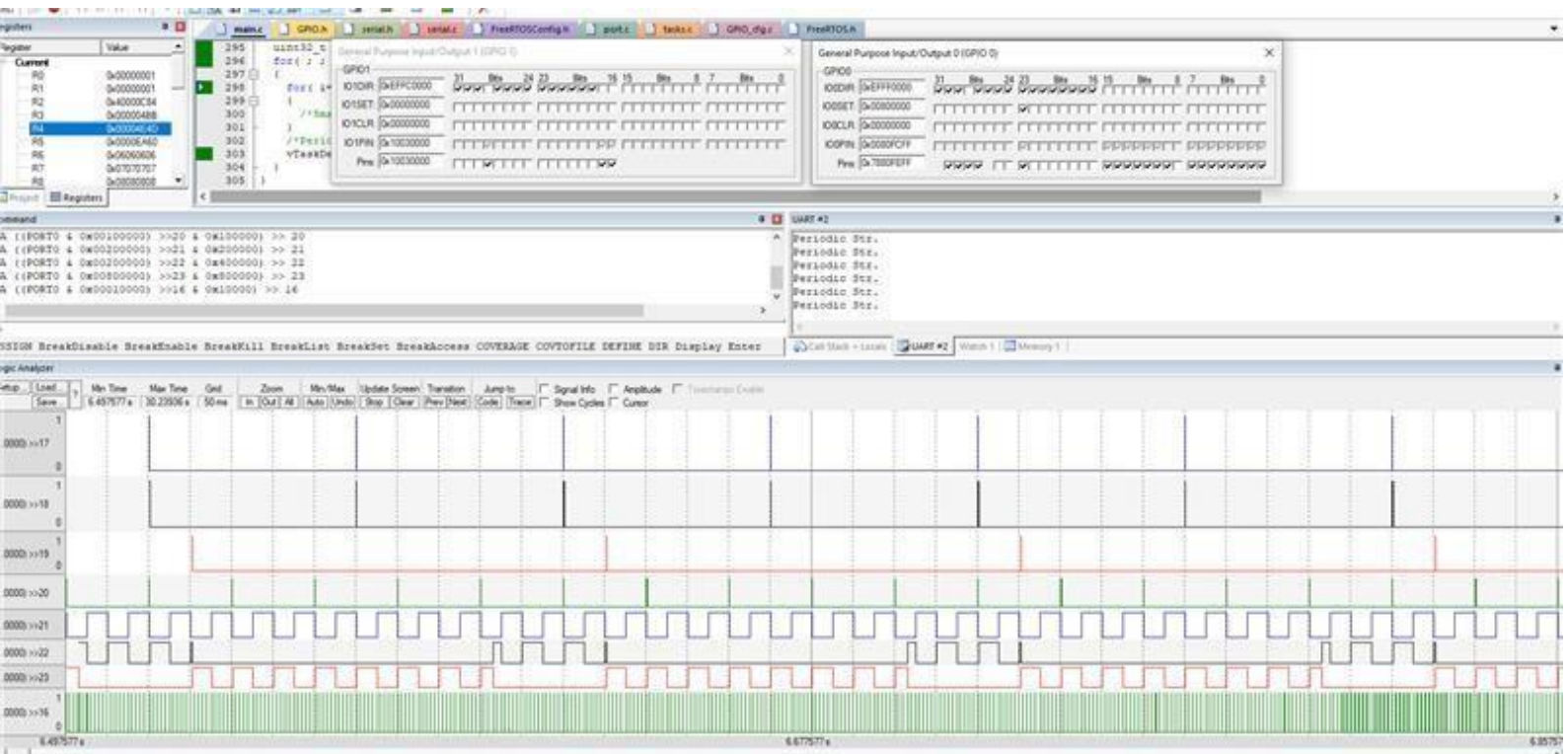
Therefore, Task 6 : Load 2 Simulation is schedulable $w(100) = 62.452 < 100$

Therefore, System is Schedulable.

4- SIMSO Offline Simulator



5-Kiel Simulation



Name	Value	Type
cpu_load	0x0000003F	uint
execution_time	0x0000DF21	uint
T1TC	0x000162F3	ulong
<Enter expression>		

Therefore, EDF scheduler is a suitable scheduling policy for such tasks. As it keeps the system feasible, on the other hand Fixed priority rate monotonic scheduling policy doesn't keep this system feasible as tasks keep missing deadlines.