Implementing EDF Scheduler Report

REAL-TIME OPERATING SYSTEMS

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Embedded Systems Advanced Nanodegree

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1. Analytical Methods

Task	Period	Deadline	Execution Time	Occurrence
B1	50	50	0.024167	2
B2	50	50	0.024367	2
Tx	100	100	0.089067	1
Rx	20	20	0.10305	5
L1	10	10	5.04	10
L2	100	100	12.22	1

1. HYPERPERIOD

According to tasks periodicities hyperperiod = 100

2. CPU LOAD

Total Execution Time = (0.024167*2) + (0.024367*2) + 0.089067 + (0.10305*5) + (5.04*10) + 12.22

3. SYSTEM SCHEDULABILITY

Assuming the given set of tasks are scheduled using a fixed priority rate -monotonic scheduler

1. URM

Utilization = Total Execution Time / Hyperperiod = 63.296951 / 100 = 0.63296
URM = 6 * (2 ^ (1/6) − 1) = 0.73477
Since U < URM Then System Is Guaranteed to Be Schedulable.

2. Time Demand Analysis

1. Button 1 Monitor Task

W(50) = 0.024167 + (50/20) * 0.10305 + (50/10) * 5.04 = 25.48

Since W(50) < 50 then the task is schedulable

2. Button 2 Monitor Task

W(50) = 0.024367 + (50/50) * 0.024167 + (50/20) * 0.10305 + (50/10) * 5.04 = 25.73

Since W(50) < 50 then the task is schedulable

3. Periodic Transmitter Task

W(100) = 0.089067 + (100/50) * 0.024367 + (100/50) * 0.024167 + (100/20) * 0.10305 + (100/10)   * 5.04 = 51.1

Since W(100) < 100 then the task is schedulable

4. UART Receiver Task

W(20) = 0.10305 + (20/10)   * 5.04 = 10.18

Since W(20) < 100 then the task is schedulable

5. Load 1 Simulation Task

W(10) = 5.04 + 0 = 5.4

Since W(10) < 10 then the task is schedulable

6. Load 2 Simulation Task
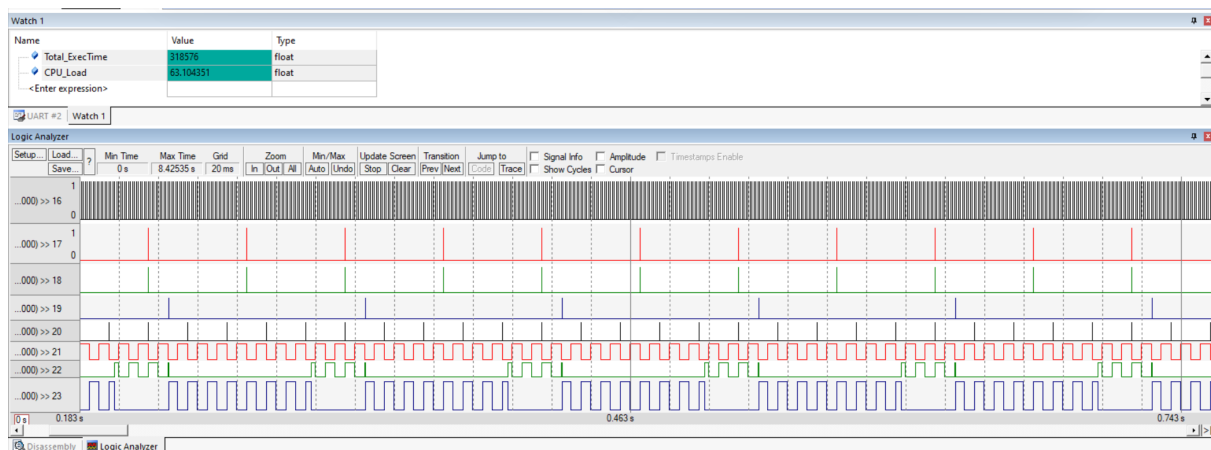
W(100) = 12.22 + (100/100) * 0.089067 + (100/50) * 0.024367 + (100/50) * 0.024167 + (100/20) * 0.10305 + (100/10)   * 5.04 = 63.32

Since W(100) < 100 then the task is schedulable

So, system is schedulable and work as expected

2. Simulation

1.KEIL

2.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	B1	Periodic	No	0	50		50	0.024167	
2	B2	Periodic	No	0	50		50	0.024367	
3	Tx	Periodic	No	0	100	-	100	0.089067	
4	Rx	Periodic	No	0	20	-	20	0.10305	
5	L1	Periodic	No	0	10	-	10	5.04	
6	L2	Periodic	No	0	100	-	100	12.22	

Edit data fields...

Remove selected task(s)　　Add task　Generate Task Set

Results

Observation Window:

from 0.00 to 100.00 ms　　Configure...

	Total load	Payload	System load
CPU 1	0.6332	0.6332	0.0000
Average	0.6332	0.6332	0.0000