Implementing and Test EDF Scheduler

Report

Sohaib Elsayed Dar

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 = *L***east 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	90 uS	1
Uart Receiver	100 uS	5
Load 1 Simulation	5 ms	10
Load 2 Simulation	12 ms	1

U = ((25 * 2) + (25 * 2) + (90 * 100) + (100 * 5) + (5 * 10) + (12) / 100ms) × 100%
=62%

3. System Schedubility

1- Using Rate Monotomic Utilization Bound $U \leq n(2\ n1 - 1)$

- **And U = 0.62**
- Urm **= 6 (21/6 − 1) = 0. 7348** $U < Urm$ **The system is feasible (Schedulable)**

2- Using Time Demand Analysis

$$w_i(t) = e_i + \sum_{k=1} \lceil P_k \rceil e_k$$

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 (E: 5ms , P: 10ms, Provided Time=10ms)**
- w**1(10) = 5**m **+ 0 = 5 ,** w**(10) = 5 < 10**
- **Therefore, Task 1 : Load 1 simulation is schedulable**

For Task 2 :

- **Uart Receiver (E: 100us , P: 20ms, Provided Time=20ms)**
- **w2(20) = 100μ + (20/10) 5m = 10. 03 ms , w(20) = 10. 03 < 20**
- **Therefore, Task 2 : Uart Receiver is schedulable**

For Task 3 :

- **Button 1 Monitor (E: 25us , P: 50ms, Provided Time=50ms)**
- **w3(50) = 25μ + (50/10) 5m + (50/20) 100μ = 25. 059 ms , w(50) = 25. 059 < 50**
- **Therefore, Task 3 : Button 1 Monitor is schedulable**

For Task 4 :

- **Button 2 Monitor (E: 25us , P: 50ms, Provided Time=50ms)**
- **w4(50) = 25μ + (50/10) 5m + (50/20) 100μ + (50/50)25μ = 25. 087 ms**
- **Therefore, Task 4 : Button 2 Monitor is schedulable$w$(50) = 25. 087 < 50**

For Task 5 :

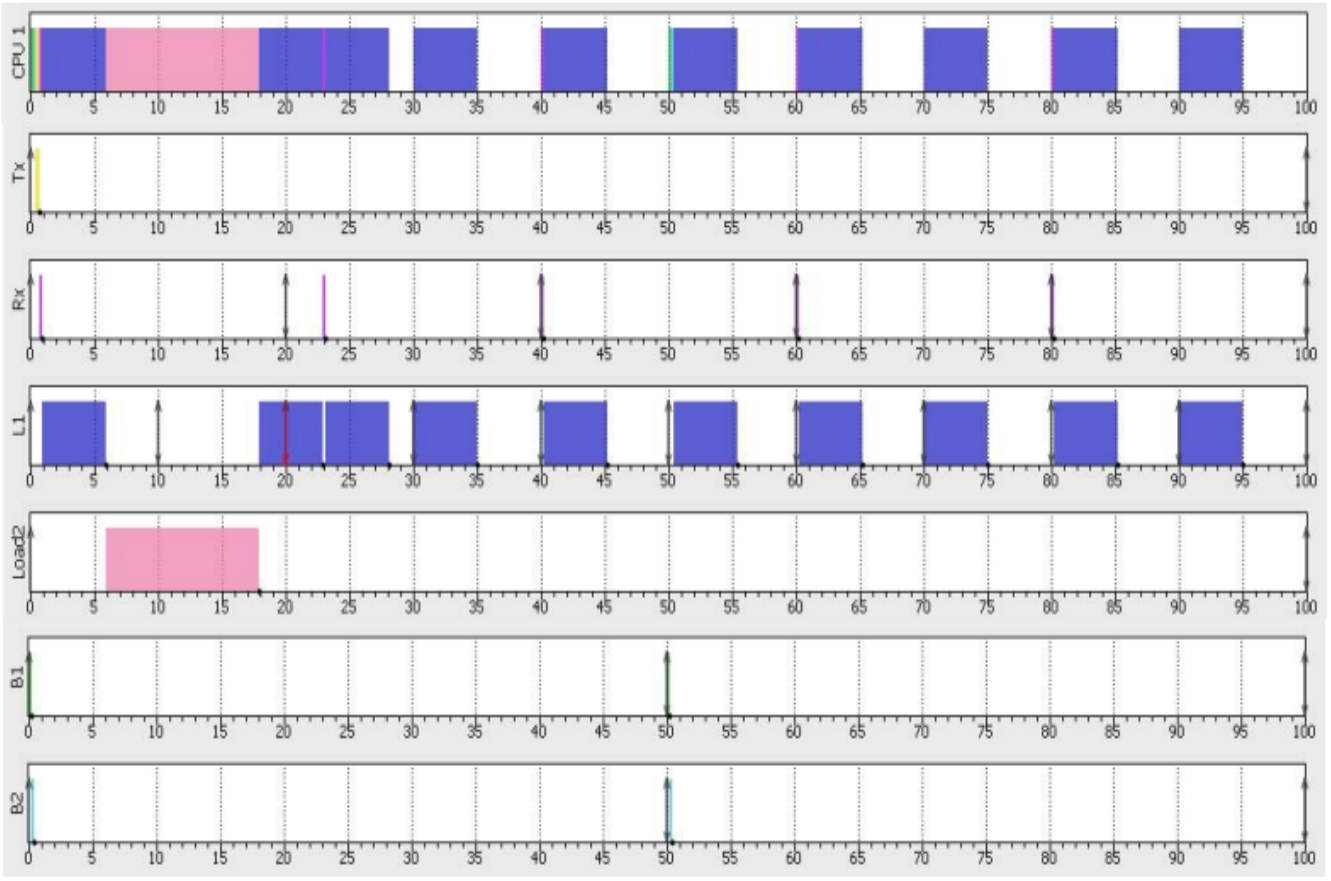
- **Periodic Transmitter (E: 90 us , P: 100ms, Provided Time=100ms)**
- **w5(100) = 90μ + (100/10) 5m + (100/20) 100μ + (100/50)25μ + (100/50)25μ = 50. 359 ms**
- **Therefore, Task 5 : Periodic Transmitter is schedulable$w$(100) = 50. 359 < 100**

For Task 6 :

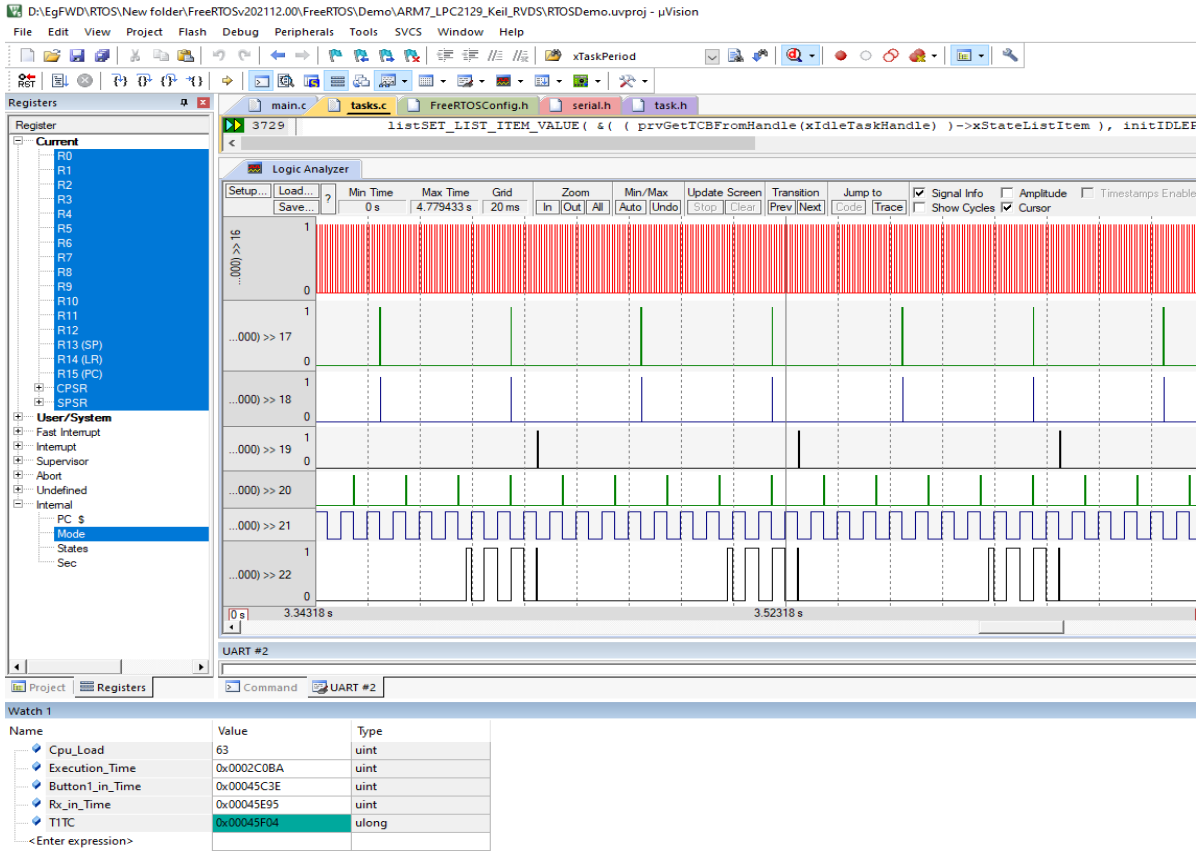
- **Load 2 Simulation (E: 12ms , P: 100ms, Provided Time=100ms)**
- **w6(100) = 12m + (100/10)5m + (100/20)100μ + (100/50)25μ + (100/50)25μ + (100/100)90μ**
- **Therefore, Task 6 : Load 2 Simulation is schedulable$w$(100) = 62. 452 < 100**

➔ Therefore, System is Scheduble.

4. SIMSO Offline Simulator



5. Kiel Simulation



THANK YOU