

EDF scheduler Analysis

- **System Hyper Period**

$$\text{Hyper period (H)} = \text{LCM (Pi)}$$

Where Pi is all tasks periodicities so Hyper period = 100 ms.

- **CPU load**

Task 1 : Button_1_Monitor

Period = 50ms , Deadline = 50ms , Execution Time = 13us

Task 2 : Button_2_Monitor

Period = 50ms , Deadline = 50ms , Execution Time = 13us

Task 3 : Periodic Transmitter

Period : 100ms , Deadline = 100ms , Execution Time = 18us

Task 4 : Uart_Receiver

Period = 20ms , Deadline = 20ms , Execution Time = 15us

Task 5 : Load_1_Simulation

Period = 10ms , Deadline = 10ms , Execution Time = 5ms

Task 6 : Load_2_Simulation

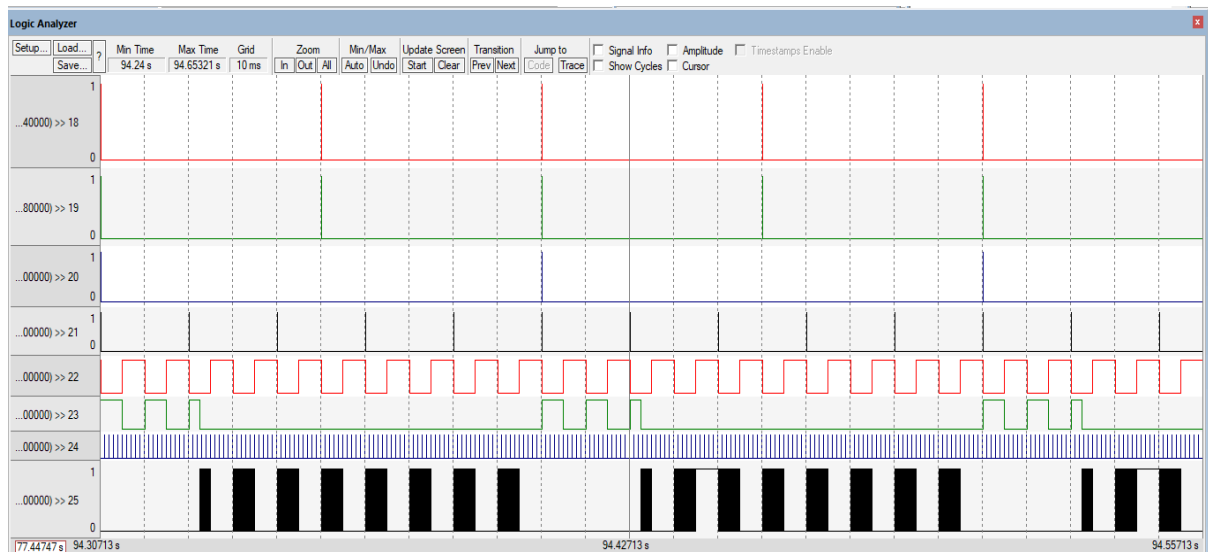
Period = 100ms , Deadline = 100ms , Execution Time = 12ms

$$\text{Utilization (U)} = \text{Total Execution Time} / \text{Hyper Period}$$

$$U = (0.013*2 + 0.013*2 + 0.018*1 + 0.015*1 + 5*10 + 12*1) / 100$$

$$U = 0.62 = 62 \%$$

Logic analyzer from Task1 to Task6 , Tick and Idle Hooks from up to down.



- **Schedulability**

$U = 0.62 < 1$ so system is scheduler (system schedulability condition)

- **System Schedulability Using URM**

$$U = \sum_{i=1}^n \frac{C_i}{P_i} \leq n(2^{\frac{1}{n}} - 1)$$

where U Total Utilization , C Execution Time, P periodicity, n Number of Tasks.

$$U = 13\mu s/50 + 13\mu s/50 + 18\mu s/100 + 15\mu s/20 + 5ms/10 + 12ms/100 = 0.62$$

$$URM = 6*(2^{1/6} - 1) = 0.735$$

hence U is less than URM so the system may be scheduler .

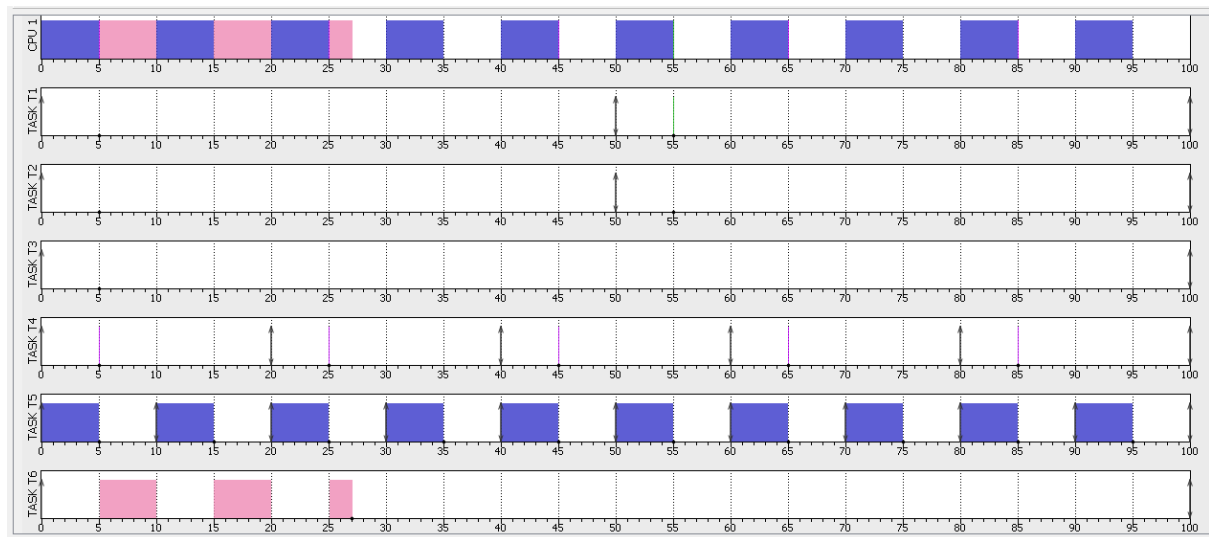
- Simso offline simulator

The screenshot shows the 'Qt Model data' window with the 'Tasks' tab selected. It contains a table with 6 tasks, each with a unique ID, name, task type (all 'Periodic'), abort on miss setting (all 'No'), activation date (all '0.0'), period, list of activation dates (all '-'), deadline, WCET, followed by (all '-'), and priority (all '1'). The priority column is highlighted in green. Below the table is an 'Edit data fields...' button and a 'Remove selected task(s)' button. At the bottom right are 'Add task' and 'Generate Task Set' buttons.

id	Name	Task type	Abort on miss	Act. Date (ms)	Period (ms)	List of Act. dates (ms)	Deadline (ms)	WCET (ms)	Followed by	priority
1	TASK T1	Periodic	<input type="checkbox"/> No	0.0	50.0	-	50.0	0.013	-	1
2	TASK T2	Periodic	<input type="checkbox"/> No	0.0	50.0	-	50.0	0.013	-	1
3	TASK T3	Periodic	<input type="checkbox"/> No	0.0	100.0	-	100.0	0.018	-	1
4	TASK T4	Periodic	<input type="checkbox"/> No	0.0	20.0	-	20.0	0.015	-	1
5	TASK T5	Periodic	<input type="checkbox"/> No	0.0	10.0	-	10.0	5.0	-	1
6	TASK T6	Periodic	<input type="checkbox"/> No	0.0	100.0	-	100.0	12.0	-	1

The screenshot shows the 'Qt Results' window with the 'General' tab selected. It displays the 'Observation Window' from 0.00 to 100.00 ms. Below this is a table showing simulation results for CPU 1 and the Average. The table has four columns: 'Total load', 'Payload', and 'System load'. The values for CPU 1 and the Average are all 0.6214 for Total load and Payload, and 0.0000 for System load.

	Total load	Payload	System load
CPU 1	0.6214	0.6214	0.0000
Average	0.6214	0.6214	0.0000



From the mentioned above analysis, I see it indicates a successful implementation and the results as expected.