

# FreeRTOS Project: EDF

## **1- Using analytical methods**

### **1.1- System Hyperperiod:** 100 msec

**1.2- CPU load** =  $\frac{0.012}{50} + \frac{0.012}{50} + \frac{0.017}{100} + \frac{0.022}{20} + \frac{5}{10} + \frac{12}{100} = 0.62175 = 62.175\%$

### **1.3- Checking schedulability**

#### **1.3.1- URM method:**

$$\text{URM} = 6(2^{(1/6)} - 1) = 0.73$$

$$\text{CPU load} < \text{URM}$$

Guaranteed schedulable

#### **1.3.2- Time demand analysis:**

$$\text{T5: } E=5, P=D=10$$

$$W(1-10) = 5 < 10 \rightarrow \text{T5 schedulable.}$$

$$\text{T4: } E=0.022, P=D=20$$

$$W(1-10) = 0.022 + \frac{10}{10} * 5 = 5.022$$

$$W(11-20) = 0.022 + \frac{20}{10} * 5 = 10.022 < 20 \rightarrow \text{T4 schedulable.}$$

$$\text{T1: } E=0.012, P=D=50$$

$$W(50) = 0.012 + \frac{50}{10} * 0.022 + \frac{50}{10} * 5 = 25.1 < 50 \rightarrow \text{T1 schedulable.}$$

$$\text{T2: } E=0.012, P=D=50$$

$$W(50) = 0.012 + \frac{50}{50} * 0.012 + \frac{50}{10} * 0.022 + \frac{50}{10} * 5 = 25.1 < 50$$

$\rightarrow$  T2 schedulable.

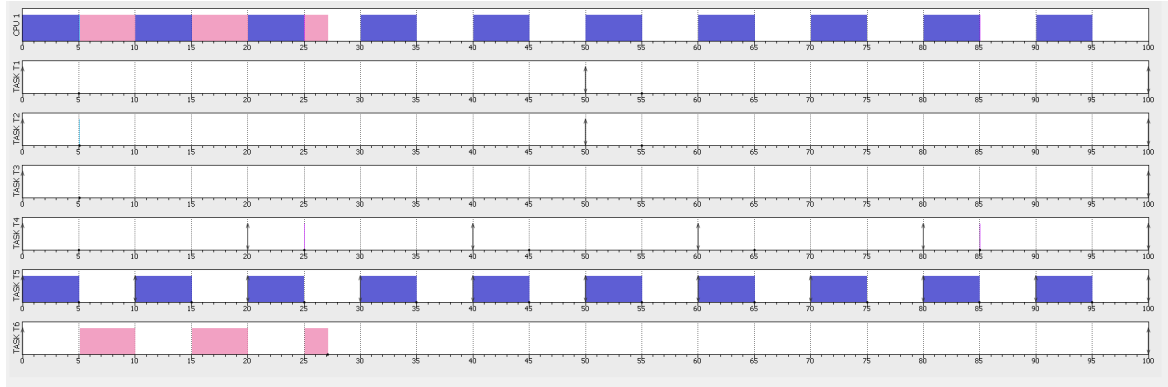
$$\text{T3: } E=0.017, P=D=100$$

$$W(100) = 0.017 + \frac{100}{50} * 0.012 + \frac{100}{50} * 0.012 + \frac{100}{10} * 0.022 + \frac{100}{10} * 5 = 50.2 < 100$$

$\rightarrow$  T3 schedulable.

$$\text{T6: } E=12, P=D=100$$

## 2- Using Simso:



The screenshot shows the 'Model data' window with the 'Tasks' tab selected. The table below lists the tasks and their parameters. The 'Followed by' column shows task dependencies with arrows. The 'priority' column is highlighted in green.

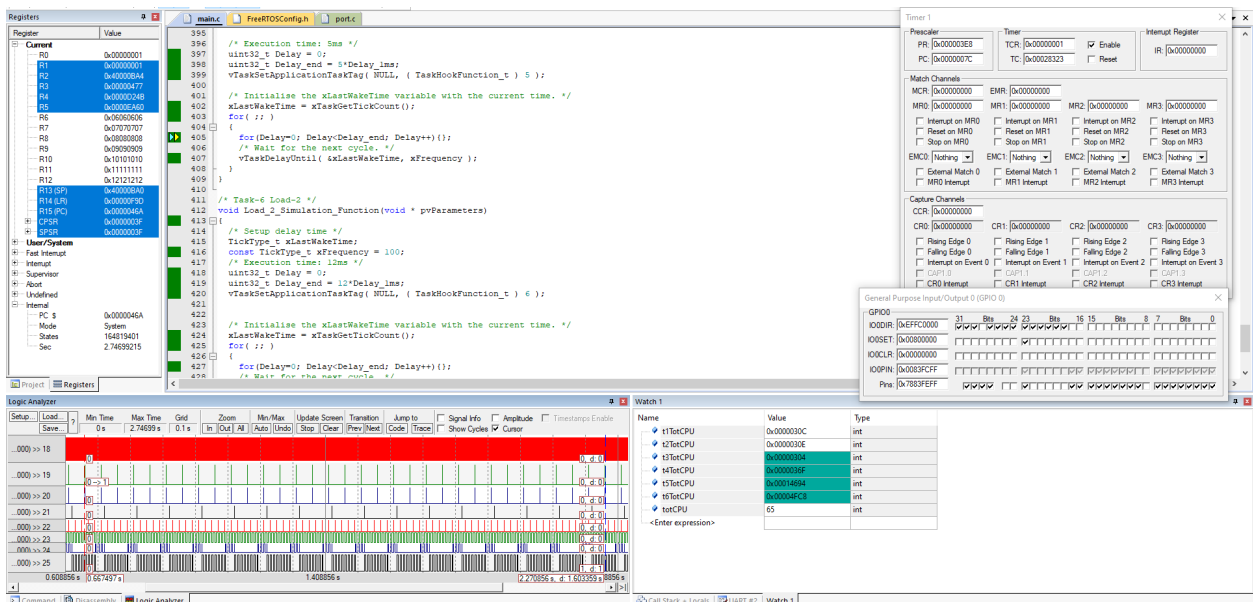
id	Name	Task type	Absort on miss	Act. Date (ms)	Period (ms)	List of Act. dates (ms)	Deadline (ms)	WCET (ms)	Followed by	priority
1	TASK T1	Periodic	<input type="checkbox"/> No	0.0	50.0	-	50.0	0.012	↓ 1	
2	TASK T2	Periodic	<input type="checkbox"/> No	0.0	50.0	-	50.0	0.012	↓ 1	
3	TASK T3	Periodic	<input type="checkbox"/> No	0.0	100.0	-	100.0	0.017	↓ 1	
4	TASK T4	Periodic	<input type="checkbox"/> No	0.0	20.0	-	20.0	0.022	↓ 1	
5	TASK T5	Periodic	<input type="checkbox"/> No	0.0	10	-	10	5.0	↓ 1	
6	TASK T6	Periodic	<input type="checkbox"/> No	0	100.0	-	100.0	12.0	↓ 1	

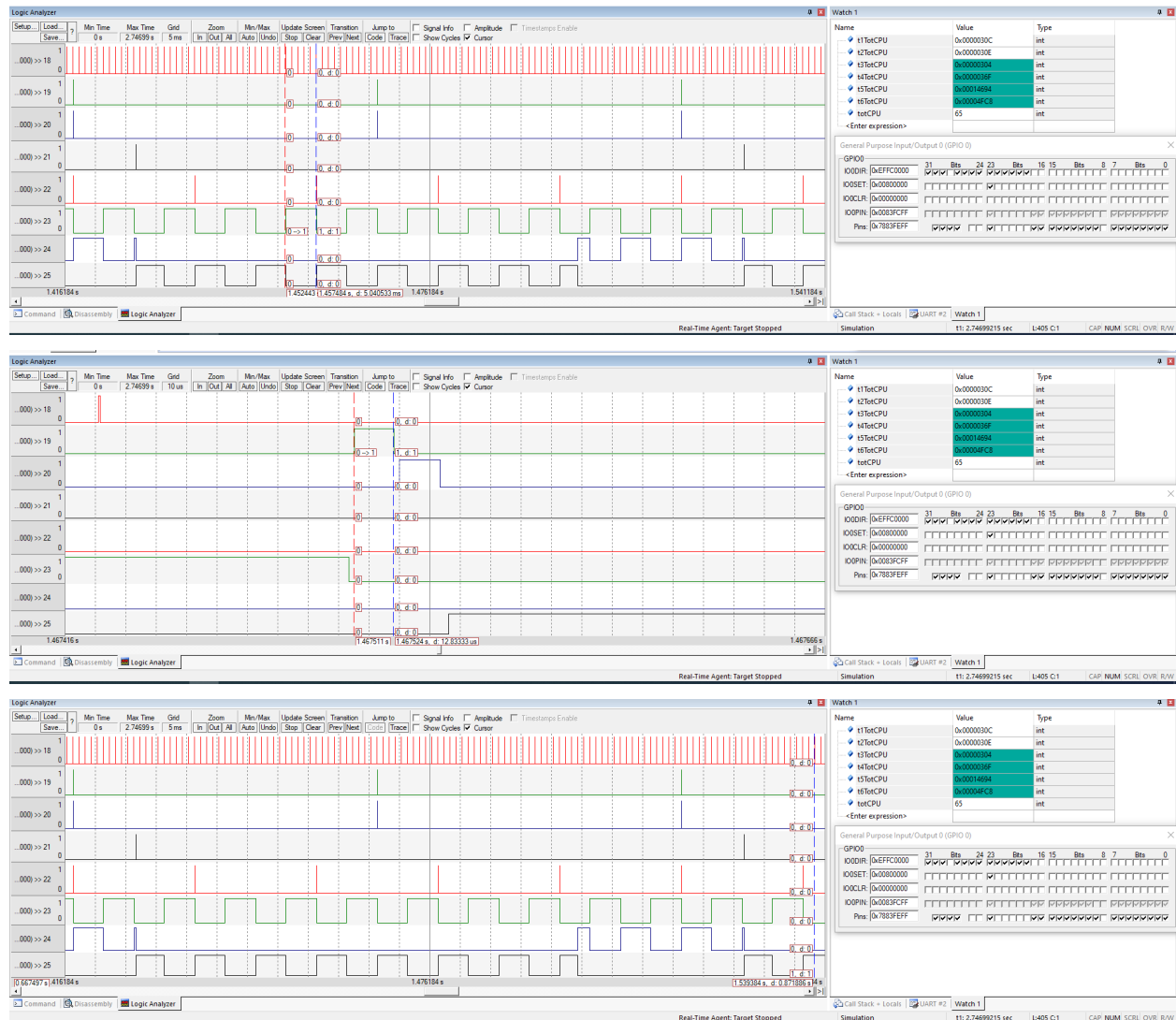
Below the table is an 'Edit data fields...' button. At the bottom, there are buttons for 'Remove selected task(s)', 'Add task', and 'Generate Task Set'.

On the right, the 'Results' window is visible, showing the 'General' tab. It displays the 'Observation Window' as 'from 0.00 to 100.00 ms' and a 'Configure...' button. Below this is a table with task performance metrics:

	Total load	Payload	System load
CPU 1	0.6218	0.6218	0.0000
Average	0.6218	0.6218	0.0000

### 3- Using Timer and trace macros:





## Comments:

- Results as expected.
- The results indicate a successful implementation.