

RTOS Master Class by SPRINTS Egypt (Udacity)

Implementation of an EDF Scheduler Based on FreeRTOS

By : Michael Samir

Msemb.mail@gmail.com

ID	Task	Periodicity (ticks)	Execution Time (ms)	Calls in Hyper Period
1	Button_1_Monitor	50	0.019	2
2	Button_2_Monitor	50	0.0193	2
3	Periodic Transmitter	100	0.02465	1
4	Uart_Receive	20	0.02352	5
5	Load_1_Simulation	10	5	10
6	Load_2_Simulation	100	12	1

Hyper Period = LCM(Periodicities) = LCM(50,50,100,20,10,100).

HyperPeriod = 100

CPU Load = (Total Time / HyperPeriod) * 100

Total time = (0.019*2) + (0.0193 * 2) + (0.02465 * 1) + (0.02352*5) + (5*10) + (12*1) = 62.21

CPU Load = 62.21 %

General	Scheduler	Processors	Tasks							
id	Name	Task type	Abort on miss	Act. Date (ms)	Period (ms)	List of Act. dates (ms)	Deadline (ms)	WCET (ms)	Followed by	
1	TASK T1	Periodic	<input type="checkbox"/> No	0.0	50.0	-	50.0	0.019	2	
2	TASK T2	Periodic	<input type="checkbox"/> No	0.0	50.0	-	50.0	0.0193	2	
3	TASK T3	Periodic	<input type="checkbox"/> No	0.0	100.0	-	100.0	0.02465	1	
4	TASK T4	Periodic	<input type="checkbox"/> No	0.0	20.0	-	20.0	0.02352	3	
5	TASK T5	Periodic	<input type="checkbox"/> No	0.0	10.0	-	10.0	5.0	4	
6	TASK T6	Periodic	<input type="checkbox"/> No	0.0	100.0	-	100.0	12.0	1	

Since $D=10$ ms and $W(10) = 5$ ms so Task # 5 : is schedulable.

For Task 4 :

$$W(20) = 0.02352 + (20/10) * 5 = 10.02352 \text{ ms}$$

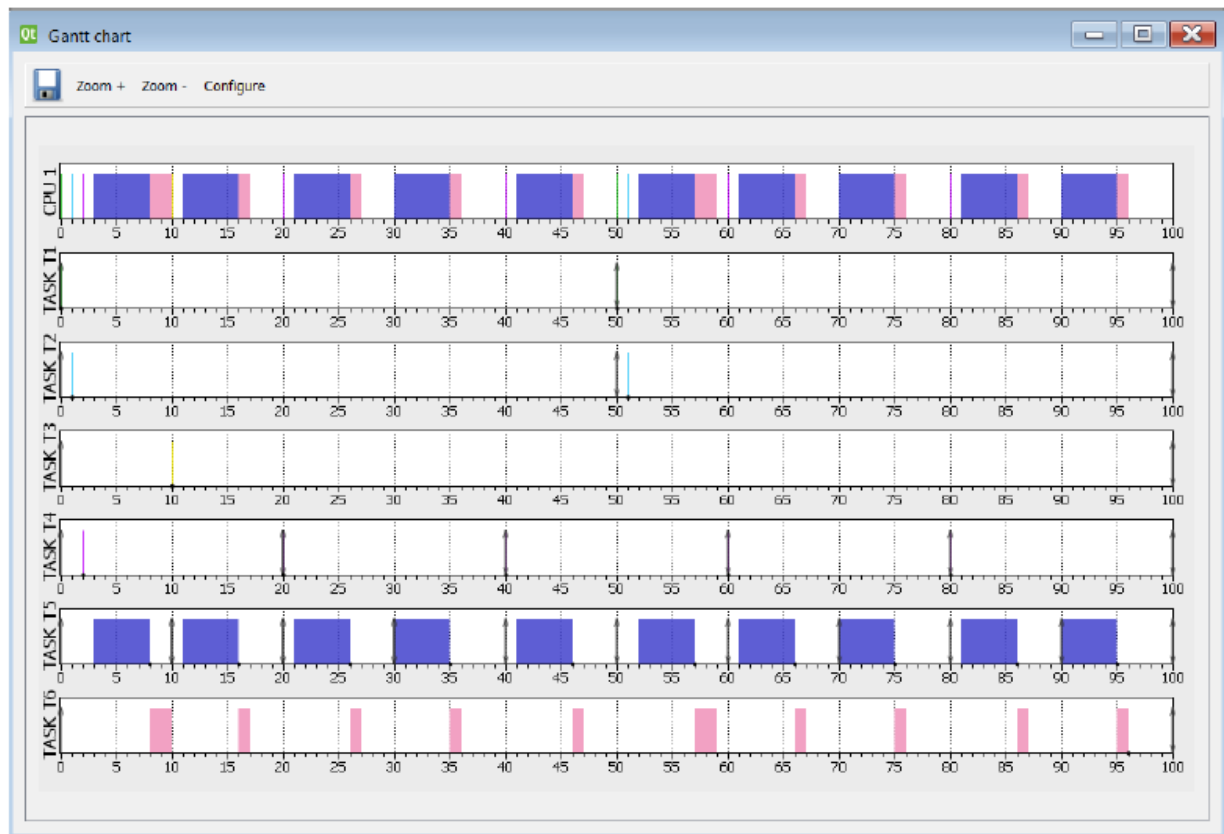
Since $D = 20$ ms and $W(20) = 10.02352$ ms

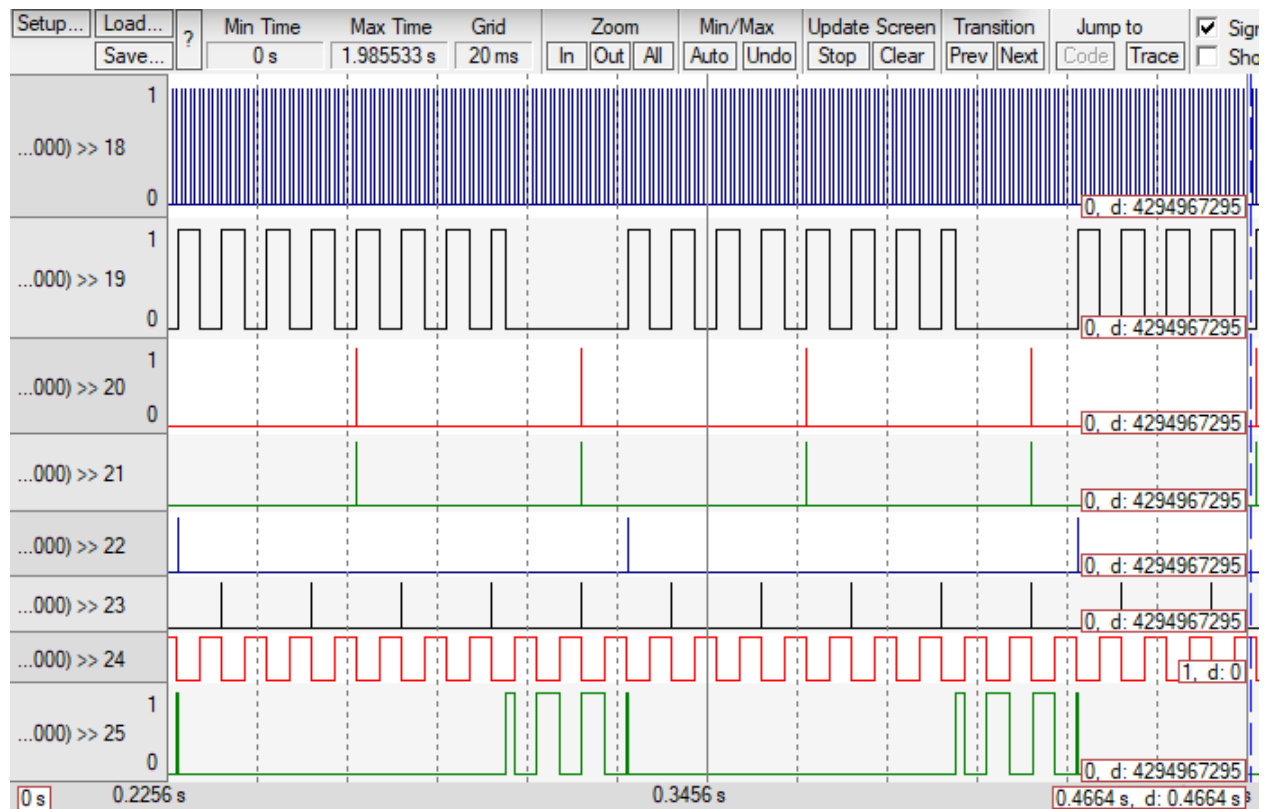
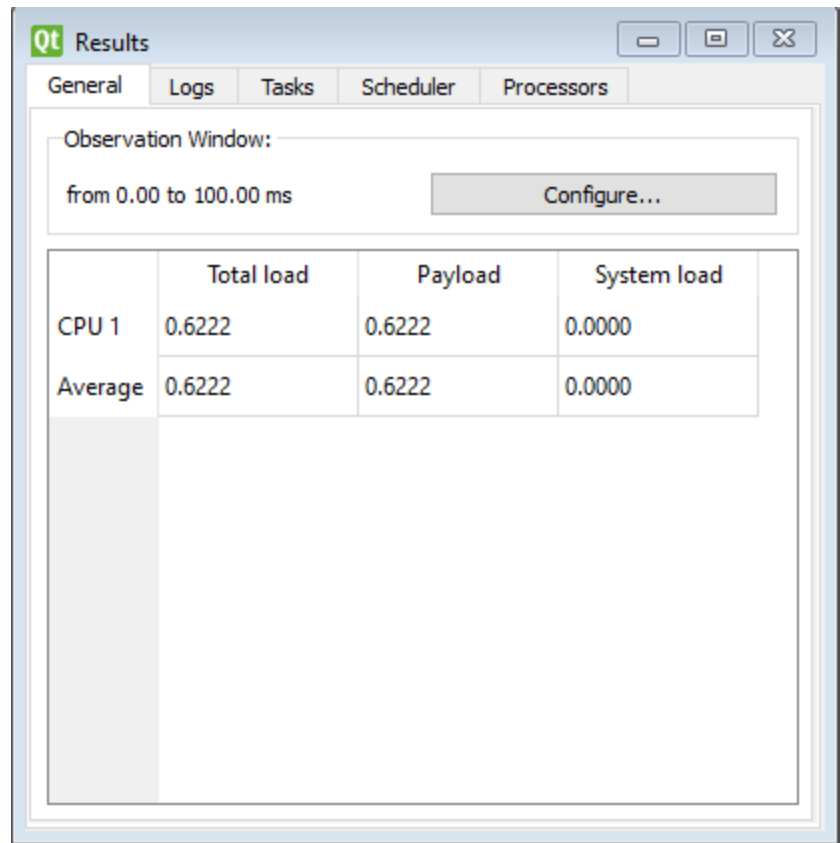
$W(20) < D$ so Task 4 is schedulable.

Make the same for other tasks we got that :

Task #1 , 2 , 3 ,6 are schedulable.

Therefore, our system is schedulable.





Watch 1		
Name	Value	Type
TasksTotalTime	0x40000118 TasksTotalTime	int[6]
Task_Loads	0x40000130 Task_Loads	int[6]
[0]	0	int
[1]	0	int
[2]	0	int
[3]	0	int
[4]	50	int
[5]	12	int
CPU_Load	62	int
System_Time	1463895	int
<Enter expression>		

General Purpose Input/Output 0 (GPIO 0)

GPIO0	31	Bits	24	23	Bits	16	15	Bits	8	7	Bits	0	
IO0DIR: 0xEFFC0000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IO0SET: 0x01000001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
IO0CLR: 0x00000000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IO0PIN: 0x0103FCFF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pins: 0x7903FEFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>