RTOS MASTERCLASS

FINAL PROJECT

ABDERLRAHMAN ELNAHAS

1.System info

TASK	PERODICITY	EXECUTION TIME	DEADLINE
Button 1	200 ms	17us	200 ms
Button 2	200 ms	20 us	200 ms
Periodic Transmitter	100 ms	21 us	100 ms
UART Receiver	100 ms	30 us	100 ms
Load 1	10 ms	5 ms	10 ms
Load 2	100 ms	12 ms	100 ms

2.Hyper Period

the time at which all the tasks occur together is 200 ms.

3.CPU Load

U = R/C

U = (E1 + E2 + E3 + E4 + E5 + E6)/H

U = ((17us * 1) + (20us * 1) + (21us * 2) + (30us * 2) + (5ms * 20) + (12ms * 2))/200ms

U = 62%

4.System Schedulability

- **Rate Monotonic**

  U = (17us/200ms) + (20us/200ms) + (21us/100ms) + (30us/100ms) + (5ms/10ms) + (12ms/100ms)

  U = .62

  Urm = 6*(2^(1/6)-1) = .734

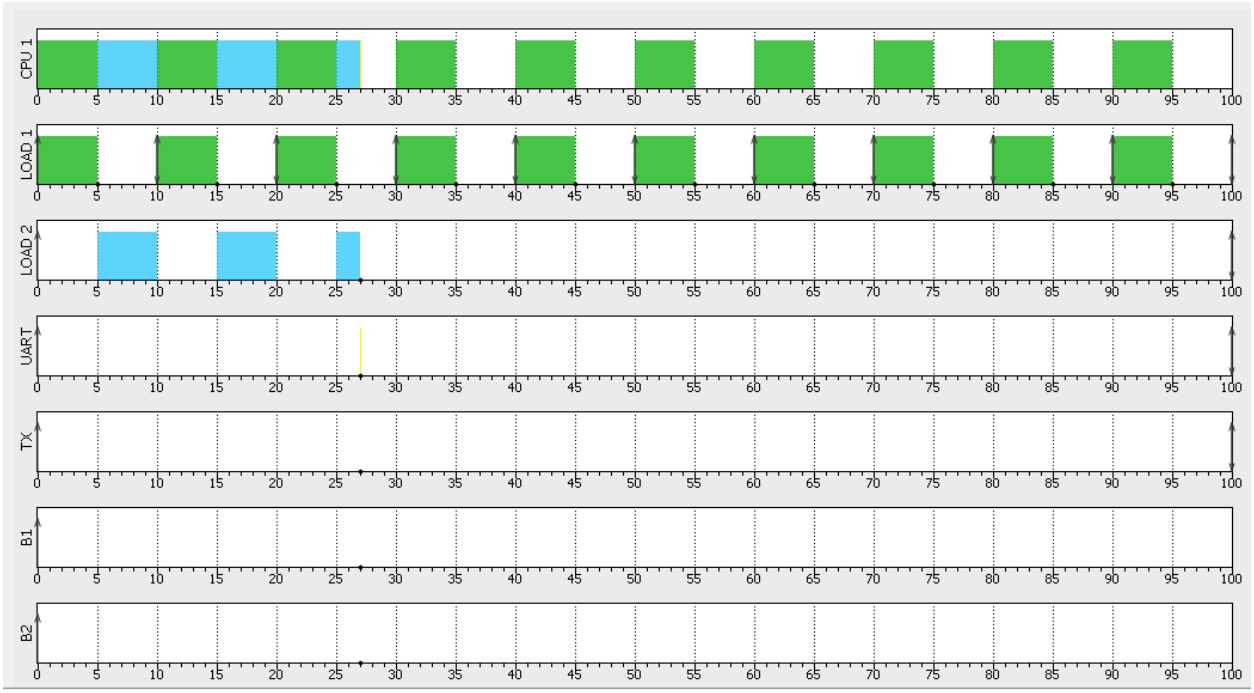
  U < Urm **SYSTEM IS SCHEDULABLE.**

- **Time demand**

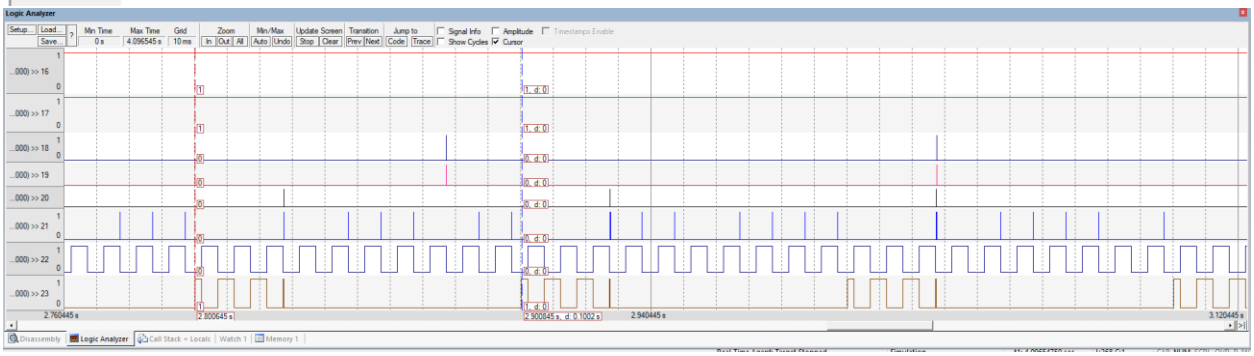
Load 1	**W(10)=5ms + 0 = 5ms<D**	**SCHEDULABLE**
Load 2	**W(100)=12ms+(100/10)*5ms = 62 ms < D**	**SCHEDULABLE**
UART RECIVER	**W(100)=30us+(100/10)*5ms = 50.03 ms < D**	**SCHEDULABLE**
PERIODIC TRANSMITTER	**W(100)=21us + +(100/10)*5ms = 50.021 ms < D**	**SCHEDULABLE**
BUTTON 1	**W(200) = 17us+ (100/10)*5ms + (200/100)*30us + (200/100)*21us = 50 ms <D**	**SCHEDULABLE**
BUTTON 2	**W(200) = 20us+ (200/10)*5ms + (200/100)*30us + (200/100)*21us +(200/100)*10ms = 112 ms <D**	**SCHEDULABLE**

- **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	LOAD 1	Periodic	Yes	0	10	-	10	5	
2	LOAD 2	Periodic	Yes	0	100		100	12	
3	UART	Periodic	Yes	0	100	-	100	0.003	
4	TX	Periodic	Yes	0	100	-	100	.021	
5	B1	Periodic	Yes	0	200	-	200	.02	
6	B2	Periodic	Yes	0	200	-	200	.017	



	Total load	Payload	System load
CPU 1	0.6209	0.6209	0.0000
Average	0.6209	0.6209	0.0000



Results as expected