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Implementing EDF Scheduler

1-Task 1:

"Button_1_Monitor", {Periodicity: 50, Deadline: 50}
This task will monitor rising and falling edge on button 1 and send this event to the consumer task. (Note: The rising and failling edges are treated as separate events, hence they have separate strings)

2-Task2

"Button_2_Monitor", {Periodicity: 50, Deadline: 50}
This task will monitor rising and falling edge on button 2 and send this event to the consumer task. (Note: The rising and failling edges are treated as separate events, hence they have separate strings)

3-Task3

"Periodic Transmitter", {Periodicity: 100, Deadline: 100}
This task will send periodic string every 100ms to the consumer task

4-Task4

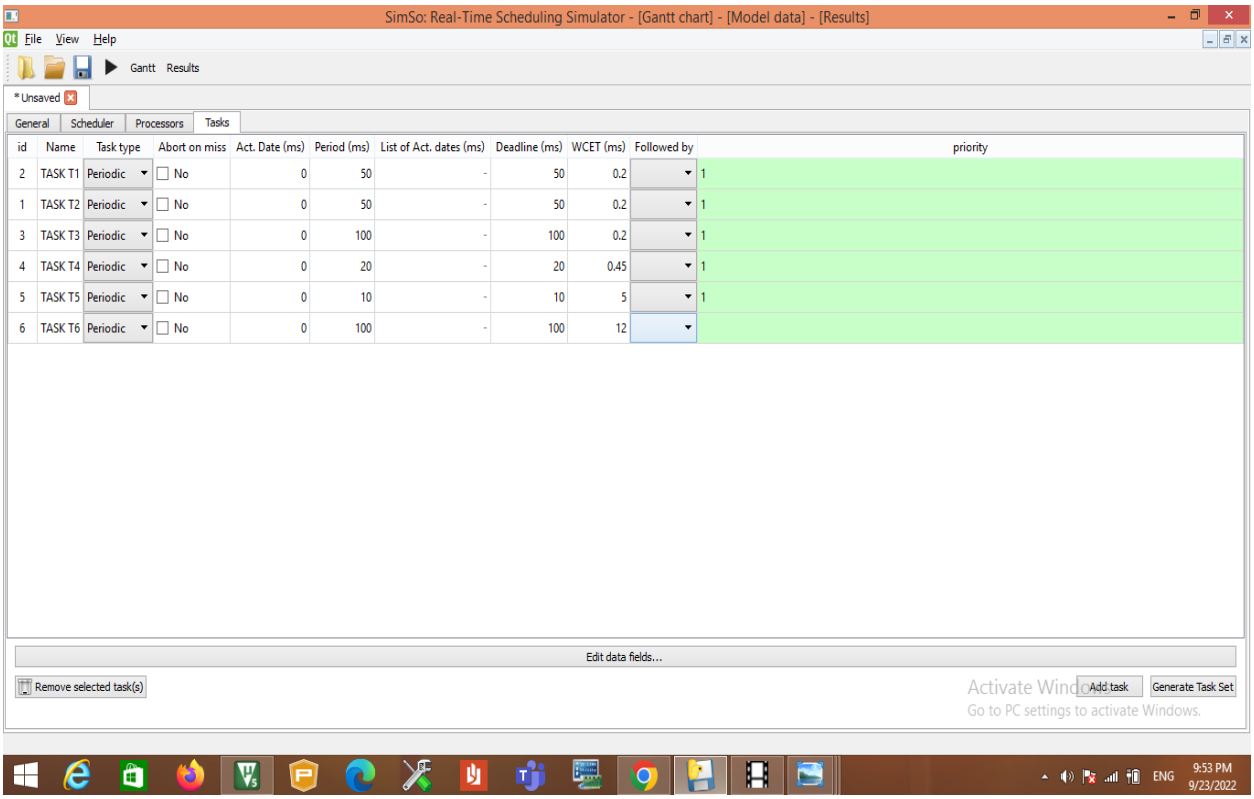
"Uart_Receiver", {Periodicity: 20, Deadline: 20}
This is the consumer task which will write on UART any received string from other tasks

5-Task5

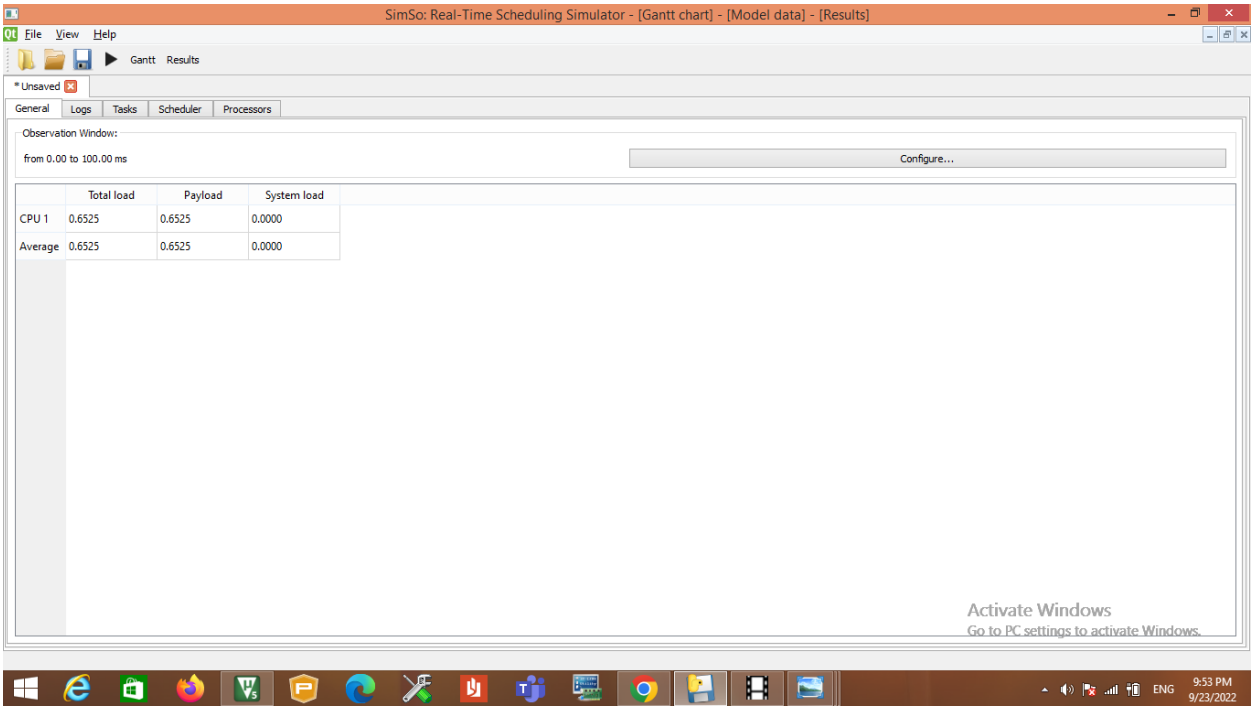
"Load_1_Simulation", {Periodicity: 10, Deadline: 10}, Execution time: 5ms

6-Task6

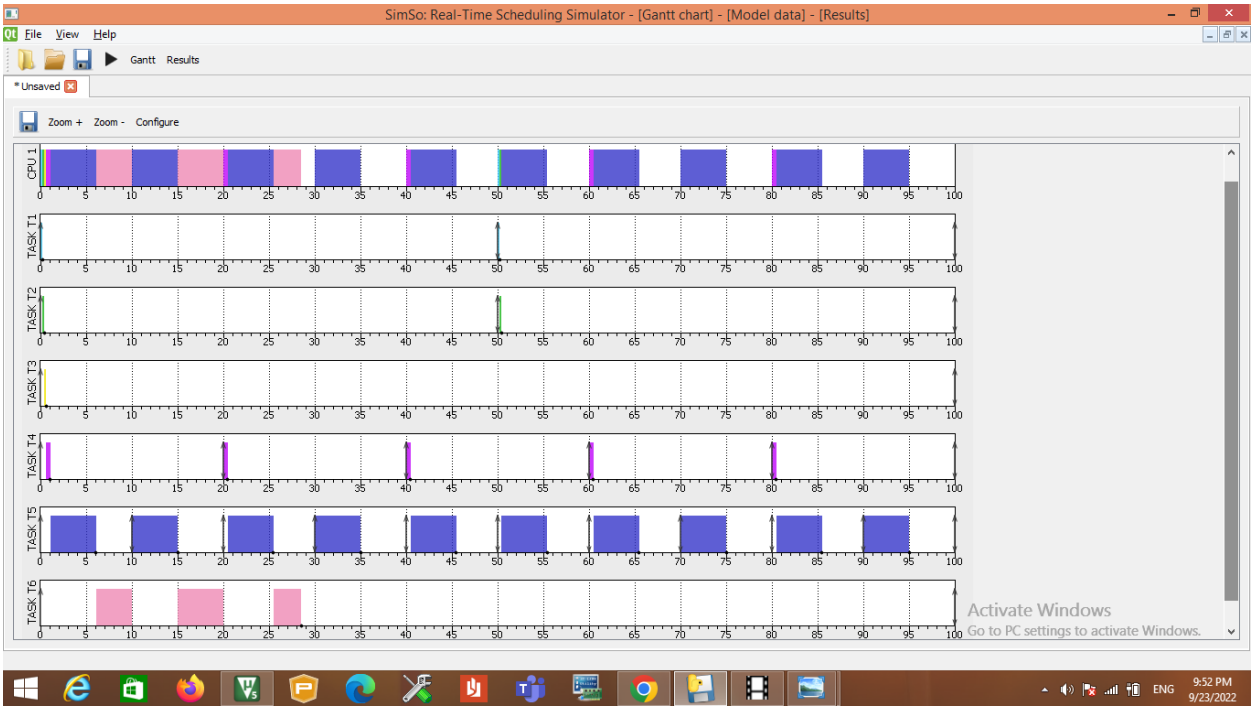
"Load_2_Simulation", {Periodicity: 100, Deadline: 100}, Execution time: 12ms



Cpu Load by using Simso 65.25%



Scedulability by using simso



Detect The HyperPeriod Of The System?

The system will repeat itself and all tasks will execute together each 100ms.

Detect The CPU Load Of The System?

U=((0.2/50)+(0.2/50)+(0.2/100)+(0.45/20)+(5/10)+(12/100))*100

=65.25%

Detect The Schedulability Of The System?

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

65.25% < 6 (2^(1/6)-1)

65.25%< 73.477% --- > So system is Schedulable

Detect The Schedulability Of The System using Time Demade?

$$w_i(t) = e_i + \sum_{k=1}^{i-1} \left\lceil \frac{t}{p_k} \right\rceil e_k \quad for\ 0 < t \le p_i$$

W = Worst response time
E = Execution time
P = Periodicity
T = Time instance

Task1 → 20u+(50/20)45u+(50/10)*5m= 25.123m < 50m → Schedulable

Task2 →20u+(50/50)20u+(50/20)45u+(50/10)*5m = 25.1525m <50m→ Sched

Task3 →20u+2(100/50)20u+(100/20)45u+(100/10)*5m= 50.305m < 100 →Sched

Task4 →20u+(20/10)*5m = 10.02m < 20m→ Schedulable

Task5 →5m +0 = 5m →10m

Task6 →12m+3(100/50)20u+(100/20)45u+(100/10)*5m = 62.345m →100m Sched