

# Khaled Shalaby

## 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

SimSo: Real-Time Scheduling Simulator - [Gantt chart] - [Model data] - [Results]

File View Help

Unsaved

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	priority
2	TASK T1	Periodic	<input type="checkbox"/> No	0	50	-	50	0.2	1	
1	TASK T2	Periodic	<input type="checkbox"/> No	0	50	-	50	0.2	1	
3	TASK T3	Periodic	<input type="checkbox"/> No	0	100	-	100	0.2	1	
4	TASK T4	Periodic	<input type="checkbox"/> No	0	20	-	20	0.45	1	
5	TASK T5	Periodic	<input type="checkbox"/> No	0	10	-	10	5	1	
6	TASK T6	Periodic	<input type="checkbox"/> No	0	100	-	100	12		

Edit data fields...

Remove selected task(s)

Activate Windows  
Go to PC settings to activate Windows.

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## Cpu Load by using Simso 65.25%

SimSo: Real-Time Scheduling Simulator - [Gantt chart] - [Model data] - [Results]

File View Help

Unsaved

General Logs Tasks Scheduler Processors

Observation Window:  
from 0.00 to 100.00 ms

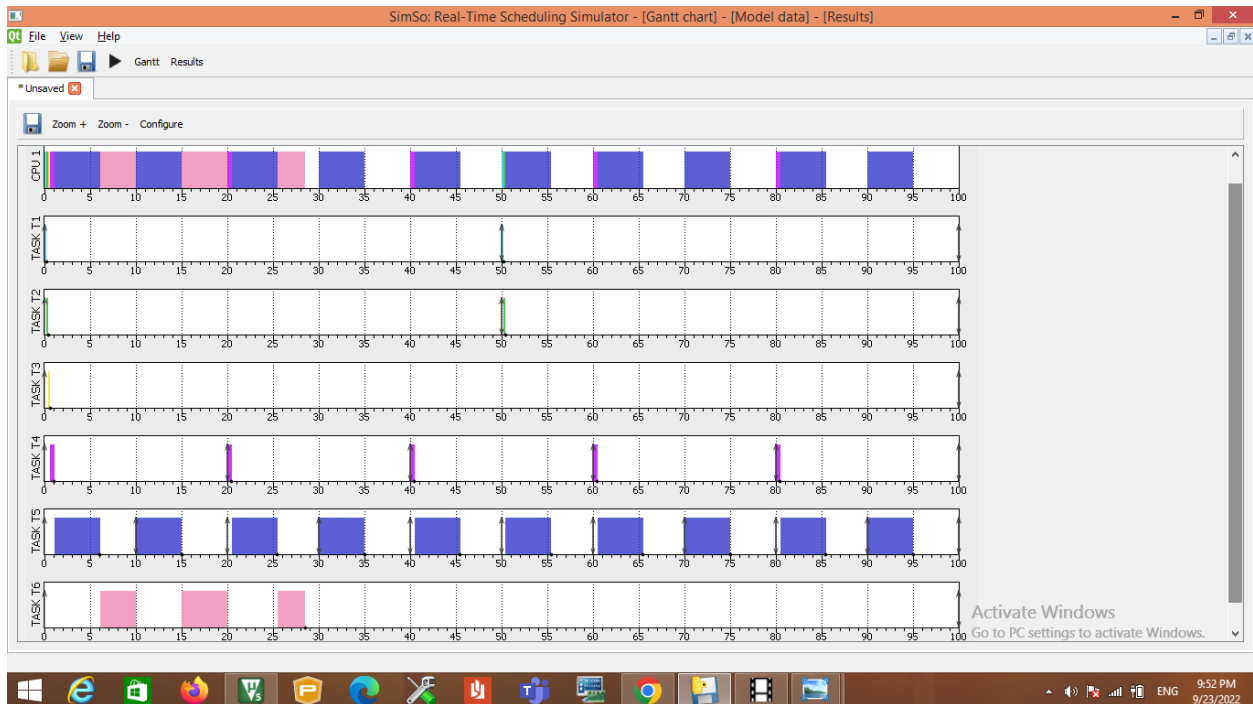
Configure...

	Total load	Payload	System load
CPU 1	0.6525	0.6525	0.0000
Average	0.6525	0.6525	0.0000

Activate Windows  
Go to PC settings to activate Windows.

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## 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?

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

W = Worst response time

E = Execution time

P = Periodicity

T = Time instance

Activate Windows  
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Task1  $\rightarrow 20u + (50/20)45u + (50/10)*5m = 25.123m < 50m \rightarrow$  Schedulable

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

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

Task4  $\rightarrow 20u + (20/10)*5m = 10.02m < 20m \rightarrow$  Schedulable

Task5  $\rightarrow 5m + 0 = 5m \rightarrow 10m$

Task6  $\rightarrow 12m + 3(100/50)20u + (100/20)45u + (100/10)*5m = 62.345m \rightarrow 100m$

Sched