Schedulability Calculation

1) Define Tasks.

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Task (1): {Periodicity: 50 , Deadline: 50 , Execution time: 0.018ms }
Task (2): {Periodicity: 50 , Deadline: 50 , Execution time: 0.018ms }
Task (3): {Periodicity: 100 , Deadline: 100 , Execution time: 0.084ms }
Task (4): {Periodicity: 20 , Deadline: 20 , Execution time: 0.025ms }
Task (5): {Periodicity: 10 , Deadline: 10 , Execution time: 5ms }
Task (6): {Periodicity: 100 , Deadline: 100 , Execution time: 12ms }
```

2) Analytic Method (Rate - Monotonic).

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U = \sum_{i=1}^n \frac{C_i}{P_i} \leq n(2^{\frac{1}{n}} - 1) \\ \qquad \begin{array}{c} \text{U = Total Utilization} \\ \text{C = Execution time} \\ \text{P = Periodicity} \\ \text{N = Number of tasks} \end{array}
```

- Hyper Period =100ms
- O Utilization = (Total Time / Period) * 100 = 1 * (4*0.018 + 0.084 + 5*0.025 + 10*5 + 12)=62.281%
- \circ CPU(LOAD)=2(0.018/50) + (0.084/100) + (0.025/20) + (5/10) + (12/100) = 0.6228
- \circ URM=6*(2^(1/6) 1) = 0.7347
- System Is Schedulable.

3) Analytic Method (Time Demand).

 $w_i(t) = e_i + \sum_{k=1}^{i-1} \left\lceil \frac{t}{p_k} \right\rceil e_k \quad \text{ for } 0 < t \le p_i \quad \text{E = Execution time } \\ \text{E = Periodicity} \\ \text{T = Time instance} \\$

- Hyper Period =100ms
- Task (5): {Periodicity:10 , Deadline:10 , Execution time:5ms}

O Task (4): {Periodicity:20 , Deadline: 10 , Execution time: 0.025ms}

o Task (1): {Periodicity:50 , Deadline: 50 , Execution time: 0.018ms}

- W (1) = 0.018 + (1/10) * 5 + (1/20) * 0.025 = 5.043 >>>>>>>>> - W (50) = 0.018 + (50/10) * 5 + (50/20) * 0.025 = 25.093

- W (50) < Deadline (50) ->Schedulable

o Task (2): {Periodicity:50 , Deadline: 50 , Execution time: 0.018ms}

- W (50) = 0.018 + (50/10) * 5 + (50/20) * 0.025 + (50/50) * 0.018 = 25.111 - W (50) < Deadline (50) ->Schedulable

o Task (3): {Periodicity:100 , Deadline:100 , Execution time:0.084ms}

- W (100) = 0.084 + (100/10) * 5 + (100/20) * 0.025 + (100/50) * 0.018 + (100/50) * 0.018 = 50.281

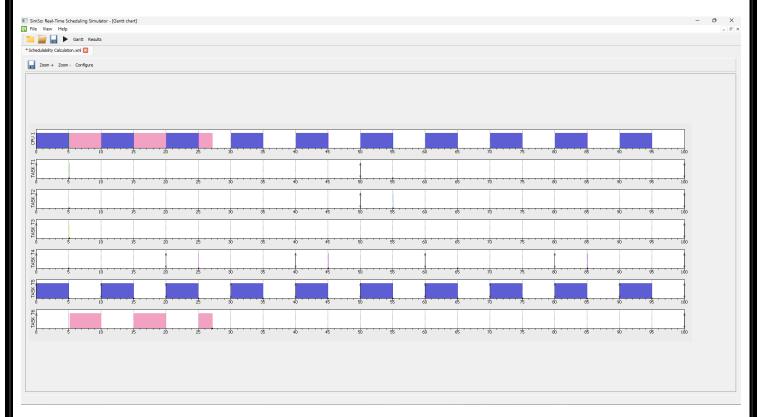
- W (100) < Deadline (100) -> Schedulable

o Task (6):

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

- W (100) = 12 + (100/10) * 5 + (100/20) * 0.025 + (100/50) * 0.018 + (100/50) * 0.018 + 0.084 * (100/100) = 62.281 - W (100) < Deadline (100) ->Schedulable

1) SimSo Simulation



	Total load	Payload	System load
CPU 1	0.6228	0.6228	0.0000
Average	0.6228	0.6228	0.0000

Computation time:							
Task	min	avg	max	std dev	occupancy		
TASK T1	0.018	0.018	0.018	0.000	0.000		
TASK T2	0.018	0.018	0.018	0.000	0.000		
TASK T3	0.084	0.084	0.084	0.000	0.001		
TASK T4	0.025	0.025	0.025	0.000	0.001		
TASK T5	5.000	5.000	5.000	0.000	0.500		
TASK T6	12.000	12.000	12.000	0.000	0.120		

4) Keil Simulation

