Theory assignment

1. T1(15, 1, 14) T2(20, 2, 26) T3(22, 3)
   Requirement 1: f >= 3
   Requirement 2: f = {22, 20, 15, 12, 11, 10, 6, 5, 4, 3, 2, 1}
   Requirement 3: 2f - gcd(pi, f) <= Di

f	T1(15, 1, 14)	T2(20, 2, 26)	T3(22, 3)
22	44 - 1 <= 14 (X)		
20	40 - 5 <= 14 (X)		
15	30 - 15 <= 14 (X)		
12	24 - 3 <= 14 (X)		
11	22 - 1 <= 14 (X)		
10	20 - 5 <= 14 (X)		
6	12 - 3 <= 14 (OK)	12 - 2 <= 26 (OK)	12 - 2 <= 22 (OK)

   Frame size: 6

2. T1(4, 1) T2(5, 2, 7) T3(20, 5)
   Requirement 1: f >= 5
   Requirement 2: f = {1, 2, 4, 5, 10, 20}
   Requirement 3: 2f - gcd(pi, f) <= Di

f	T1(4, 1)	T2(5, 2, 7)	T3(20, 5)
20	40 - 4 <= 4 (X)		
10	20 - 2 <= 4 (X)		
5	10 - 1 <= 4 (X)		
4	8 - 4 <= 4 (OK)	8 - 1 <= 7 (OK)	8 - 4 <= 20 (OK)

   Frame size: 4, Job from T3 split into 2 parts. One part is time of 4, another is time of 1.

3. T1(5, 0.1) T2(7, 1) T3(12, 6) T4(45, 9)
   Requirement 1: f >= 9
   Requirement 2: f = {1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 14, 15, 18, 20, 21, 28, 30, 35, 42, 45}
   Requirement 3: 2f - gcd(pi, f) <= Di

f	T1(5, 0.1)	T2(7, 1)	T3(12, 6)	T4(45, 9)
45	90 - 5 <= 5 (X)			
42	84 - 1 <= 5 (X)			
35	70 - 5 <= 5 (X)			
30	60 - 5 <= 5 (X)			
28	56 - 1 <= 5 (X)			
21	42 - 1 <= 5 (X)			
20	40 - 5 <= 5 (X)			
18	35 - 1 <= 5 (X)			
15	30 - 5 <= 5 (X)			
14	28 - 1 <= 5 (X)			
12	24 - 1 <= 5 (X)			
10	20 - 5 <= 5 (X)			
9	18 - 1 <= 5 (X)			
7	14 - 1 <= 5 (X)			
6	12 - 1 <= 5 (X)			
5	10 - 5 <= 5 (OK)	10 - 1 <= 7 (X)		
4	8 - 1 <= 5 (X)			
3	6 - 1 <= 5 (OK)	6 - 1 <= 7 (OK)	6 - 3 <= 12 (OK)	6 - 3 <= 45 (OK)

   Frame size: 3.
   Job from T3 splits into 2 parts, each part is 3. Job from T4 splits into 3 parts, each is the same.

Simulation assignment

1. T1(2, 0.5), T2(3, 1.2), T3(6, 0.5)and the RM scheduler into the SimSo simulator
   - What is the utilization factor of the system and what is the value for Urm(3)
     Ans: U = 0.5 / 2 + 1.2 /3 + 0.5 /6 = 0.7333
       Urm(3) = 3(2^1/3 – 1) = 0.779
       U <= Urm → system is guaranteed feasible.

	Total load	Payload	System load
CPU 1	0.7333	0.7333	0.0000
Average	0.7333	0.7333	0.0000

Task	min	avg	max	std dev	occupancy
TASK T1	0.500	0.500	0.500	0.000	0.250
TASK T2	1.200	1.200	1.200	0.000	0.400
TASK T3	0.500	0.500	0.500	0.000	0.083

   - What is the minimum/maximum/average response time of all tasks?

Response time:

Task	min	avg	max	std dev
TASK T1	0.500	0.500	0.500	0.000
TASK T2	1.700	1.700	1.700	0.000
TASK T3	2.700	2.700	2.700	0.000

   - Is any task missing the deadline? Which task? Where?

     Ans: The system is feasible, there isn't any task missing deadline.

   - If a deadline is missed, could it be avoided by changing the scheduler?

     Ans: The system is feasible.
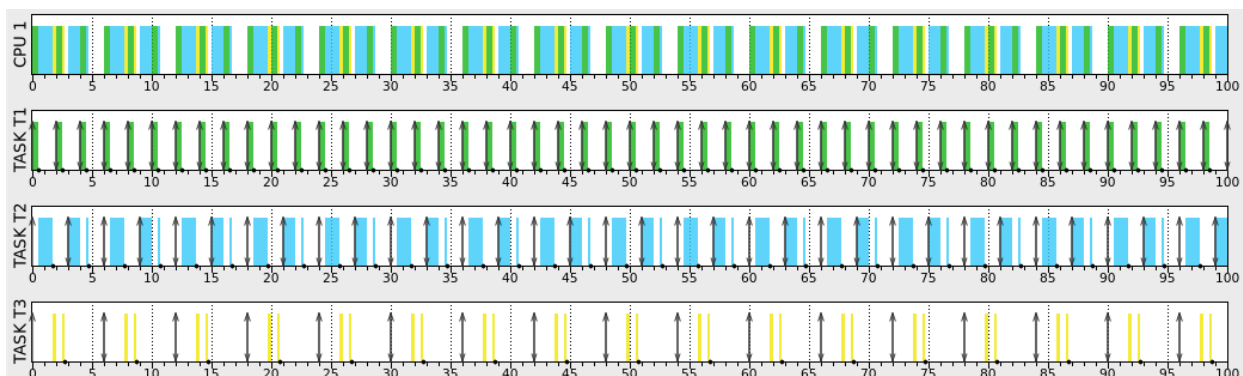
2. T1(2, 0.5, 1.9) T2(5, 2) T3(1, 0.1, 0.5) T4(10, 5, 20)and the EDF scheduler into the SimSo simulator

- What is the utilization factor of the system and what is the value for Urm(4)

  Ans: Urm(4) = 4(2^1/4 – 1) = 0.7568

  U = 0.5/2 + 2/5 + 0.1 + 5/10 = 1.25

  U > 1, the system is guaranteed not feasible.

	Total load	Payload	System load
CPU 1	1.0000	1.0000	0.0000
Average	1.0000	1.0000	0.0000

- What is the minimum/maximum/average response time of all tasks?

Task	min	avg	max	std dev
TASK T1	0.600	0.600	0.600	0.000
TASK T2	2.800	3.100	3.400	0.300
TASK T3	0.100	0.100	0.100	0.000
TASK T4	20.000	20.000	20.000	0.000

- Is any task missing the deadline? Which task? Where?

  Ans: T4 is missing the deadline at time 30, 40, 50, 60, 70, 80, 90, 100.

General	TASK T1	TASK T2	TASK T3	TASK T4	
Activation	Start	End	Deadline	Comp. time	Resp. time
0.0000	0.0000	20.0000	20.0000	5.0000	20.0000
10.0000	20.0000	30.0000	30.0000	2.5000	20.0000
20.0000	30.0000	40.0000	40.0000	2.5000	20.0000
30.0000	40.0000	50.0000	50.0000	2.5000	20.0000
40.0000	50.0000	60.0000	60.0000	2.5000	20.0000
50.0000	60.0000	70.0000	70.0000	2.5000	20.0000
60.0000	70.0000	80.0000	80.0000	2.5000	20.0000
70.0000	80.0000	90.0000	90.0000	2.5000	20.0000
80.0000	90.0000	100.0000	100.0000	2.5000	20.0000
90.0000	100.0000		110.0000		
100.0000			120.0000		

- If a deadline is missed, could it be avoided by changing the scheduler?

  Ans: Because U > 1, it couldn't be avoided by changing the scheduler.