Theory assignment

Requirement 1: f >= 3
Requirement 2 : Candidate divide H (hyperperiod) evenly
Requirement 3: 2f - gdc(pi, f) <= Di

T1(15, 1, 14) T2(20, 2, 26) T3(22, 3) f = {22, 20, 15, 11, 10, 5, 4, 3}

f = 10
2*10 - gcd(15, 10) <= 14 20 - 5 > 14
2*10 - gcd(20, 10) <= 26 20 - 10 <= 26
2*10 - gcd(22, 10) <= 22 20 - 2 <= 22

f = 5
2*5 - gcd(15, 5) <= 14 10 - 5 <= 14
2*5 - gcd(20, 5) <= 26 10 - 5 <= 26
2*5 - gcd(22, 5) <= 22 10 - 1 <= 22

Choose f = 5 (frame size)

T1(4, 1) T2(5, 2, 7) T3(20, 5) f = {20, 10, 5, 4, 2, 1}

f = 5
2 * 5 - gcd(4, 5) <= 4 10 - 1 > 4
2 * 5 - gcd(5, 5) <= 7 10 - 1 > 7
2 * 5 - gcd(20, 5) <= 20 10 - 5 <= 20

f = 4
2 * 4 - gcd(4, 4) <= 4 8 - 4 <= 4
2 * 4 - gcd(5, 4) <= 7 8 - 1 <= 7
2 * 4 - gcd(20, 4) <= 20 8 - 4 <= 4

Choose f = 4 (frame size)
T3 has to be split into two tasks (20, 3) (20, 2)

T1(5, 0.1) T2(7, 1) T3(12, 6) T4(45, 9) f = {45, 12, 7, 6, 3}

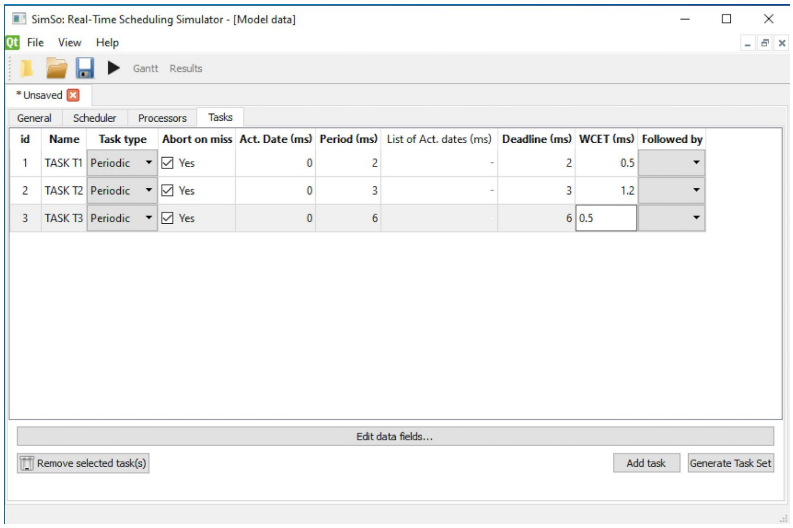
f = 6
2 * 6 - gcd(5, 6) <= 5 12 - 1 > 5
2 * 6 - gcd(7, 6) <= 7 12 - 1 > 7
2 * 6 - gcd(12, 6) <= 12 12 - 6 <= 12
2 * 6 - gcd(45, 6) <= 45 12 - 3 <= 45

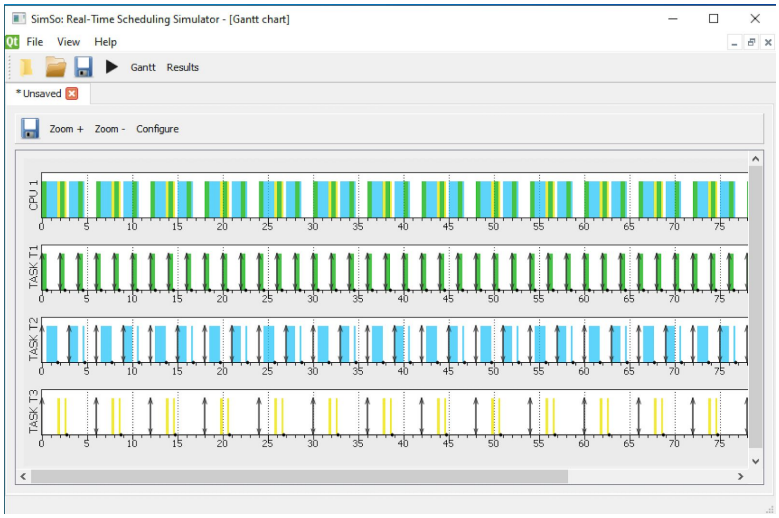
f = 3
2 * 3 - gcd(5, 3) <= 5 6 - 1 <= 5
2 * 3 - gcd(7, 3) <= 7 6 - 1 <= 7
2 * 3 - gcd(12, 3) <= 12 6 - 3 <= 12
2 * 3 - gcd(45, 3) <= 45 6 - 3 <= 45

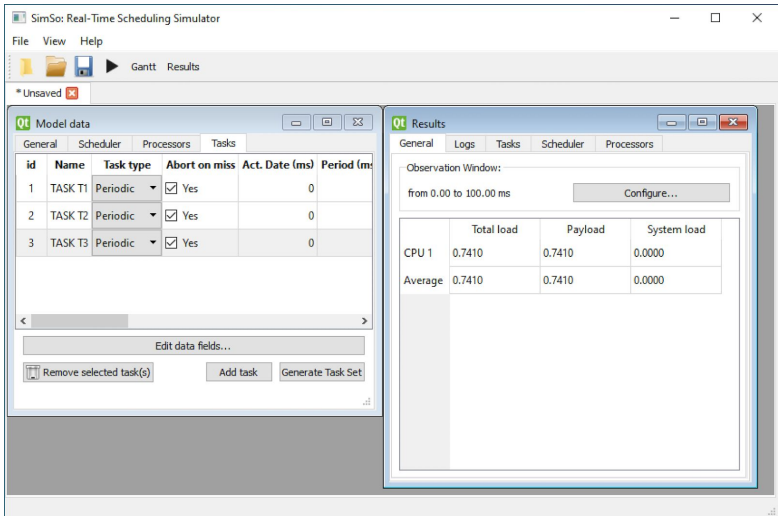
Choose f = 3 (frame size)
T3 has to be split into two tasks (12, 3) (12, 2)
T4 has to be split into three tasks (45, 3) (45, 3) (45, 3)

Simulation assignment

T1(2, 0.5), T2(3, 1.2), T3(6, 0.5)




SimSo: Real-Time Scheduling Simulator - [Gantt chart]
File View Help
Gantt Results
*Unsaved
Zoom + Zoom - Configure
CPU 1
TASK T1
TASK T2
TASK T3


SimSo: Real-Time Scheduling Simulator
File View Help
Gantt Results
*Unsaved
Model data
General Scheduler Processors Tasks
id Name Task type Abort on miss Act. Date (ms) Period (ms
1 TASK T1 Periodic Yes 0
2 TASK T2 Periodic Yes 0
3 TASK T3 Periodic Yes 0
Edit data fields...
Remove selected task(s)
Add task
Generate Task Set
Results
General Logs Tasks Scheduler Processors
Observation Window:
from 0.00 to 100.00 ms
Configure...
Total load Payload System load
CPU 1 0.7410 0.7410 0.0000
Average 0.7410 0.7410 0.0000

1. What is the utilization factor of the system and what is the value for Urm(3)

U=0.7410 and Urm=0.779

U<Urm, so feasible

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

Response time(min,max,avg)=> Task1: 0.5

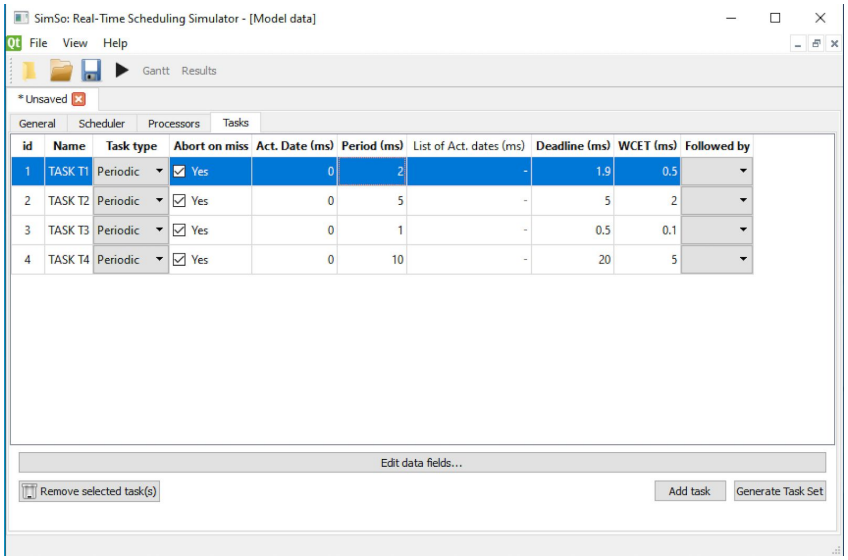
Task2: 1.7

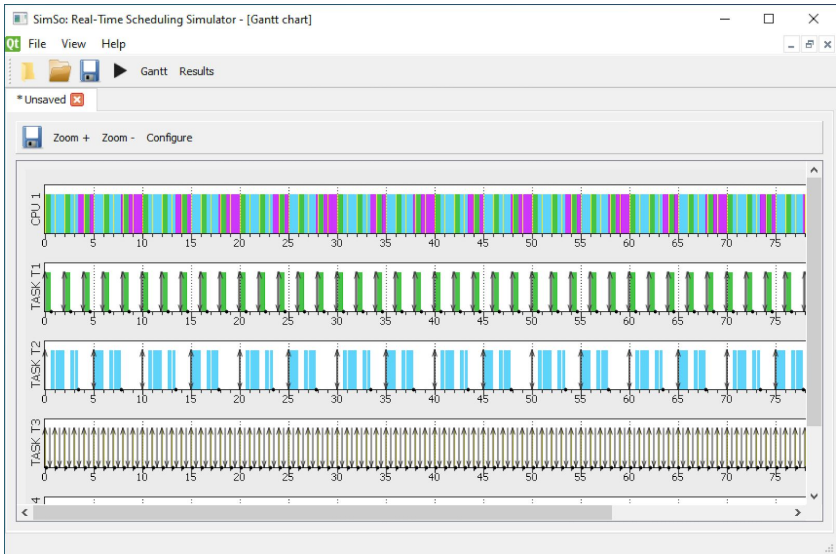
Task3: 2.7

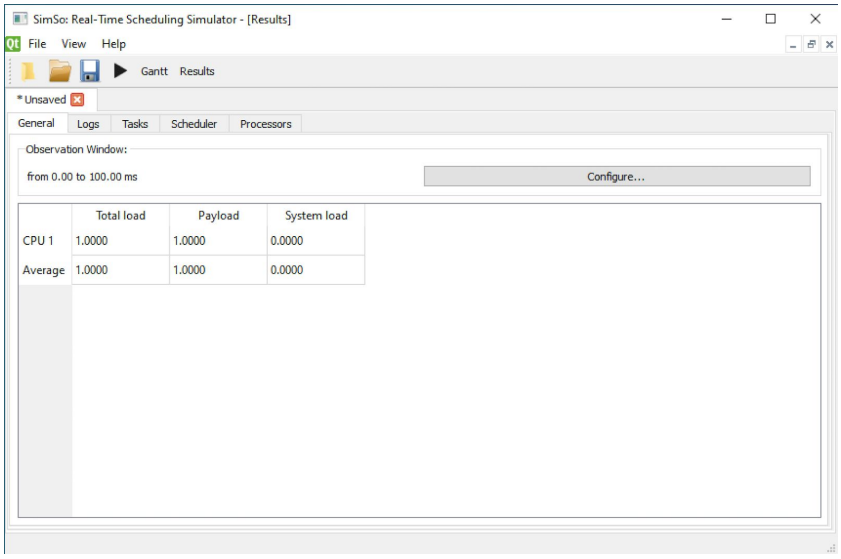
3. Is any task missing the deadline? Which task? Where?

No.

T1(2, 0.5, 1.9) T2(5, 2) T3(1, 0.1, 0.5) T4(10, 5, 20)




SimSo: Real-Time Scheduling Simulator - [Gantt chart]
File View Help
Gantt Results
*Unsaved
Zoom + Zoom - Configure
CPU 1
TASK T1
TASK T2
TASK T3
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75


SimSo: Real-Time Scheduling Simulator - [Results]
File View Help
Gantt Results
*Unsaved
General Logs Tasks Scheduler Processors
Observation Window:
from 0.00 to 100.00 ms
Configure...
Total load Payload System load
CPU 1 1.0000 1.0000 0.0000
Average 1.0000 1.0000 0.0000

1. What is the utilization factor of the system and what is the value for Urm(3)

U=1.00 and Urm verification not applicable in EDF Scheduler.

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

Response time=> Task1: min=0.6, max=0.6, avg=0.6

Task2: min=2.8, max=3.4, avg=3.1

Task3: min=0.1, max=0.1, avg=0.1

Task4: min=20, max=20, avg=20

3. Is any task missing the deadline? Which task? Where?

Yes. Task4
At t=30, 40, 50, 60, 70, 80, 90, 100

4. If a deadline is missed, could it be avoided by changing the scheduler?
No. Because the CPU is 100% used.