Scheduling analysis

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This document provides analysis for simple RTOS system where we use URM analysis and time demand analysis and test our manual calculations using Simso.

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Table of Content:

Tasks description:

Task 1: [P: 5, E: 2.5, D: 5]

Task 2: [P: 15, E: 4.5, D: 15]

Task 3: [P: 20, E: 3.5.5, D: 20]

URM analysis:

U = (E1/P1) + (E2/P2) + (E3/P3) = (2.5/5) + (4.5/15) + (3.5/20) = 0.975

URM = n * (2^(1/n) – 1) = 3 * (2^(1/3) – 1) = 0.779

Result: As U > URM , Then the system isn't schedulable.

Comment: As all tasks are periodic tasks and deadlines are equal to periodicities, URM analysis technique can be applied.

Time demand analysis:

Task 1: [P: 5, E: 2.5, D: 5]

Task 2: [P: 15, E: 4.5, D: 15]

Task 3: [P: 20, E: 3.5, D: 20]

1- Calculating critical instant

(LCM) hyper period = 60.

2- For task1 ➔ provided time = 5 ms.

Needed time = 2.5 + 0 = 2.5 ms

Needed < provided ➔ task1 is schedulable.

3- For task2 ➔ provided time = 15 ms.

Needed time = 4.5 + (2.5*3) = 12 ms

Needed < provided ➔ task2 is schedulable.

4- For task3 ➔ provided time = 20 ms.

Needed time = 3.5 + (2.5*4) + (4.5*2) = 22.5 ms

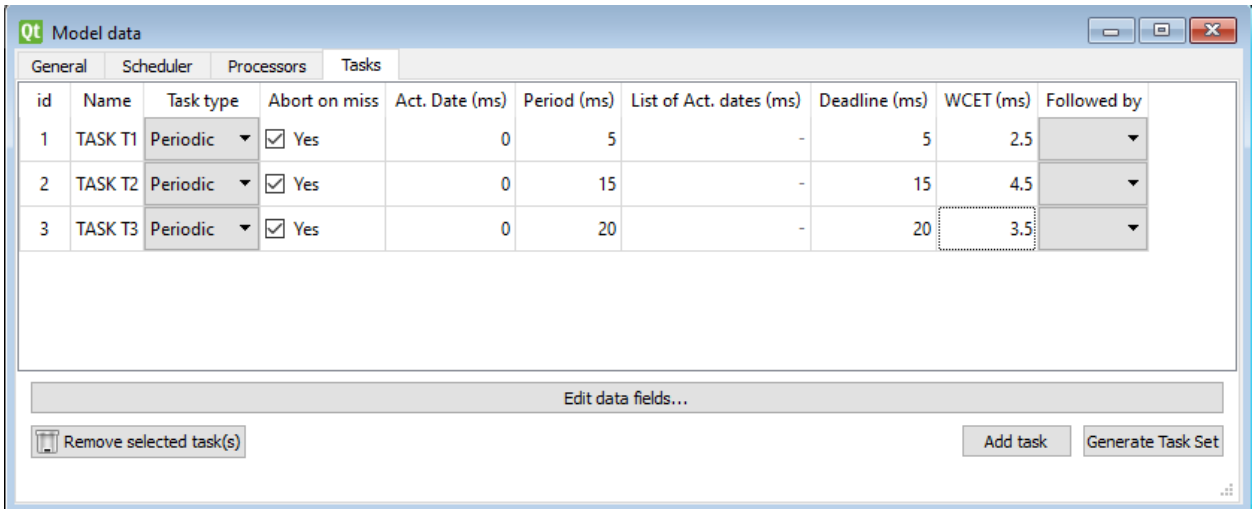
Needed > provided ➔ task3 isn't schedulable.

Result: The system isn't schedulable.

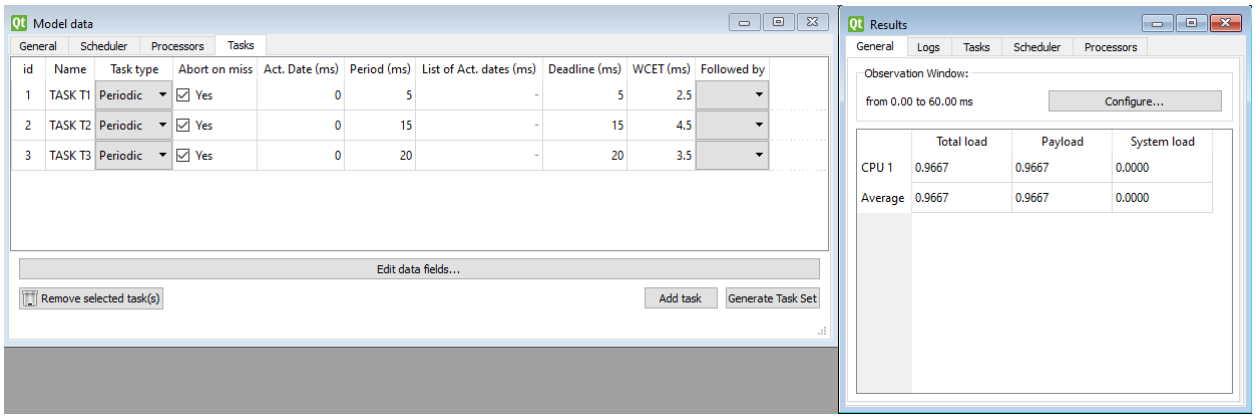
Comment: It's predicted that this system isn't schedulable because URM which is the optimum analysis shows that this isn't a schedulable .

SimSO Figures:

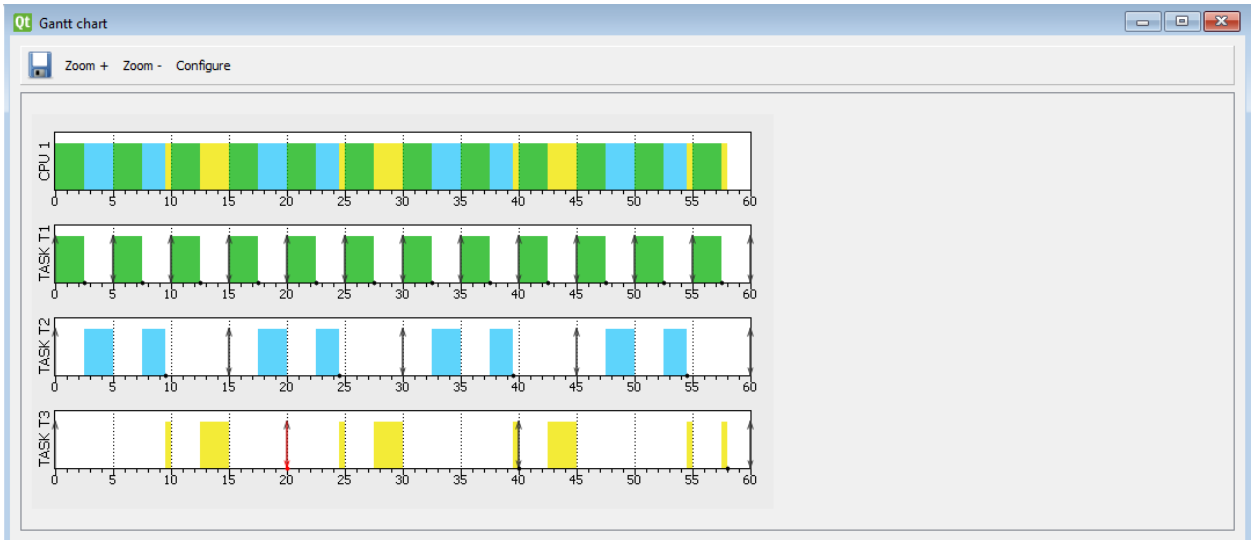
1- Adding tasks



2- CPU load



3- Time line



Comment: Simso shows that system is not schedulable (Task3 missed deadline) and also the CPU_load is very high.