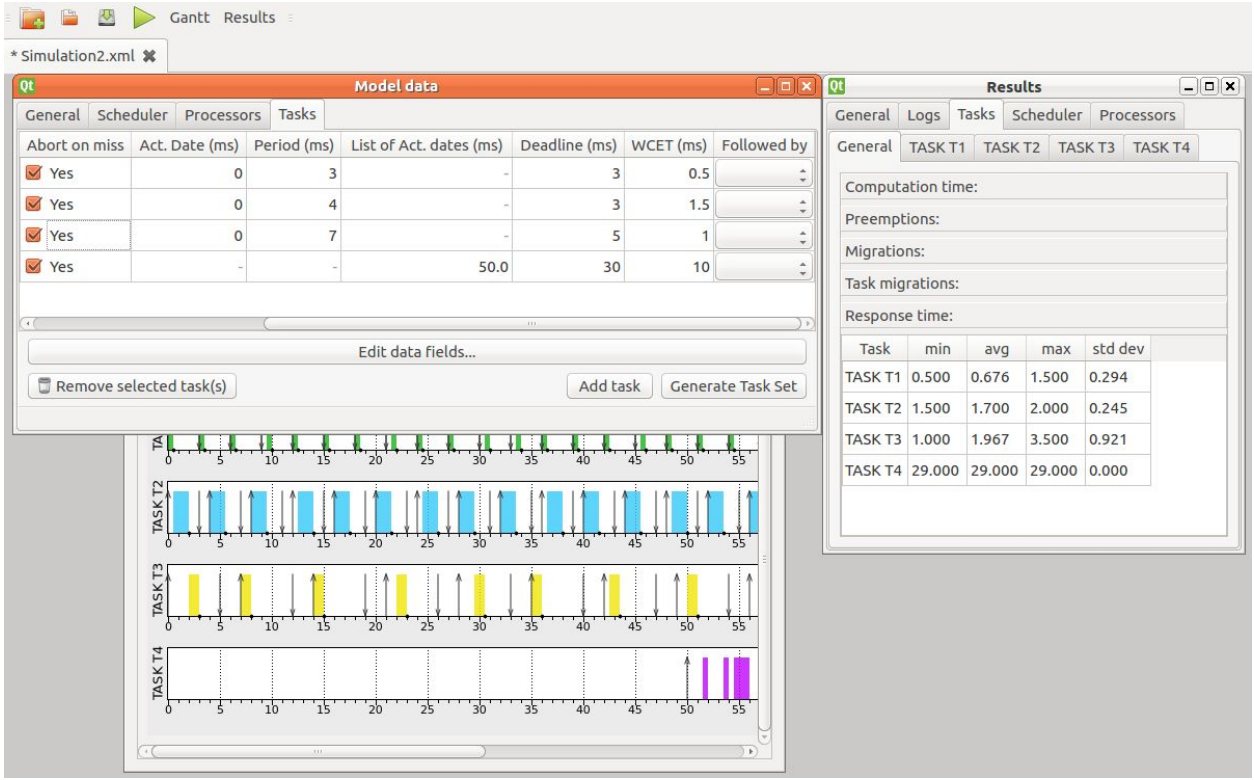
Development of Real-Time system

Assignment 4:

Simulation assignment:

1. Consider the tasks T1(3, 0.5), T2(4, 1.5, 3), T3(7, 1.0, 5) and the EDF scheduler. A sporadic job arrives at t=50 having the execution time of 10 and a relative deadline of 30. Create the sporadic task in SimSo by selecting: ”generate task set” and then list of act. Dates to the release time.



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

  For Task 1 :

  Minimum Response Time = 0.5

  Average Response Time = 0.676

  Maximum Response Time = 1.5

  For Task 2 :

  Minimum Response Time = 1.5

  Average Response Time = 1.7

  Maximum Response Time = 2.0

  For Task 3 :

  Minimum Response Time = 1.0

  Average Response Time = 1.967

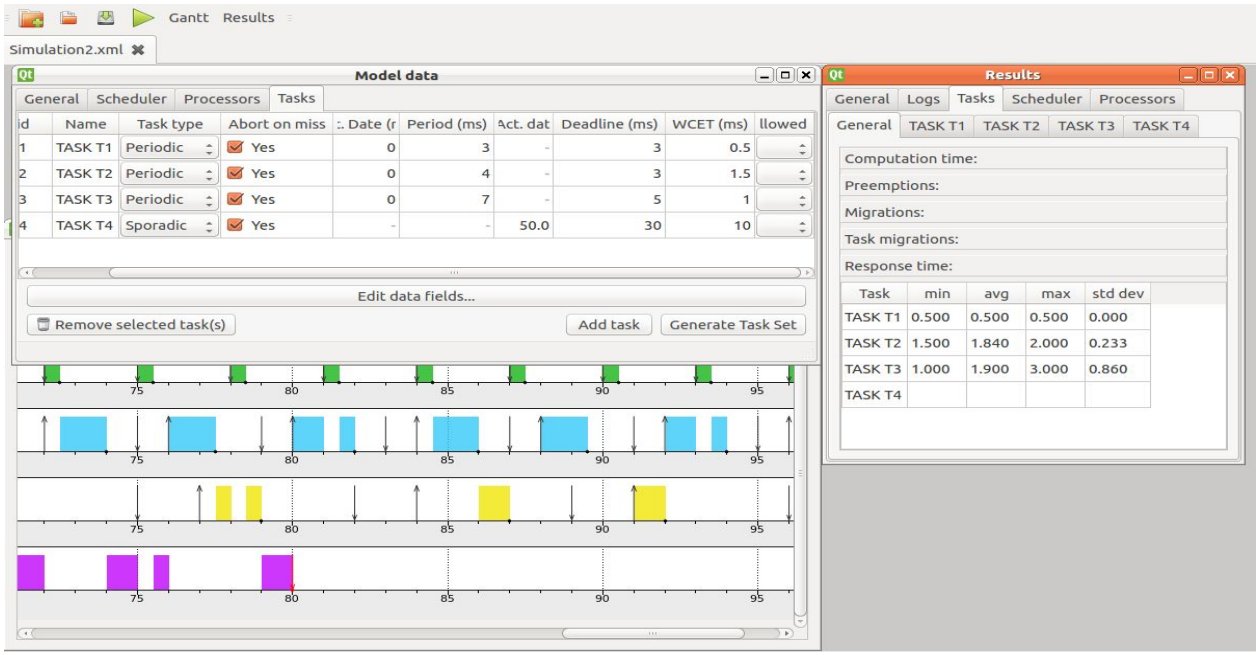
  Maximum Response Time = 3.5
- Is any task missing the deadline? Which task? Where?

  No, none of the task miss deadline.
- Is the sporadic job meeting its deadline?

  Yes, Sporadic job meets deadline.
- What is the response time for the sporadic job?

  Minimum Response Time = 29

2. Consider the tasks T1(3, 0.5), T2(4, 1.5, 3), T3(7, 1.0, 5) and the RM scheduler. A sporadic job arrives at t=50 having the execution time of 10 and a relative deadline of 30. Create the sporadic task in SimSo by selecting: ”generate task set” and then list of act. Dates to the release time.



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

  For Task 1 :
  Minimum Response Time = 0.5
  Average Response Time = 0.5
  Maximum Response Time = 0.5
  For Task 2 :
  Minimum Response Time = 1.5
  Average Response Time = 1.84
  Maximum Response Time = 2.0
  For Task 3 :
  Minimum Response Time = 1.0
  Average Response Time = 1.9
  Maximum Response Time = 3.0

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

  None of the periodic task miss deadline. But Task 4, Sporadic Task misses deadline at time 80.

- Is the sporadic job meeting its deadline?

  No. Sporadic job misses deadline.

- What is the response time for the sporadic job?

  Response time for sporadic job is 30. i.e., it starts at time 50 and ends at time 80.

- Which scheduler is better is better in this example; EDF or RM?

  In this case EDF scheduler is better, because with this scheduler sporadic task does not miss deadline.

Programming assignment:

- Is the system fast enough to handle all aperiodic tasks? Why?

  Yes, the system is fast enough to handle all aperiodic task in my case. Because, aperiodic task is generated only when there is a timer interrupt every 5 seconds. But my matrix multiplication only takes 600 to 700ms.
- If not, solve this problem without alter the functionality of any task

  I do not see a problem on my machine. In case, if I cannot handle all aperiodic task within next period (5 seconds in this case), I could have created set priority task and increased the priority of the aperiodic task.
- What is the response time of the aperiodic task?

  Response time of the aperiodic task depends on the execution state of Matrix Multiplication task at the time of 5 seconds timer interrupt. For me, I was able to see response time of 400ms on an average.
- Provide a screenshot of the running system