Sanket Vinod Agarwal

Assignment 4

Git: https://github.tamu.edu/agarwal-220196/FreeRTOS.git

1) EDF Scheduler:

Periodic Task Set: T1(3, 0.5), T2(4, 1.5, 3), T3(7, 1.0, 5)
Sporadic Task set: Arrival time t= 50, Execution time = 10, Relative deadline =30. i.e. @t=80

Q: What is the minimum/maximum/average response time of all tasks?
A: T4 is the Sporadic Task.

Task Name	Min Response Time	Max Response Time	Average Response Time
T1	0.5	1.5	0.676
T2	1.5	2.0	1.7
T3	1.0	3.5	1.967
T4	29	29	29

Response time:

Task	min	avg	max	std dev
TASK T1	0.500	0.676	1.500	0.294
TASK T2	1.500	1.700	2.000	0.245
TASK T3	1.000	1.967	3.500	0.921
TASK T4	29.000	29.000	29.000	0.000

Output 1: Execution Result from Sim SO

Q: Is any task missing the deadline? Which task? Where?
A: No, none of the task miss deadline

Q: Is the sporadic job meeting its deadline?
A: Yes.

Q: What is the response time for the sporadic job?
A: As seen from the above pic, the execution time is 29.

2) RM Scheduler:

Periodic Task Set: T1(3, 0.5), T2(4, 1.5, 3), T3(7, 1.0, 5)
Sporadic Task set: Arrival time t= 50, Execution time = 10, Relative deadline =30. i.e. @t=80

Q: What is the minimum/maximum/average response time of all tasks?
A: T4 is the Sporadic Task.

Task Name	Min Response Time	Max Response Time	Average Response Time
T1	0.5	0.5	0.5
T2	1.5	2.0	1.84
T3	1.0	3.0	1.9
T4	Deadline miss	Deadline miss	Deadline miss

Task	min	avg	max	std dev
TASK T1	0.500	0.500	0.500	0.000
TASK T2	1.500	1.840	2.000	0.233
TASK T3	1.000	1.900	3.000	0.860
TASK T4				

Output 2: RM Scheduler output

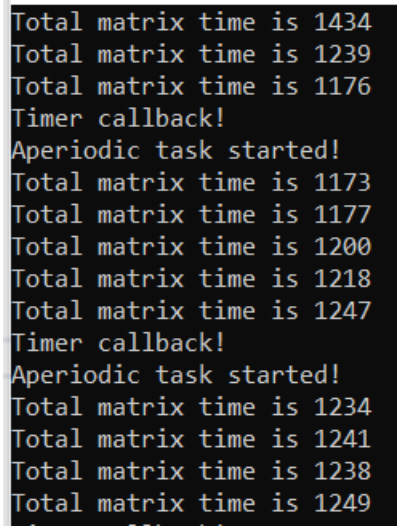
Q: Is any task missing the deadline? Which task? Where?
A: Yes, Sporadic task miss its deadline

Q: Is the sporadic job meeting its deadline?
A: No, it does not

Q: What is the response time for the sporadic job?
A: Scheduler tries to execute the sporadic job until t=80 (its deadline) however, it is not completed by then and it is removed.

Q: Which scheduler is better is better in this example; EDF or RM?
A: In this case EDF scheduler is better as all tasks meet their deadline.

Q: Is the system fast enough to handle all aperiodic tasks? Why?
A: No, the matrix multiplication task takes away all the time of CPU and thus the aperiodic job misses its deadline. This can be viewed from *output 1*

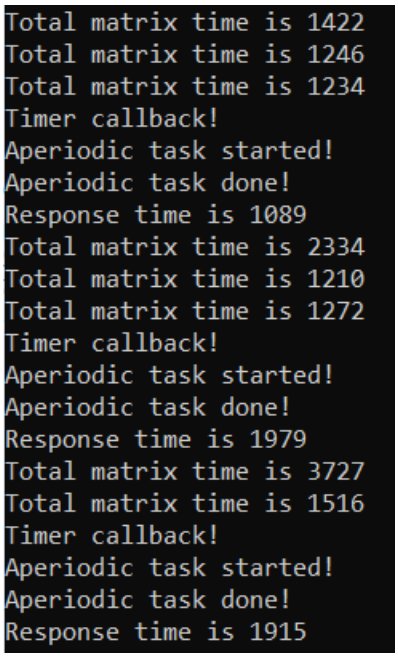


Output 1: Aperiodic task missing its deadline.

Q: If not, solve this problem without alter the functionality of any task
A: The problem is solved by changing the priority of aperiodic task from 2 to 4. (Note: It can be made to 3 as well, which is same as matrix task. In this case the response time increases)

Q: What is the response time of the aperiodic task?
A: The response time of the aperiodic task is 1979ms i.e. 1.9 sec

Q: Provide a screenshot of the running system
A: The running system output is as follows:



Output 2: Running system with aperiodic task priority as 4