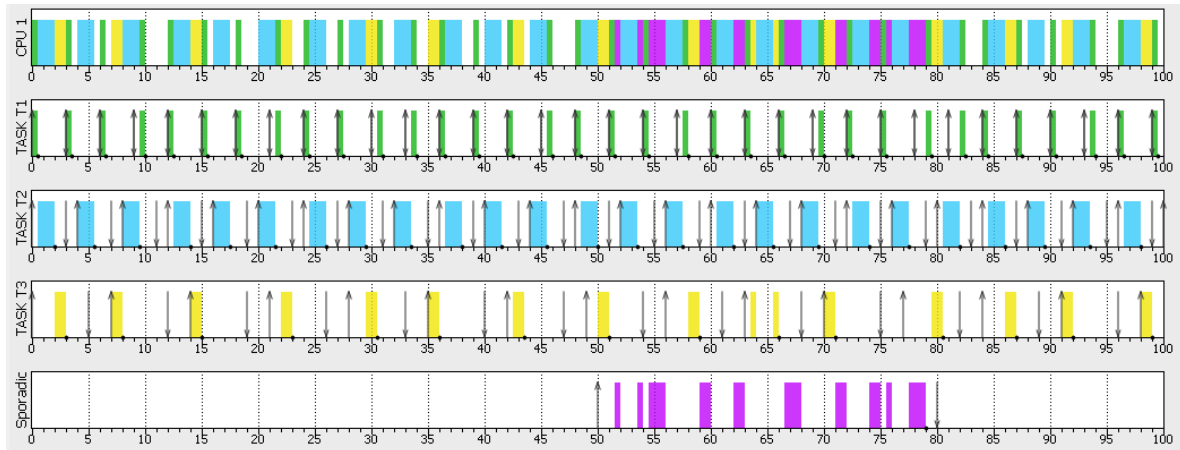


Assignment 4 – Sporadic and aperiodic tasks

Part 1. EDF Simulation

Exercise 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.



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

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
Sporadic	29.000	29.000	29.000	0.000

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

No task is missing its deadline

Is the sporadic job meeting its deadline?

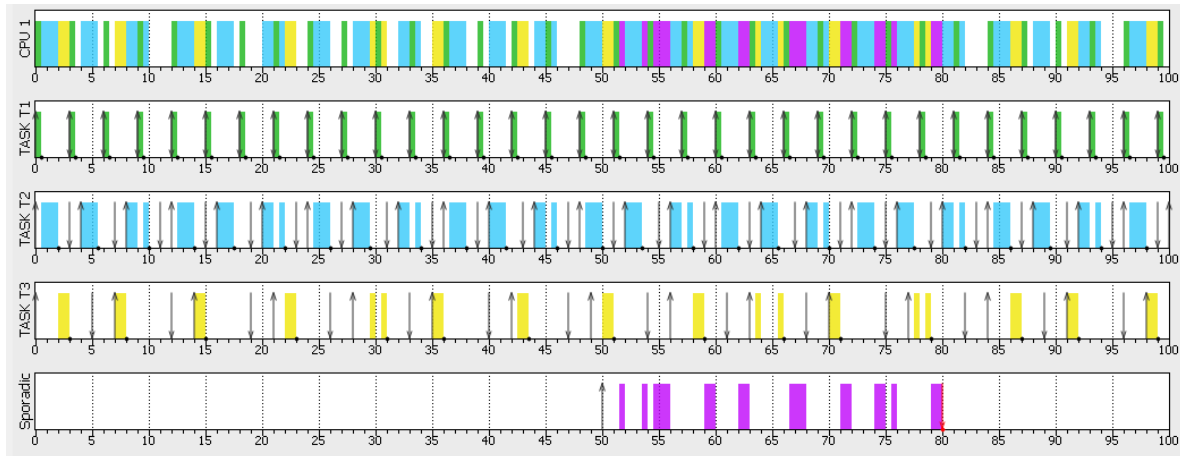
Yes

What is the response time for the sporadic job?

29ms, just 1 ms before its deadline

Part 2. RM Simulation

Exercise 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.



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	1.500	1.840	2.000	0.233
TASK T3	1.000	1.900	3.000	0.860
Sporadic				

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

No, only the sporadic

Is the sporadic job meeting its deadline?

No, sporadic is still missing 0.5ms computation time by it's deadline of 80ms

What is the response time for the sporadic job?

30.5ms

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

EDF is better in this example because it manages to keep all the tasks running and the sporadic job.

Part 2. Programming

Here create a task "matrixtask" containing the functionality given in Assignment 2.

Add a software timer in main() to trigger a software interrupt every 5 seconds.

Define a Timer callback function outside main()

Create an aperiodic task()

Original code running before any fix.

```
D:\Estudio\FreeRTOSv10\FreeRTOSv10.0.1\FreeRTOS\Demo\WIN32-MSVC\Debug\RTOSDemo.exe
Creating Tasks...
Timer created!
Matrix period: 907 mS
Matrix period: 901 mS
Matrix period: 906 mS
Matrix period: 905 mS
Matrix period: 896 mS
Timer callback!
Aperiodic task started!
Matrix period: 895 mS
Matrix period: 895 mS
Matrix period: 896 mS
Matrix period: 902 mS
Matrix period: 896 mS
Matrix period: 919 mS
Timer callback!
Aperiodic task started!
Matrix period: 912 mS
Matrix period: 896 mS
Matrix period: 898 mS
Matrix period: 897 mS
Aperiodic task done!
Aperiodic response time: 4330 mS
Matrix period: 896 mS
Timer callback!
Aperiodic task started!
Matrix period: 880 mS
Matrix period: 882 mS
Matrix period: 877 mS
Matrix period: 884 mS
Matrix period: 883 mS
Matrix period: 876 mS
Timer callback!
Aperiodic task started!
Matrix period: 884 mS
Matrix period: 912 mS
Matrix period: 887 mS
Matrix period: 881 mS
Matrix period: 880 mS
Timer callback!
Aperiodic task started!
Matrix period: 877 mS
Matrix period: 902 mS
Matrix period: 909 mS
Matrix period: 913 mS
Matrix period: 902 mS
Matrix period: 921 mS
```

The following questions should be solved with programming and the questions should be answered in a report:

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

No, response time of the aperiodic job takes longer than 5s, it's creation time.

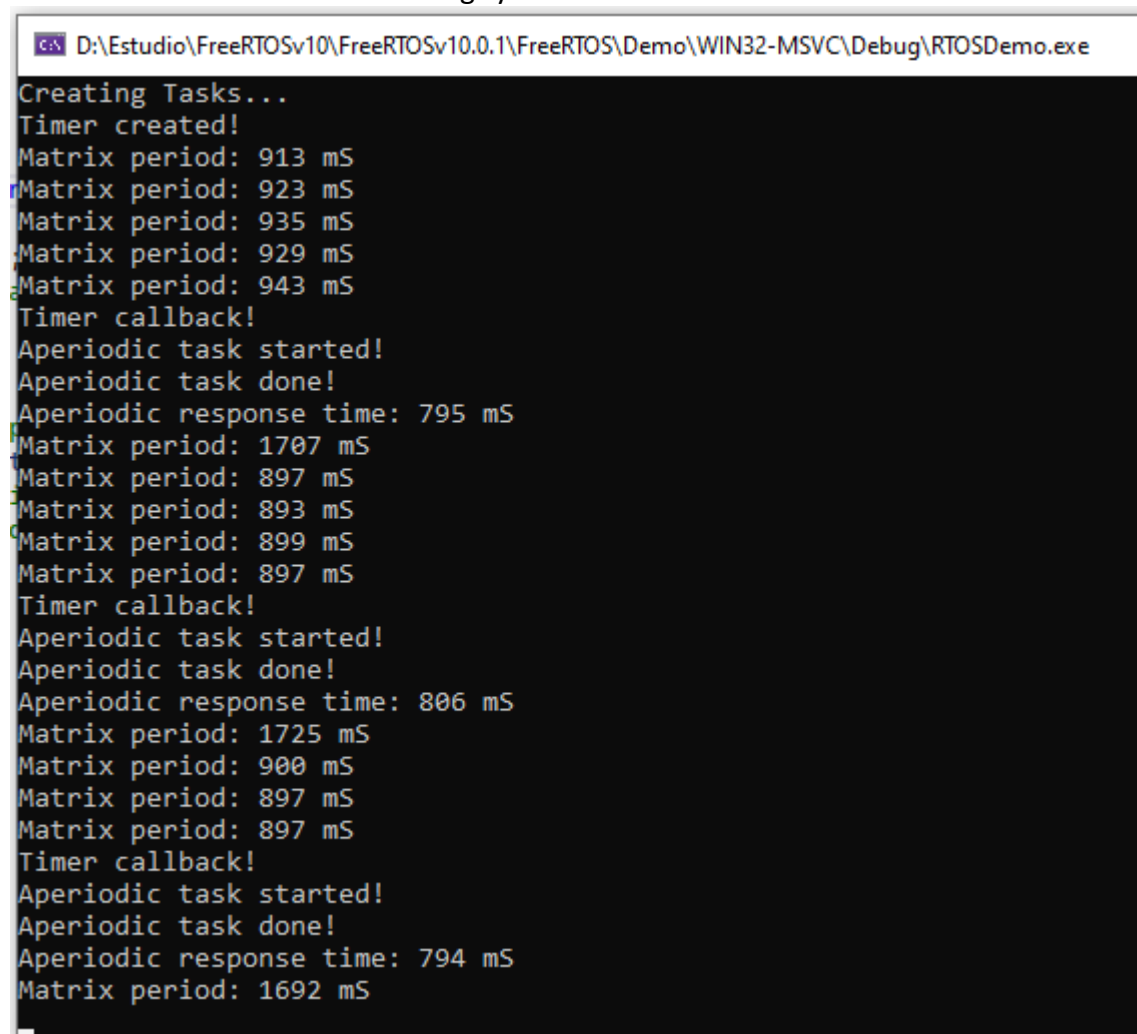
If not, solve this problem without alter the functionality of any task

I changed the priority of the aperiodic task, to be able to finish the job. The downside is that the matrix operation is postponed and now the interrupted matrix operation takes 1700mS instead of 900mS.

What is the response time of the aperiodic task?

Modified code. Modified response time is now 800mS

Provide a screenshot of the running system



```

D:\Estudio\FreeRTOSv10\FreeRTOSv10.0.1\FreeRTOS\Demo\WIN32-MSVC\Debug\RTOSDemo.exe
Creating Tasks...
Timer created!
Matrix period: 913 mS
Matrix period: 923 mS
Matrix period: 935 mS
Matrix period: 929 mS
Matrix period: 943 mS
Timer callback!
Aperiodic task started!
Aperiodic task done!
Aperiodic response time: 795 mS
Matrix period: 1707 mS
Matrix period: 897 mS
Matrix period: 893 mS
Matrix period: 899 mS
Matrix period: 897 mS
Timer callback!
Aperiodic task started!
Aperiodic task done!
Aperiodic response time: 806 mS
Matrix period: 1725 mS
Matrix period: 900 mS
Matrix period: 897 mS
Matrix period: 897 mS
Timer callback!
Aperiodic task started!
Aperiodic task done!
Aperiodic response time: 794 mS
Matrix period: 1692 mS

```