



# SPORADIC SERVER

Vytaras Juraska, Electronic Engineering 6th Semester



The background is a dark blue gradient. On the left, there are white and light blue circuit-like lines. A white line starts from the top left, goes right, then down, then right again, ending at a white dot. Another white line starts from the top right, goes left, then down, then left again, ending at a white dot. A light blue line starts from the middle left, goes right, then down, then right again, ending at a light blue dot. A light blue line starts from the bottom left, goes right, then up, then right again, ending at a light blue dot. In the center-left, there is a square box with a light blue border and a white inner border. On the right, there are white and light blue circuit-like lines. A white line starts from the top right, goes left, then down, then left again, ending at a white dot. A light blue line starts from the top right, goes left, then down, then left again, ending at a light blue dot. There are also some diagonal white lines and dots in the top right corner.

# MANAGING REAL-TIME SYSTEMS

Predictable? Unpredictable?

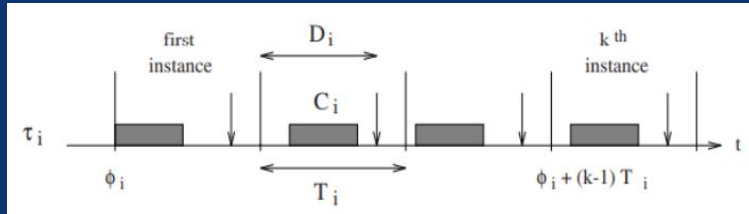


**VARIETY OF TASKS**

# VARIETY OF TASKS

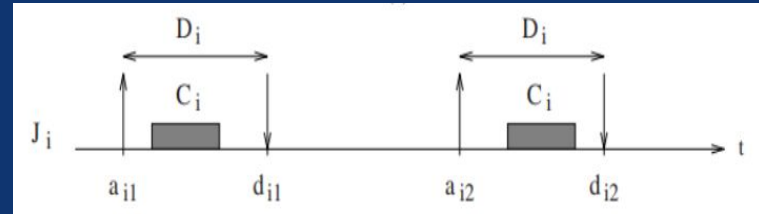
## PERIODIC TASKS

Predictable and repetitive, computationally simplified. It has various variables, applicable to all of the instances.



## APERIODIC TASKS

Arrival times unknown, execution times might be unknown. It has similar variables to periodic, inapplicable to each instance.





# ONE MORE TASK TYPE TO MENTION...

## SPORADIC TASKS

Essentially the worst case scenario of an aperiodic task: high frequency, highest priority with a known deadline.



# DEFINITION OF SPORADIC SERVER

The background is a dark blue gradient. On the left, there are white and light blue circuit-like lines. A white line starts from the top left, goes right, then down, then right again, ending at a white dot. Another white line starts from the top left, goes right, then down, then right again, ending at a white dot. A light blue line starts from the left edge, goes right, then down, then right again, ending at a light blue dot. A light blue line starts from the left edge, goes right, then down, then right again, ending at a light blue dot. In the center-left, there is a square box with a light blue border and a white inner square. On the right, there are more white and light blue circuit-like lines, including a white line that starts from the top right, goes left, then down, then left again, ending at a white dot. A light blue line starts from the top right, goes left, then down, then left again, ending at a light blue dot. At the bottom center, there are five light blue chevrons pointing to the right.


## WHAT DOES IT AIM FOR?

Improve the approach of handling  
aperiodic tasks, keeping in mind of the  
periodic tasks at the same time.



# WORKING PRINCIPLE

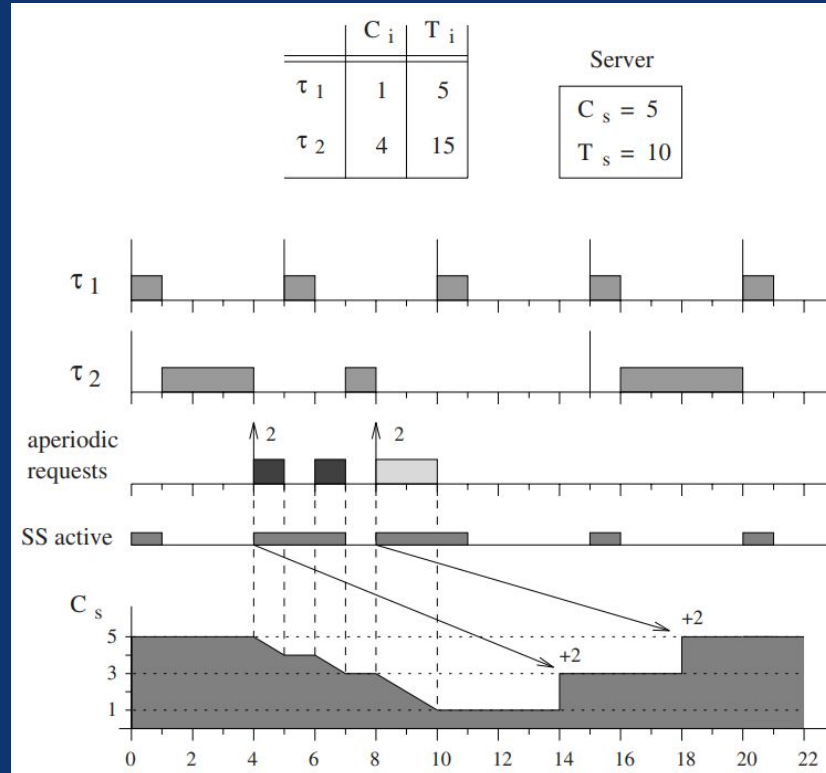
Creates high-priority servicing approach, which replenishes after each aperiodic task.





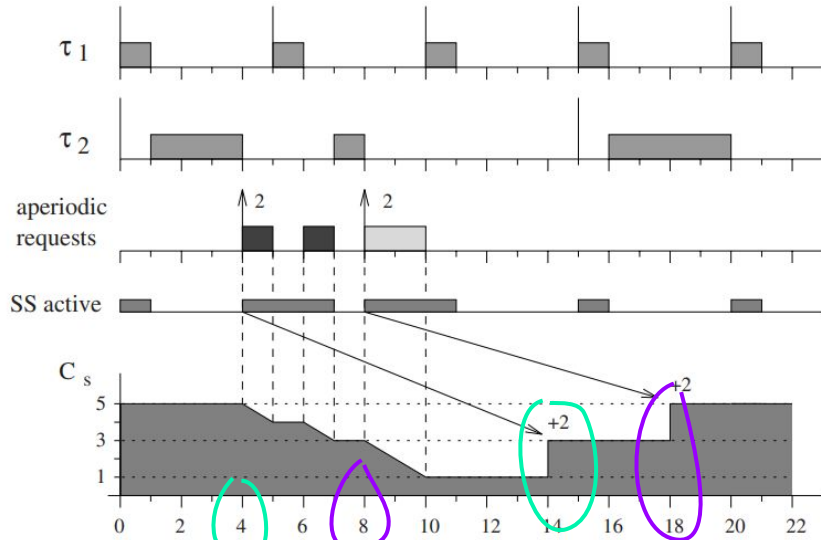
# WORKING PRINCIPLE

# VARIABLES



	$C_i$	$T_i$
$\tau_1$	1	5
$\tau_2$	4	15

Server

$$C_s = 5$$
$$T_s = 10$$


$$RT = t_A + T_s = 4 + 10 = 14$$

$$RT = t_A + T_S = 8 + 10 = 18$$

# CONCLUDING THE SPORADIC SERVER

# SUMMARISING

## ADVANTAGES

- Easy to manage aperiodic and periodic tasks
- Very convenient priority implementation, working for both variations of tasks
- Unique and very useful way of replenishing the server capacity
- Fairly good performance according to some studies

## DISADVANTAGES

- This approach violates a basic rule of top priority periodic tasks can not be interrupted, where in high priority Sporadic Server implementation any periodic task is interrupted. Further mentioned in the documentation
- Can get complex in bigger applications, since the whole Sporadic Server capacity has to be tracked, so all of the aperiodic tasks have to be calculated sequentially

# REFERENCES

1. G. C. Buttazzo, Hard real-time computing systems: predictable scheduling algorithms and applications Springer Science & Business Media, 2011, vol. 24.
2. G. C. Buttazzo, “Rate monotonic vs. edf: Judgment day,” Real-Time Systems, vol. 29, no. 1, pp. 5–26, 2005.



**THANK YOU!**