Australian
National
University

TOKEN RINGS

Week 3 Laboratory for Real-Time and Embedded Systems

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Pre-Laboratory Checklist

❏ **You worked though the provided queue examples from last week and can handle all of those programming techniques.**


Objectives

The objective of this mini-lab assignment is to confirm to yourself (and to us) that you are confident in designing basic concurrent systems. There are no real-time or direct time related aspects in this mini assignment. Talk to us if you find this assignment hard.

Interlude: ## Token Rings

A token ring structure works on the basis that each node will only send to its next node along the ring once it received a message (a "token") from its previous node on the ring. This way there is no contention and the overall system can be made predictable. Usually there is only one token travelling around such a ring, yet for the purpose of this assignment we assume two tokens travelling around a ring on separate communication channels. The two tokens are travelling independently as so it can be the case that a node will see the one token many times before it sees the other one again.

The technical challenge is to write a single entity which can accept either of the two token messages, yet will keep both tokens at maximal speed on the ring. No constraints in terms of concurrency methods exist.

Status Token
(fast)

Data Token
(slow)

Node (×9)
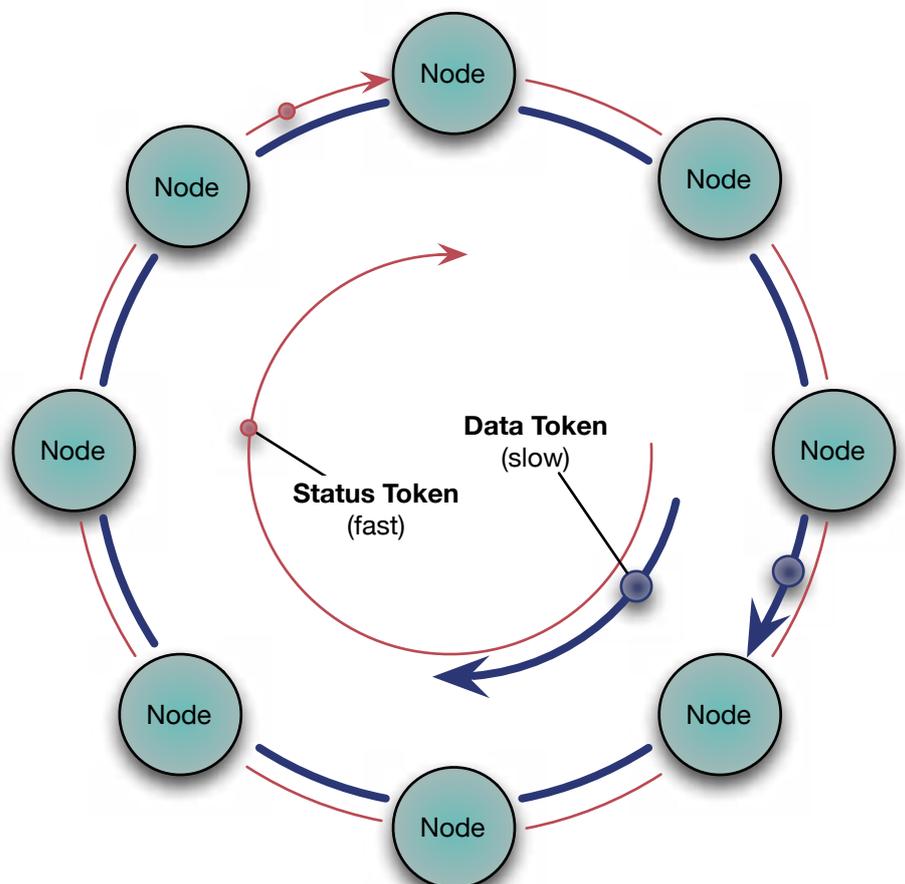
Exercise 1:   **Implement a double token ring**

Now it's your turn to show us how elegant and smooth you can design a basic concurrent system. There is no need to go through any network protocols and distribute your nodes. It is perfectly fine for your nodes to all live on the same computer node and to organize their inter-communication in the above suggested form.

Follow the form of the Queue project as you downloaded it last week and put a project file called token_rings.gpr into a directory named Token_Rings (which should also contain your source file(s) as referred to by your project file). Now zip up your Token_Rings directory and submit the resulting Token_Rings.zip file on the *SubmissionApp* under "Lab 3 Token Rings". We will check out each submission and give you feedback on your knowledge and skill level as well as potential suggestions for improvements.

Once you submitted (and finalized) your work, you will also receive a solution from another student. Check this out and see how well your colleague solved the same problem. Then provide feedback for your fellow student to let him/her know how much you admired their solution or what you would suggest to improve.