The curious case of an airport

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Consider a private airport used by two planes, which can be either flying, parked, landing, or taking off. The airport is a *resource* shared by the two planes, and the following requirements must be met:

1. only one plane can use the runway at a time;

2. a controller component receives requests to *land* or to *take off*, and replies with a *wait* signal when the field is unavailable;

3. each plane sends requests to the controller to *land* or to *take off*, and sends notifications when the field becomes *free*;

4. the controller has 5 time units to notify a plane to wait;

5. after 5 time units from requesting access to the field and with no wait signal, the planes take another 5 time units to reach the field;

6. each plane takes non-deterministically between 1-3 time units to take off, and between 4-6 time units to land and park;

7. after taking off and after parking the planes notify the controller with a *gone* signal;

8. if a plane is told to wait, we assume it will take between 5-7 time units to request again.

Suggest an UPPAAL model for the planes and the controller. List 4 to 8 desired properties that the model should satisfy. Verify the properties via UPPAAL.

The second, more exploratory stage: Extend your model to handle n planes at once and n runways at once. Can you think of other useful features that the airport should have? If so please discuss them and present the respective models/properties.

What to submit: A single report in PDF for all tasks **and** all the relevant source files. Send by email (nevrenato@gmail.com) a unique zip file "`cpc2526-N1-N2.zip`", where `N1` and `N2` are your student numbers. The subject of the email should be "`cpc2526 N1 + N2 first assignment`".

Deadline: 16th April 2026 @ 23h59

UPPAAL's reference manual