

Modelling, Validation and Verification with Uppaal

Project Proposal, 2023

Supervisor(s): Paul Crocker (DI)

1 Objectives

The objectives of this project are an introduction to the Uppaal (<https://uppaal.org/>) platform for the Modelling, Validation and Verification of real-time systems. In particular the student is expected to start by implementing simple exercises from the realm of the operating systems discipline, such as the verification of mutual exclusion algorithms and deadlock investigation [1]. In particular it's necessary to understand how semaphores are modelled (see for example <https://sws.cs.ru.nl/publications/papers/fvaan/MCinEdu/semaphores.html>) and then produce solutions to other classical and non-classical problems.

2 Tasks

T1 Uppaal Concepts (1 month)

T2 Models and Exercises for Mutual Exclusion (1 Month)

T3 models and Exercises for Semaphores (1 Month)

T5 Project Write-up. (1 month)

3 Technical and Academic Requirements

Operating Systems Network and Distributed Programming. Software Engineering.

4 Expected Results

- 1 Project Software
- 1 Report.

5 Contacts

Paul Andrew Crocker (crocker@di.ubi.pt)

References

- [1] Roelof Hamberg and Frits Vaandrager. Using model checkers in an introductory course on operating systems. *SIGOPS Oper. Syst. Rev.*, 42(6):101–111, oct 2008.