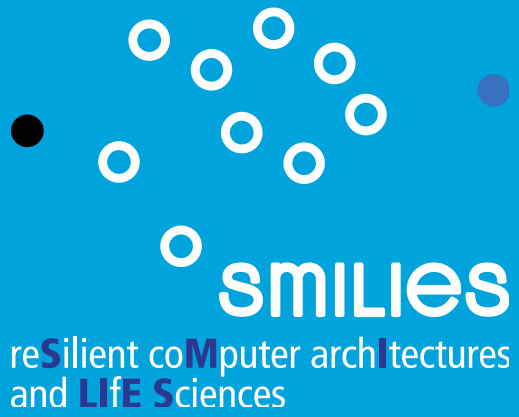

Politecnico di Torino

Department of Control and Computer Engineering

PROJECTS

COMPUTER ARCHITECTURE AND OPERATING SYSTEMS — STEFANO DI CARLO

PROJECTS' GOAL

- Learn how to use different technologies:
  - QEMU to emulate emulate an heterogeneous hardware architecture
  - FreeRTOS
- Learn how to use Git to manage a team project
- Learn how to present your work

ASSIGNMENT

- The assignment consists of FOUR parts:
  - **Part 1 (QEMU board emulation)**
  - **Part 2 (FreeRTOS porting)**
  - **Part 3 (Write a simple application)**
  - **Part 4 (Write documentation and present your work)**

PART 1 – QEMU BOARD EMULATION

- You must generate a custom QEMU version to emulate an unsupported board:
  - The target board is the NXP S32K3X8EVB
  - Ensure that QEMU emulates the proper CPU, memory map and the peripherals that have been assigned to you in the projects spreadsheet
- Available resources
  - https://fgoehler.com/blog/adding-a-new-architecture-to-qemu-01/
  - https://baltig.polito.it/os23/group8
  - https://baltig.polito.it/os23/group1
  - https://github.com/albertocastronovo/OS_Project_2023

PART 2 (FREERTOS PORTING)

- Ensure that FreeRTOS runs on the emulated board
  - FreeRTOS has been ported to NXP S32K3X8EVB. If your QEMU emulation is correct you should not experience major issues

PART 3 (WRITE A SIMPLE APPLICATION)

- Demonstrate that your setup is working by writing a simple application implementing different tasks.

PART 4 (WRITE DOCUMENTATION AND PRESENT YOUR WORK)

- Create a tutorial to run and test your code
- Document your code properly
- Prepare a short presentation (10 minutes) of the work done

PROJECT DELIVERY

- Prepare a public GitLab repository with the material you prepared. Distribute your code using a CC BY-NC 4.0 license (see https://github.com/Gibberlings3/GitHub-Templates/tree/master/License-Templates).
  - A repository and an account on baltig.polito.it will be created for you.
- Include all editable files (presentations, documents, etc.) in the repo
- Make sure all documents you prepare are marked with a Creative Common CC BY-NC 4.0 (see https://wiki.creativecommons.org/wiki/Marking_your_work_with_a_CC_license#Example:_Presentation)
- Present your project in an oral exam session