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**Assignment 4**

**Implementing cooperative tasks in Zephyr**

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**Introduction:**

The aim of this assignment is to learn how to implement a set of cooperative real-time tasks in Zephyr. Replicating the typical structure of embedded software, a mix of periodic and sporadic tasks will be considered. Two distinct IPC mechanism shall be used.

**Specification:**

The system to implement does a basic processing of an analog signal. It reads the input voltage from an analog sensor, digitally filters the signal and outputs it.

• Input sensor: Emulated by a 10 kΩ potentiometer, supplied by the DevKit 3 V supply (VDD).

• Digital filter: moving average filter, with a window size of 10 samples. Removes the outliers (10% or high deviation from average) and computes the average of the remaining samples.

• Output: pwm signal applied to one of the DevKit leds.

The system was structured with three tasks, namely one task for acquiring the sample, one for filtering and the other to output the signal. The sampling task is periodic, while the other two are sporadic, being activated when new data is available. The sampling period, in milliseconds, is specified in a macro called “SAMP\_PERIOD\_MS”.

The application was developed using two different approaches for IPC:

• Shared memory + Semaphores

• FIFO Queue

**GitHub:**

On this link is possible to find the project repository containg the project code.

https://github.com/BrunoFeitais/assignment4SETR.git