# CS-330 Assignment 1
# Introduction:
# GNU Radio

**Hard Deadline:** 18 October 2023

Assigned: 11 October 2023

## General Information

For each assignment some code examples with complete working flowgraphs or blocks are provided, but in some cases there are missing elements.
For every assignment you should provide screenshots of the execution of the flowgraph in your report! 📷

## Exercise 1

The goal of this exercise is to help you become familiar with the GNU Radio platform. Furthermore, you will be able to visually inspect/observe signal properties on-the-fly using the corresponding GNU Radio graphical tool.

First, open the *lab0_1.grc* flowgraph, using the **GNU Radio Companion**.

1. Execute the flowgraph. Show that you are able to handle the *Time Sink* functions in order to visually inspect the signals. 📷
2. Experiment with the parameters in *Signal source* block (waveform type, frequency, amplitude and phase). Label your signals in the *Time Sink* block so that you can easily identify them. 📷
3. What's the use of the *Throttle* block?

## Exercise 2

Given this time domain screenshot, correctly identify the signals. Report what is the type of waveform, frequency, amplitude and phase of each signal and provide the correct flowgraph. Submit your flowgraph with the name lab0_2.grc .
The sample rate for this exercise is set to 32KHz.

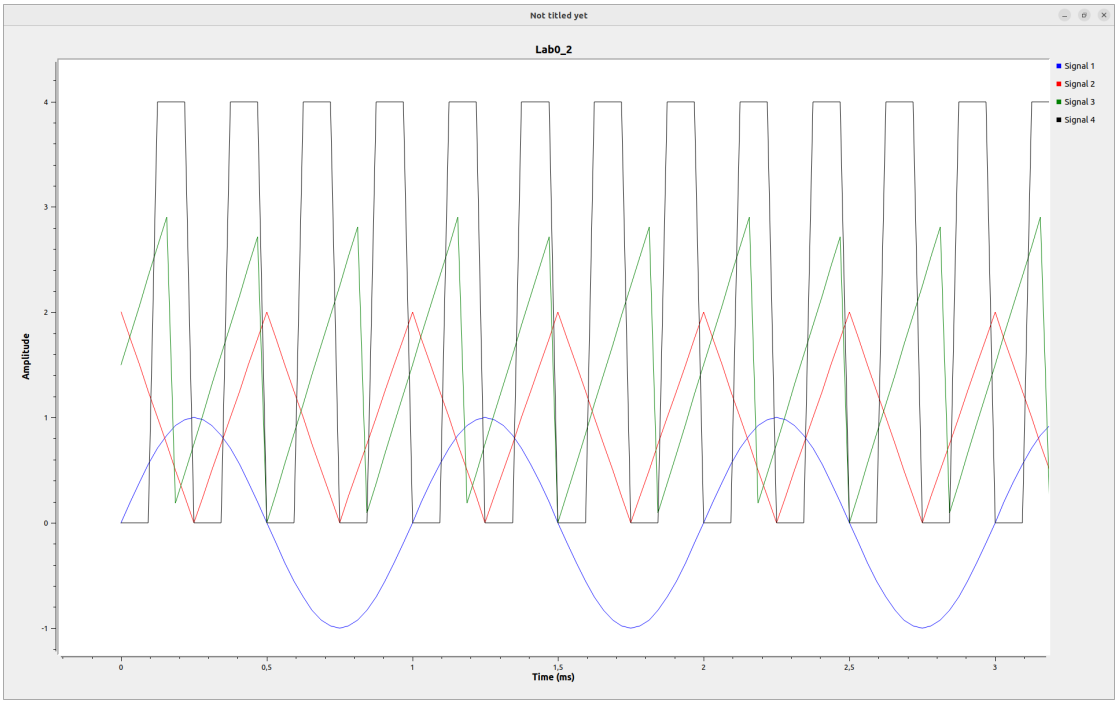


Figure 1: Lab0_2

## Exercise 3

In this exercise we will use ZeroMQ interface to stream data over a network. There are 3 ways to do this using this library: PUB sink/SUB source (Publish/Subscribe), PUSH sink/PULL source, and REP sink/REQ source (Reply/Request).
In a new flowgraph lab0_3.grc connect a *Signal Source* to a *ZMQ PUSH Sink* block. Then a *ZMQ PULL Source* block to a *Frequency Sink* block. Set the address field to tcp://127.0.0.1:port, use a port that is not used in your computer. Run the flowgraph to check that the signal you receive is correct.
Repeat the same process for the other two pairs (PUB/SUB and REP/REQ)

1. Find and report the difference between this pairs.

Your flowgraph should look like this:

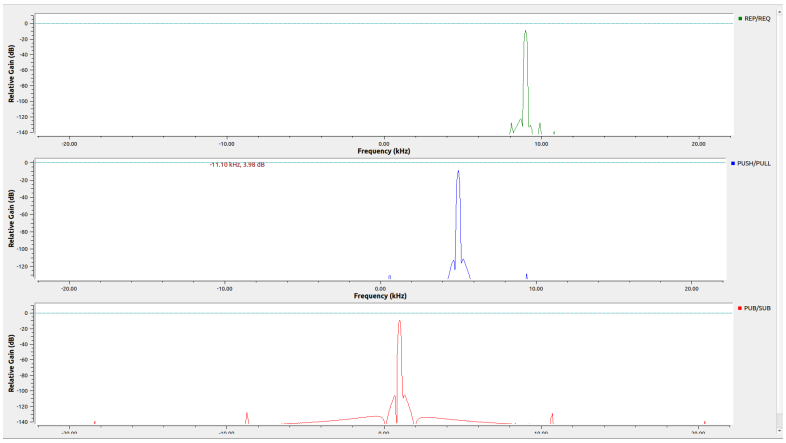


Figure 2: Lab0_2

**About Submission**

The submission of the Assignments will be done through the **turnin** process. If needed, more info will be sent to the list prior to the deadline. You can turnin this assignment using the command below:
**turnin assignment1@hy330 <dir>**

You should provide a report as a **single pdf file**, containing your comments, screenshots or anything that you believe will be helpful for your grading. Also include any .grc files that you have created or changed.

**About Oral Examination**

All the students who have submitted their exercises are requested to attend the oral exam session, in order to present their solutions. A short quiz will also take place during that time. You will need to choose a timeslot for the oral exam using Doodle. More details will be sent to you via email.

**Attention**

- Each student will only be examined during their timeslot.
- During this session both the Assignments 1 and 2 will be examined.
- Both the timely submission and the oral exam session will contribute to the grading of the assignment.