

4DM4 - Hints for Lab #1

Tuesday, Sept. 20, 2022

- Here are some hints on how to get started with lab #1.
- These hints will be useful to those who are unfamiliar with Matlab.
- Please attend the tutorial on Thursday Sept 22, where I can go over this in class.
- If you wish to ask for help, please make sure that you have first created a simple Matlab program, with a state-vector, where you initialize the state-vector, with a loop where you can shift the state-vector 1 bit (left or right) per loop iteration.

Lets start to write a 6-bit LFSR.

(1) Create a matlab script, and clear everything:

```
clear all; % clear all variables
clc;      % clear command window
```

(2) Create a state-vector S with 6 bits of state:

Matlab row vectors can have 1 row, and C columns.

Matlab ciolumn vectors can have R rows, and 1 column.

```
S = zeros(1,6) % S is a row vector, with 1 row and 6 columns
% Matlab places S(1) at the LEFT end, and S(6) at the RIGHT end;
```

(3) To shift state-vector S one bit to the LEFT, try this:

```
S(1,1:5) = S(1,2:6) % copy bits 2:6 into bits 1:5
S(1,6) = write want you want this bit to be
```

In the above, we still need to do this:

- we need to add code to perform XORs, on selected bits of state, according to the feedback polynomial we are using

- we need to initialize the state-vector S to have an initial state.

The initial state S can be (1, 0, 0, 0, 0, 0).

We can set the LEFT-most bit S(1,1) by doing this:

```
S(1,1) = 1;
```

- we need to add a loop, to keep updating the state-vector S, until the state-vector returns to the initial state vector, which was S_initial. We can write this:

```
S_initial = zeros(1,6);
S_initial = [1, 0, 0, 0, 0, 0];
```

In the loop, we can write this:

```
if (S == S_initial)
    fprintf('We are done - state vector S = S_initial \n');
    pause;
end;
```