```
clear all; close all; clc;
```

The following steps here can be used to implement CFAR in the next MATLAB exercise. You can use the code template below to get started as well.

T : Number of Training Cells

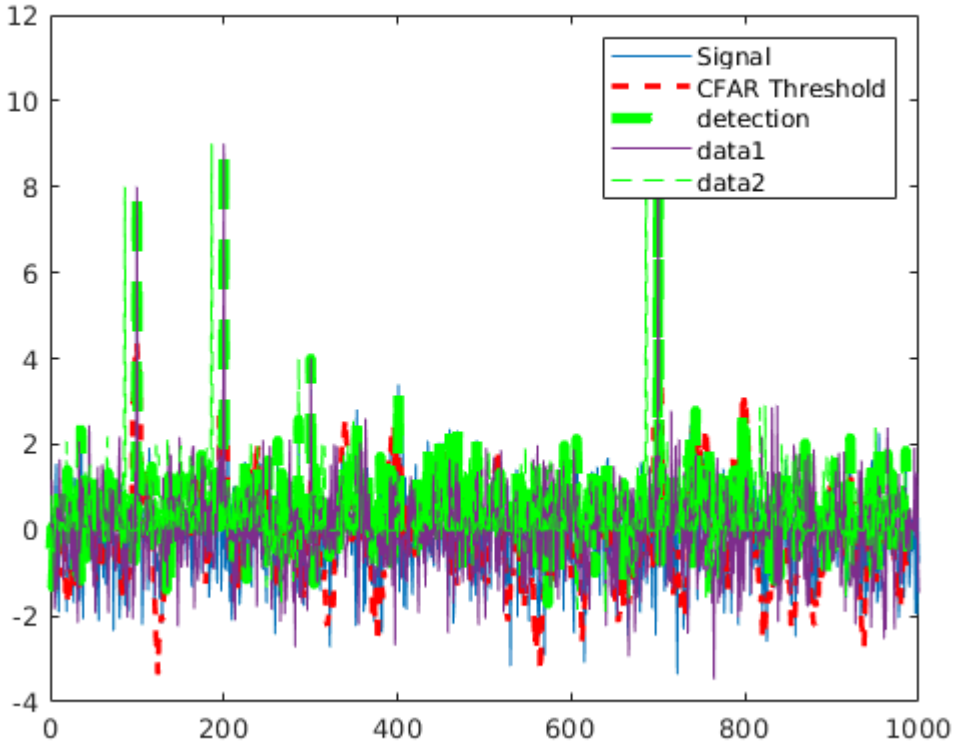
G : Number of Guard Cells

N : Total number of Cells

1. Define the number of training cells and guard cells
2. Start sliding the window one cell at a time across the complete FFT 1D array. Total window size should be: 2(T+G)+CUT
3. For each step, sum the signal (noise) within all the leading or lagging training cells
4. Average the sum to determine the noise threshold
5. Using an appropriate offset value scale the threshold
6. Now, measure the signal in the CUT, which is T+G+1 from the window starting point
7. Compare the signal measured in 5 against the threshold measured in 4
8. If the level of signal measured in CUT is smaller than the threshold measured, then assign 0 value to the signal within CUT.

```
% Implement 1D CFAR using lagging cells on the given noise and target scenario.

% Data_points
Ns = 1000;

% Generate random noise
s=randn(Ns,1);


%Targets location. Assigning bin 100, 200, 300 and 700 as Targets with the amplitudes o
s([100 ,200, 300, 700])=[8 9 4 11];

%plot the output
plot(s);

% TODO: Apply CFAR to detect the targets by filtering the noise.

% 1. Define the following:
% 1a. Training Cells
% 1b. Guard Cells
G = 4;               %Guard cells
T = 10;              %Training cells

% Offset : Adding room above noise threshold for desired SNR
offset=3;

% Vector to hold threshold values
```

```
threshold_cfar = [];

%Vector to hold final signal after thresholding
signal_cfar = [];

% 2. Slide window across the signal length
for i = 1:(Ns-(G+T))

    % 2. - 5. Determine the noise threshold by measuring it within the training cells
    noise_level = sum(s(i:i+T-1));

    % 6. Measuring the signal within the CUT
    threshold = (noise_level/T)*offset;
    threshold_cfar = [threshold_cfar, {threshold}];
    % 8. Filter the signal above the threshold

    signal = s(i+T+G);

    if(signal<threshold)
        signal = 0;
    end

    signal_cfar = [signal_cfar, {signal}];
end

% plot the filtered signal
plot (cell2mat(signal_cfar),'g--');
```



```
% plot original sig, threshold and filtered signal within the same figure.
figure,plot(s);
hold on,plot(cell2mat(circshift(threshold_cfar,G)),'r--','LineWidth',2)
hold on, plot (cell2mat(circshift(signal_cfar,(T+G))),'g--','LineWidth',4);
legend('Signal','CFAR Threshold','detection')
```