LOW PASS FILTER

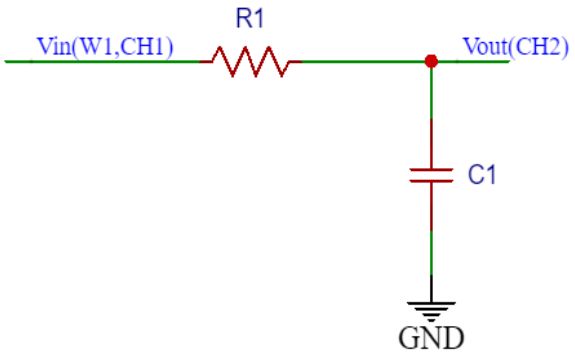
Objectives:

1. Perform time response and bode analysis

2. Perform parametric variations and observe the impact of the same on the circuit response.

3. Verify the output response with the expected values.

4. Analyze the circuit by measuring desired parameters of the waveforms/plots.

Circuit diagram	Transfer Function
	$T(s) = \frac{a1s+ao}{s+wo}$ where, a1=0 $T(s) = \frac{ao}{s+wo}$ F cutoff = $\frac{1}{2\pi R1C1}$

Procedure for conduction:

1. Select the Low Pass Filter through Filters option.
2. Click on conduction button.
3. Take screenshots as required.
4. Verify the output response with the expected values.
5. Also observe the peak-peak input and output voltage in Scope.
6. Use cursors to measure the Pass band frequency, magnitude and Pass band gain.
7. Perform time response and bode analysis.
8. Repeat the above steps with different circuit parameters and signal parameters.

Analog Discovery settings:

Wavegen		Scope: Time: Position: 0s Base: 5ms/div	
Wavegen 1	Wavegen 2	Channel 1	Channel 2
Sine wave Amplitude: 5V Offset: 0V Frequency: 100Hz Duty cycle: 50%	DC: 0, 1,2, -1, -2 V	Offset: 0V Range: 1V/div	Offset: 0V Range: 1V/div
		View-Measurements-Add	
		Vertical C1: Maximum, Minimum **Horizontal:** C1: Frequency	**Vertical** C2: Maximum, Minimum

Expt.	**Input Frequency**	**R_1**	**C_1**	Pass band gain (v/v)	Pole frequency (Hz)	Zero frequency (Hz)
LPF	500 HZ	1 kΩ	0.1uF			
Phase Lag Network	100 HZ	10 kΩ	0.01uF			
LPF1	1k HZ	10kΩ||1kΩ	0.01uF||0.1 uf			

Experiment Outcome: After conducting the experiment students are able to

1. Understand the effect of parametric variations on circuit performance.
2. Know how to place cursors to measure magnitude, pass band frequency and pass band gain.
3. Know the role of each component and input frequency.

4. Design the Low Pass Filter for desired transfer function.