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```

bits = 4;
min_v = 0;
max_v = 3.3;
voltage_range = 0:0.25:3.25;
bin_range = Voltage2Bin(min_v,max_v,bits,voltage_range);

figure(); hold on; grid on;
scatter(voltage_range,bin_range);
xlabel("Voltage (V)");
ylabel("Bin Number");
title("Voltage vs. Bin Number (4-bit)");
hold off;

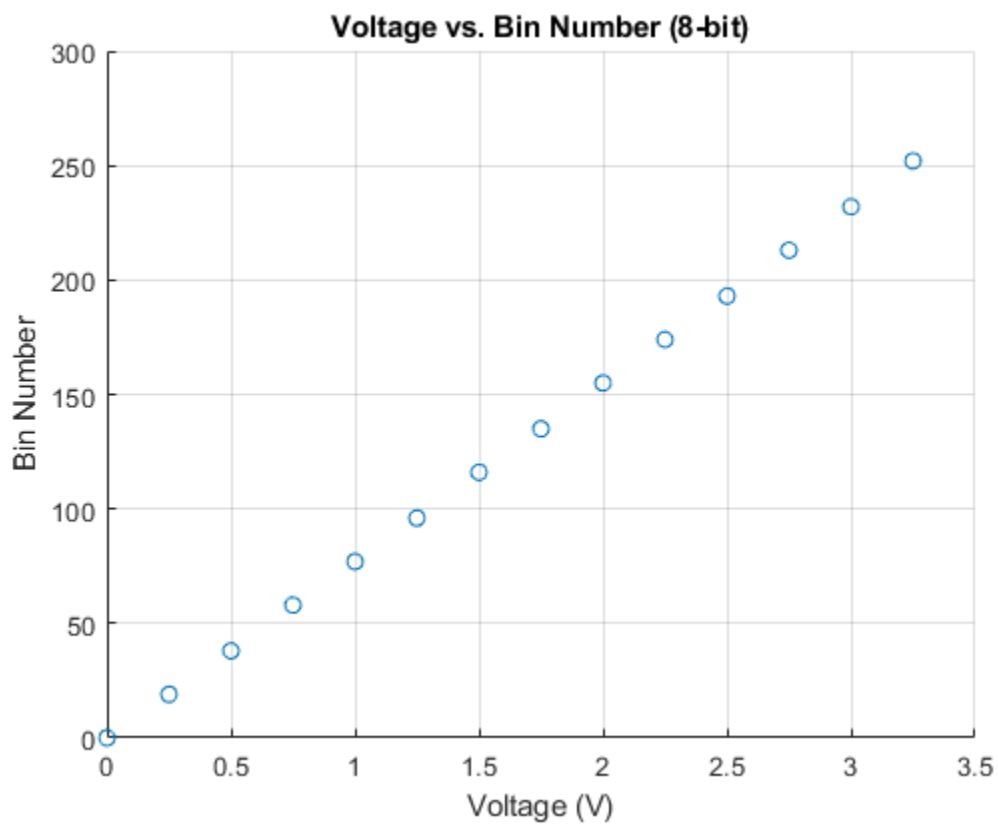
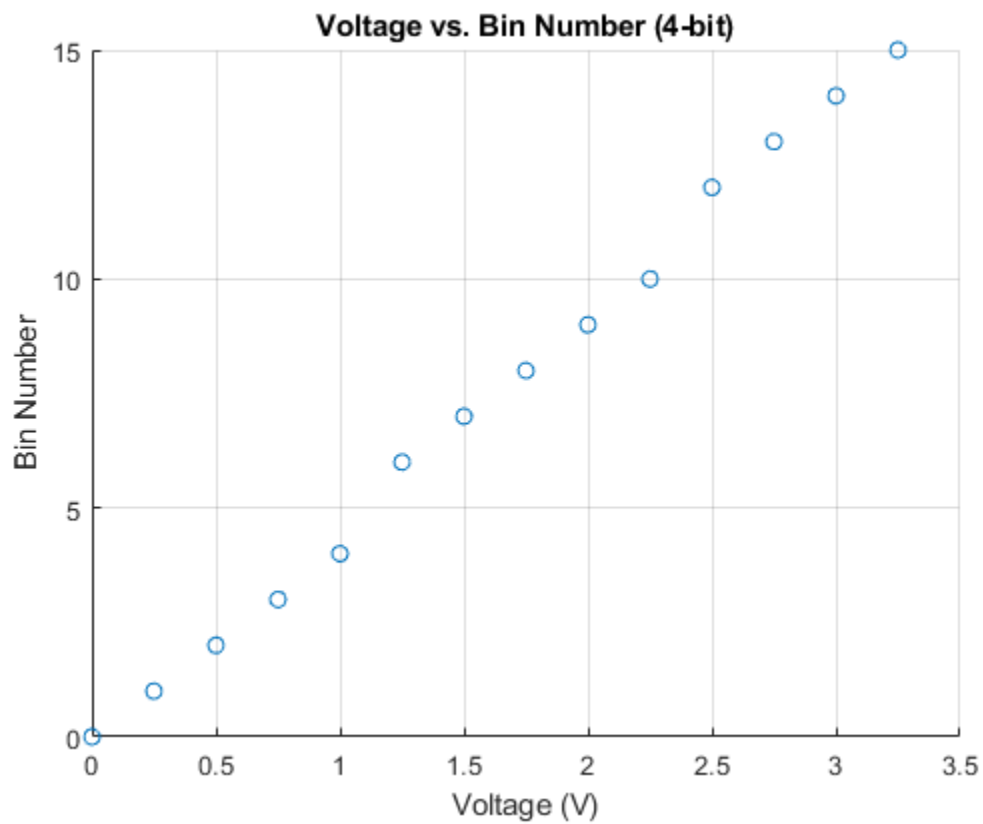
bits = 8;
bin_range = Voltage2Bin(min_v,max_v,bits,voltage_range);
figure(); hold on; grid on;
scatter(voltage_range,bin_range);
xlabel("Voltage (V)");
ylabel("Bin Number");
title("Voltage vs. Bin Number (8-bit)");
hold off;

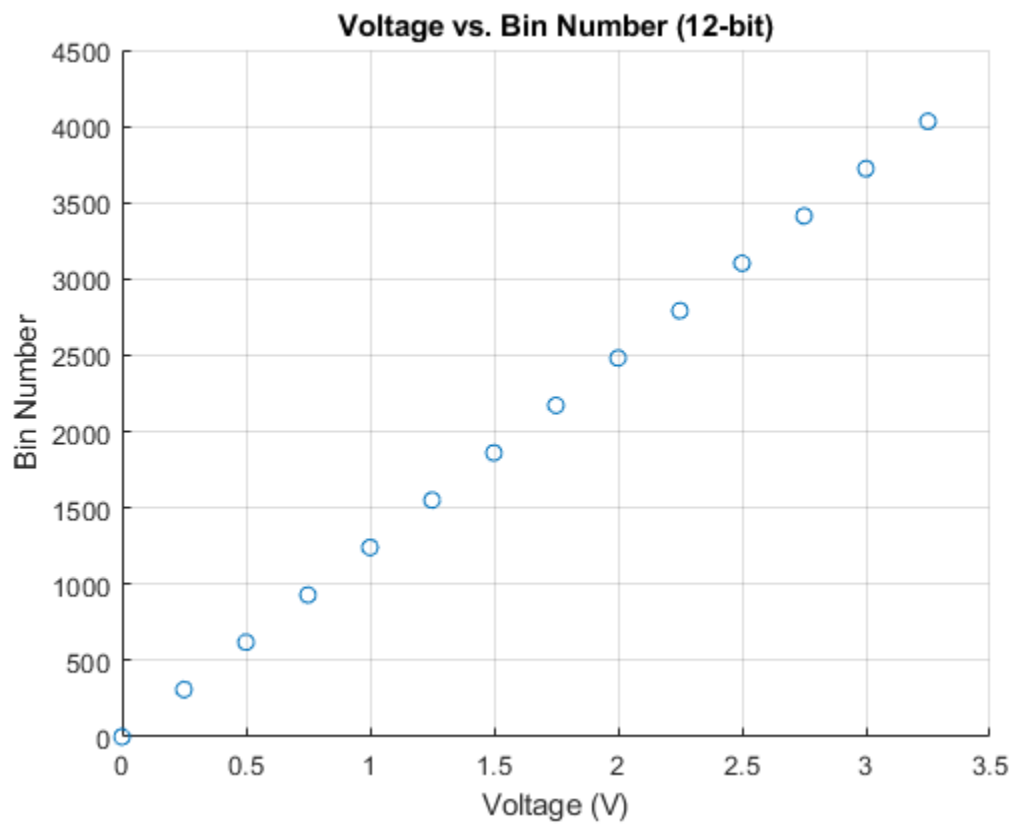
bits = 12;
bin_range = Voltage2Bin(min_v,max_v,bits,voltage_range);
figure(); hold on; grid on;
scatter(voltage_range,bin_range);
xlabel("Voltage (V)");
ylabel("Bin Number");
title("Voltage vs. Bin Number (12-bit)");
hold off;

function bin = Voltage2Bin(min_v, max_v, bits, voltage)
%INPUTS      min_v    scalar value of minimum voltage range
%            max_v    scalar value of maximum voltage range
%            bits     scalar value of number of bits in range
%            voltage  scalar or vector value of voltage to convert to bins
%
%OUTPUTS     vector of bin numbers that voltage fits into
%
%METHODOLOGY  This function takes in a voltage range and number of bits,
%divides that range into bins, and finds which bin the input voltage fits
%into, and outputs that number.
num_bins = 2^bits;
slope = (max_v - min_v)/num_bins;
bin = floor(voltage./slope);
end

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