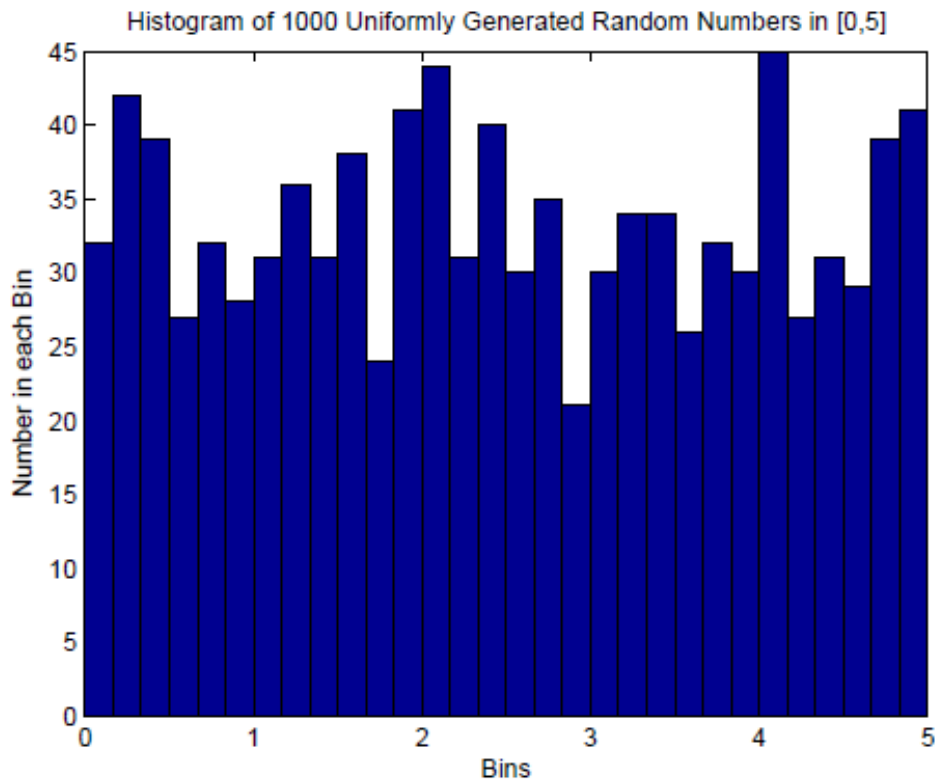# Typical Solutions for Project 1 ECE 528

1. **Use MATLAB functions to generate 1000 samples of a uniform random numbers between 0 and 5.....**

   Mean=2.4825

   Standard Deviation= 1.4263

Histogram of 1000 Uniformly Generated Random Numbers in [0,5]

MATLAB CODE:

% A typical solution to project 1 part a, ECE 528, Dr. Bijan Jabbari

% This program "project1a.m" generates 1000 uniform random numbers

% between 0 and 5 and provides associated statistics and histogram.

[u]=5*rand(1,1000);

mean(u)

std(u)

whitebg;

hist(u,30);

xlabel('Bins');

ylabel('Number in each Bin');

title('Histogram of 1000 Uniformly Generated Random Numbers in [0,5]');

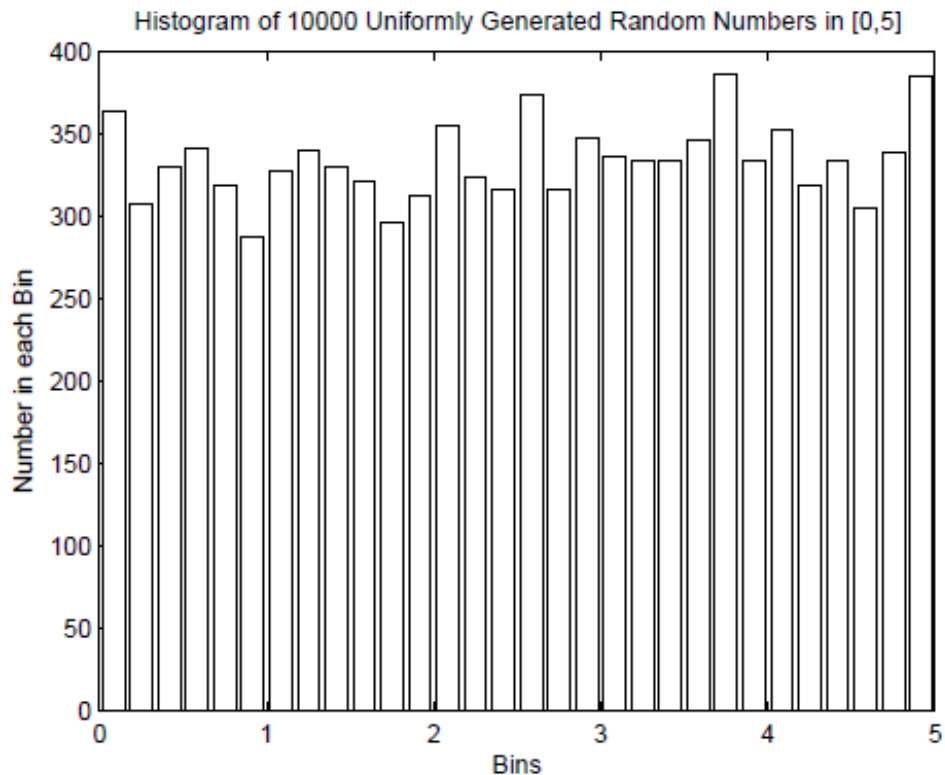**Or a alternative solution is:**

m=2.5624

sigma = 1.4353

2. **Do A for 10,000 samples**

Mean= 2.5333

Standard Deviation = 1.4483

m= 2.5068

sigma= 1.4563

Histogram of 10000 Uniformly Generated Random Numbers in [0,5]

MATLAB CODE:

% Another typical solution to project 1 part b, ECE 528, Dr. Bijan Jabbari

% This program "project1b.m" generates 10000 uniform random numbers

% between 0 and 5 and provides associated statistics (mean, m, and

% standard deviation, sigma), and plots the histogram.

% Generate 10000 Random Numbers Between [0,5]

[u]=5*rand(1,10000);

% the mean of the vector u;

m=mean(u)

% the standard deviation for the vector u;

sigma=std(u)

% the histogram of the vector u, using no_bins for the number of

% bins as the parameter for the matlab function "hist".

no_bins=30;

[N,X]=hist(u,no_bins);

colordef white;

bar(X,N,'w');

xlabel('Bins');

ylabel('Number in each Bin');

title('Histogram of 10000 Uniformly Generated Random Numbers in [0,5]');

3. **Now do part A for 10 different seeds and average the means and standard deviations**

The output is:

Seed is 1223

Seed is 340506

Seed is 54904333

Seed is 73232

Seed is 9.355268e+010

Seed is 73

Seed is 174544

Seed is 350543

Seed is 42256

Seed is 90423056

Mean= 2.4921

Standard Deviation=1.4364

MATLAB CODE:

% A typical solution to project 1 part c, ECE 528, Dr. Bijan Jabbari

% This program "project1c.m" generates 10000 uniform random numbers

% between 0 and 5 by generating 10 sample runs of 1000 random

% numbers with 10 different seeds of and provides associated statistics

% (mean, m, and standard deviation, sigma), and plots the histogram.

% we set the 10 different seeds in the vector "seeds"

seeds=[1223 340506 54904333 73232 93552677666 73 174544 350543 42256 90423056]; u=[];

% in the vector u (empty at this point) we are going to colect all the

% 10 sample runs of 1000 random numbers with 10 different seeds

for k=1:10

% Sets the seed for random number generation

disp(['Seed is ' num2str(seeds(k))]);

rand('seed',seeds(k));

Histogram of 10000 Uniform Random Numbers, 10 Seeds, Using 30 Bins
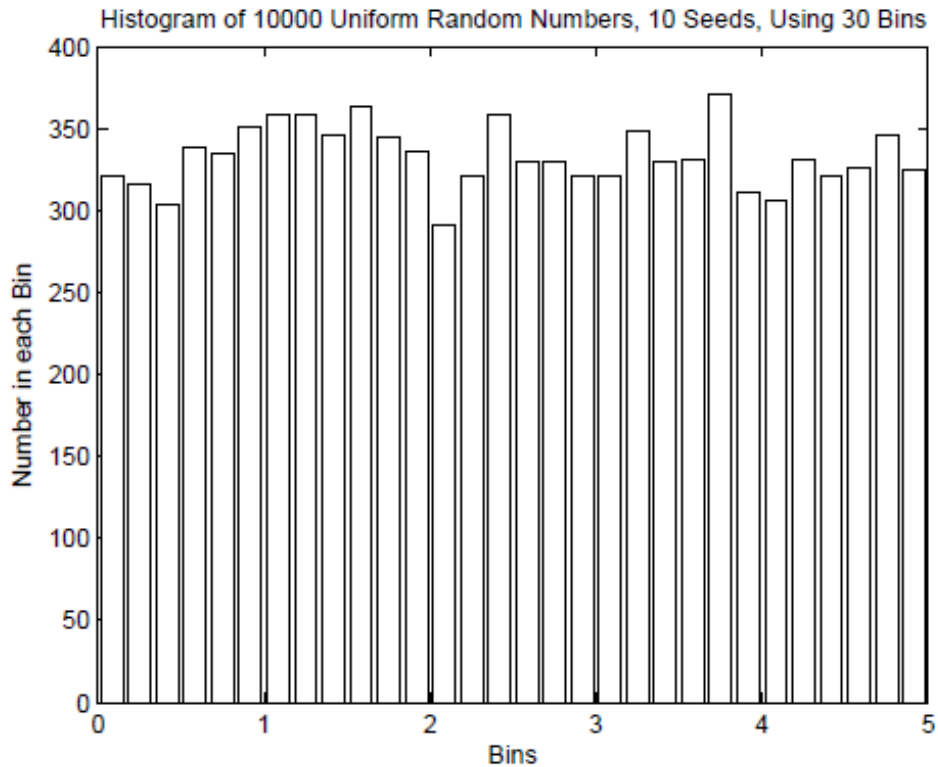
% Generate 1000 Random Numbers Between [0,5]

[v]=5*rand(1,1000);

u=[u v];

end

% now, we have colected all the random sequences in the vector u. So,

% we can delete from memory the variables v seeds and k;

clear v seeds k;

% furthermore, all the processing will be applied to the vector u;

% the mean of the vector u;

m=mean(u);

disp(['Mean= ' num2str(m)]);

% the standard deviation for the vector u;

sigma=std(u);

disp(['Standard Deviation= ' num2str(sigma)]);

% the histogram of the vector u, using no_bins for the number of bins

% as the parameter for the matlab function "hist".

no_bins=30;

[N,X]=hist(u,no_bins);

colordef white;

bar(X,N,'w');

xlabel('Bins');

ylabel('Number in each Bin');

title(['Histogram of 10000 Uniform Random Numbers, 10 Seeds, Using ' ,

num2str(no_bins), ' Bins']);