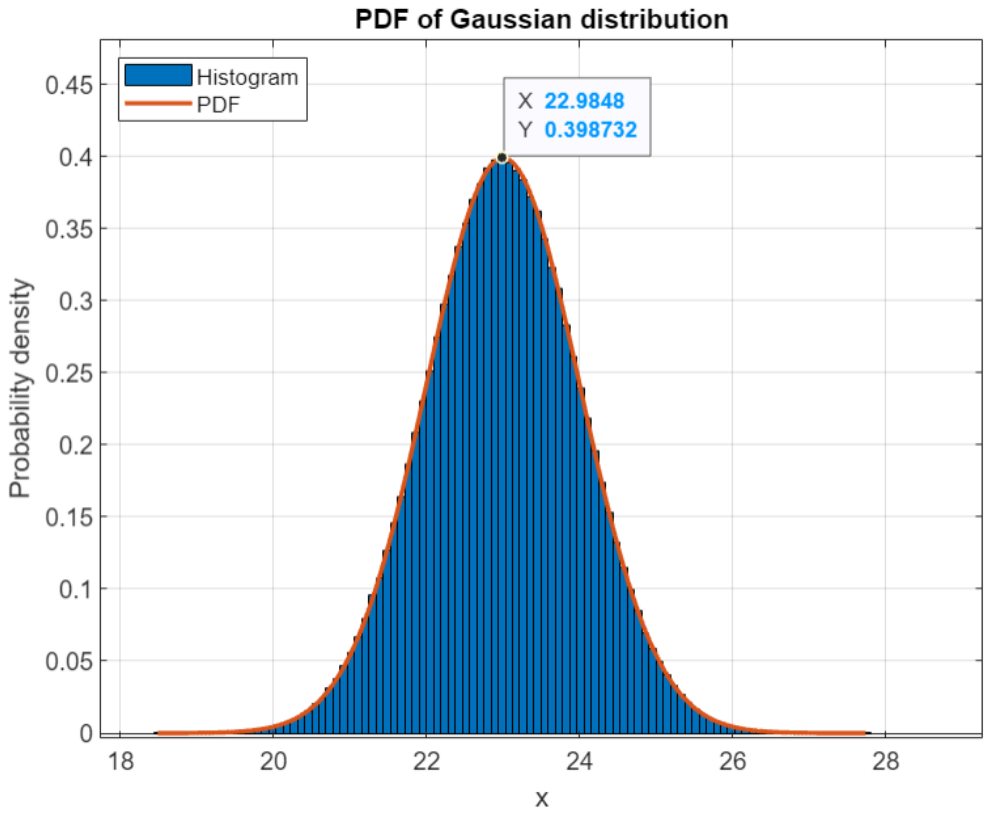
Input

```
close all;
clear;
% Define the minimum and maximum values for the uniform distribution
rollno=23;
N = 10^6;
M = 100;
normal = rollno + randn(N, 1);
a=min(normal);
b=max(normal);
mu = mean(normal);
var_x = var(normal);
sigma = sqrt(var_x);
% Plot the probability density function
dx =(b-a)/M;
[fx,pos]= hist(normal,M);
bar(pos,fx/(N*dx),'BarWidth', 1);
hold on;
x = pos(1):0.05:pos(end);
% Calculate the probability density function using the equation of the normal
distribution
pdf = (1 / (sigma * sqrt(2 * pi))) * exp(-(x - mu).^2 / (2 * sigma^2));
% Plot the Gaussian distribution
plot(x, pdf, 'LineWidth', 2)
xlabel('x')
ylabel('Probability density')
title('PDF of Gaussian distribution')
legend('Histogram', 'PDF', 'Location', 'northwest');
% Display the mean and variance of the distribution
disp(['Mean: ', num2str(mu)]);
disp(['Variance: ', num2str(var_x)]);
```

Output

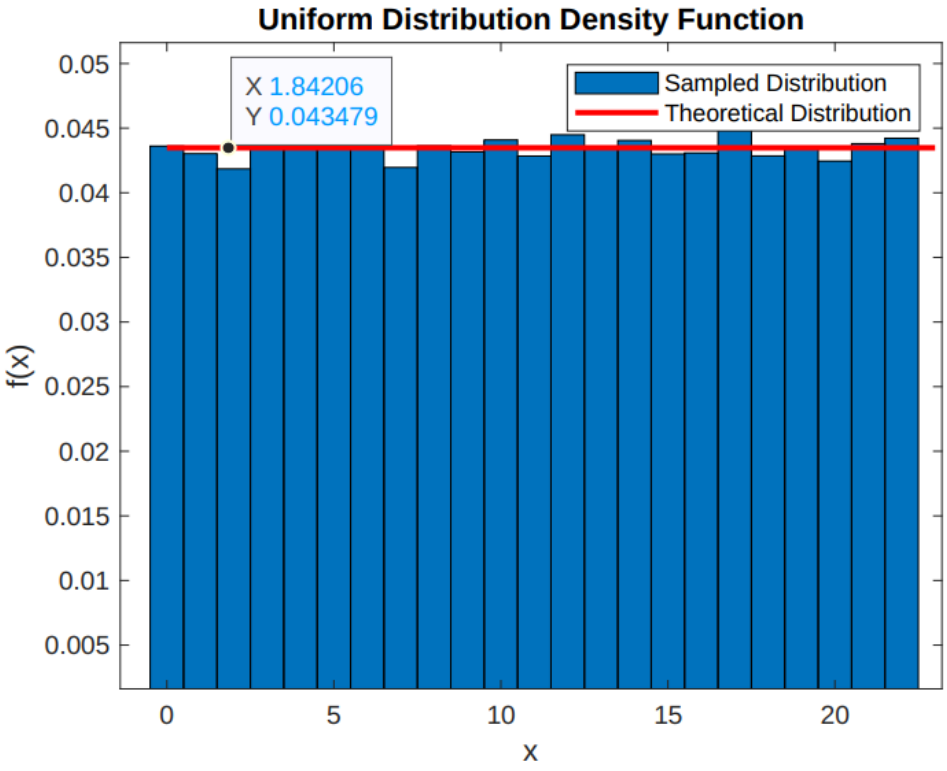



```
>> lab4
Mean: 23.0009
Variance: 1.0008
```

INPUT

```
close all;
clear;
% Define the minimum and maximum values for the uniform distribution
rollno=23;
N = 100000;
x = rand(N,1)*rollno;
a = min(x);
b = max(x);
M = rollno;
% Calculate the mean and variance of the distribution
mu = (a + b) / 2;
variance = (b - a)^2 / 12;
% Plot the density function of the distribution
dx =(b-a)/M;
[fx]= hist(x,M);
h = a: dx :b-dx;
bar(h,fx/(N*dx),'BarWidth', 1);
hold on;
% Theoritical plot
x_values = linspace(a, b, N);
y_values = unifpdf(x_values, a, b);
plot(x_values, y_values, 'r', 'LineWidth', 2);
title('Uniform Distribution Density Function');
xlabel('x');
ylabel('f(x)');
legend('Sampled Distribution', 'Theoretical Distribution');
% Display the mean and variance of the distribution
disp(['Theoretical Mean: ', num2str(mu)]);
disp(['calculated Mean: ', num2str(mean(x))]);
disp(['Theoretical Variance: ', num2str(variance)]);
disp(['Calculated Variance: ', num2str(var(x))]);
```

OUTPUT



Command Window

```
Theoritical Mean: 11.4999
calculated Mean: 11.5027
Theoritical Variance: 44.0819
Calculated Variance: 44.1044
>>
```