<제1장> 서론

2022310853
백연우

* 연동문제 : 1.2.3.4
* comp. 심동문제 : 1.2.3

연동문제

1.

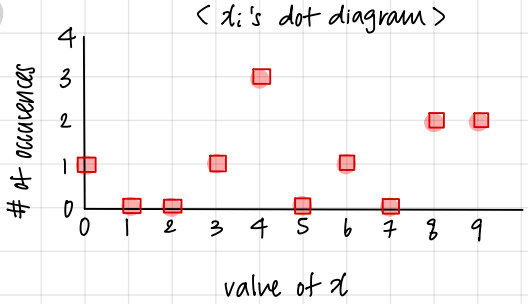
i	1	2	3	4	5	6	7	8	9	10
x_i	3	6	8	9	9	4	4	4	0	8
y_i	16	20	38	61	16	15	-2	24	21	25

sample mean of x_i : $\frac{1}{10}\sum_{k=1}^{10} x_k = 5.5$

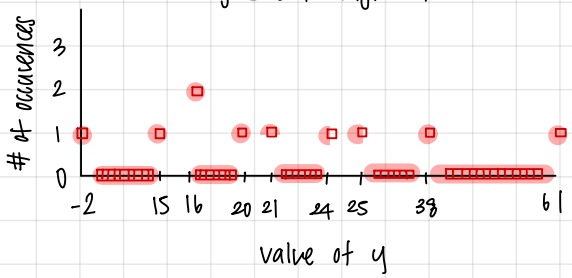
sample mean of y_i : $\frac{1}{10}\sum_{k=1}^{10} y_k = 23.4$

2.

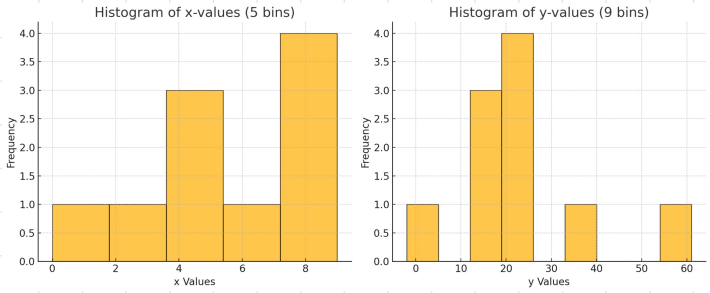
<x_i's dot diagram>



<y_i's dot diagram>



3.




```python
import matplotlib.pyplot as plt

# Data
x_values = [3, 6, 8, 9, 9, 4, 4, 4, 0, 8]
y_values = [16, 20, 38, 61, 16, 15, -2, 24, 21, 25]

# Create histograms
plt.figure(figsize=(12, 5))

# Histogram for x-values (5 bins)
plt.subplot(1, 2, 1)
plt.hist(x_values, bins=5, edgecolor='black', alpha=0.7)
plt.xlabel('x Values')
plt.ylabel('Frequency')
plt.title('Histogram of x-values (5 bins)')

# Histogram for y-values (9 bins)
plt.subplot(1, 2, 2)
plt.hist(y_values, bins=9, edgecolor='black', alpha=0.7)
plt.xlabel('y Values')
plt.ylabel('Frequency')
plt.title('Histogram of y-values (9 bins)')

# Show plots
plt.tight_layout()
plt.show()
```

* python matplotlib을 이용함.

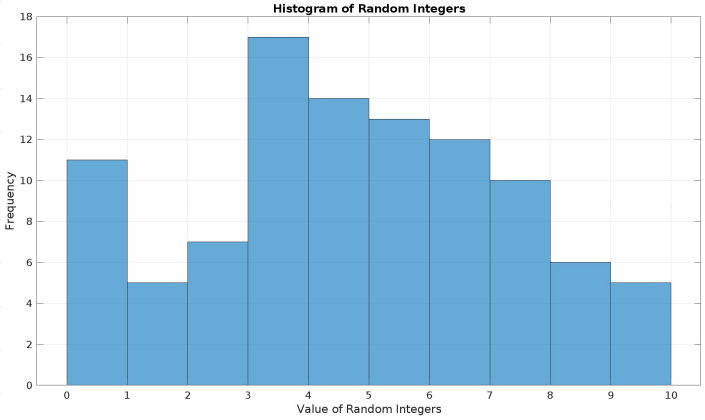
4. $\{y_i\}$의 나열도 :

(stem : 10의 자리수
leaf : 1의 자리수

stem	leaf
-0	2
0	
1	5 5 6
2	0 1 4 5
3	8
4	
5	
6	1

Comp. 심동문제

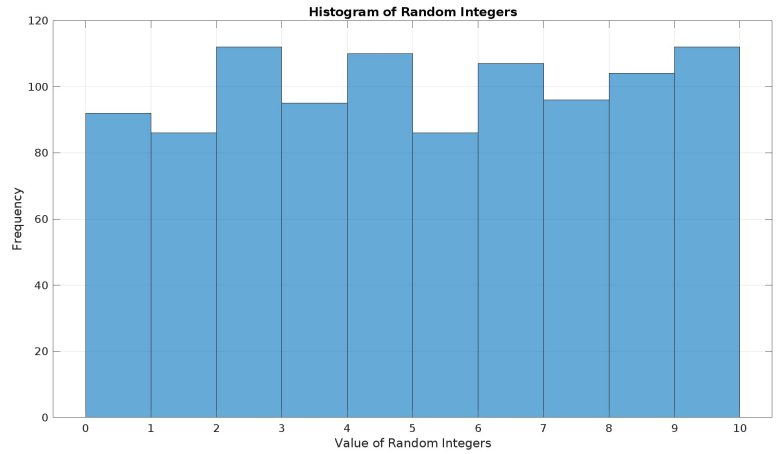
1. (a)



MATLAB Drive > a1_1.m

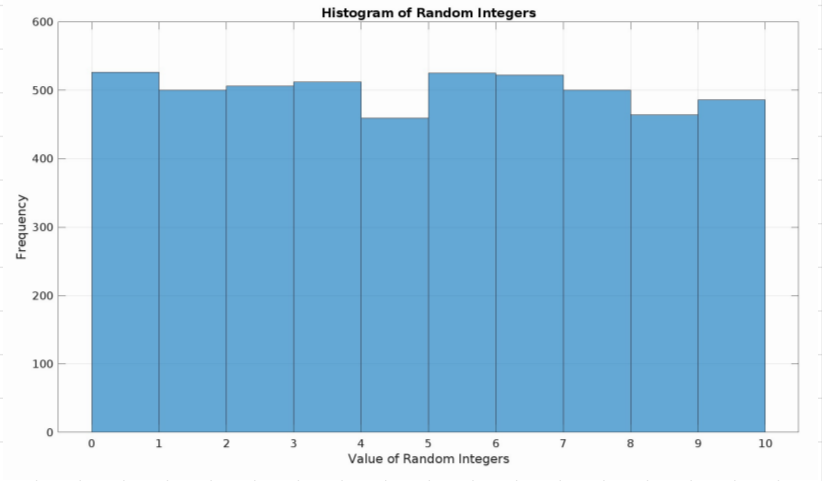
```
% Generate 100 random integers between 0 and 9
N = 100;
random_numbers = fix(10 * rand(1, N));

% Create a histogram with 10 bins (from 0 to 10)
edges = 0:1:10
histogram(random_numbers, edges);

% Labeling the axes
xlabel('Value of Random Integers');
ylabel('Frequency');
title('Histogram of Random Integers');

% Display the grid
grid on;

```

(b)



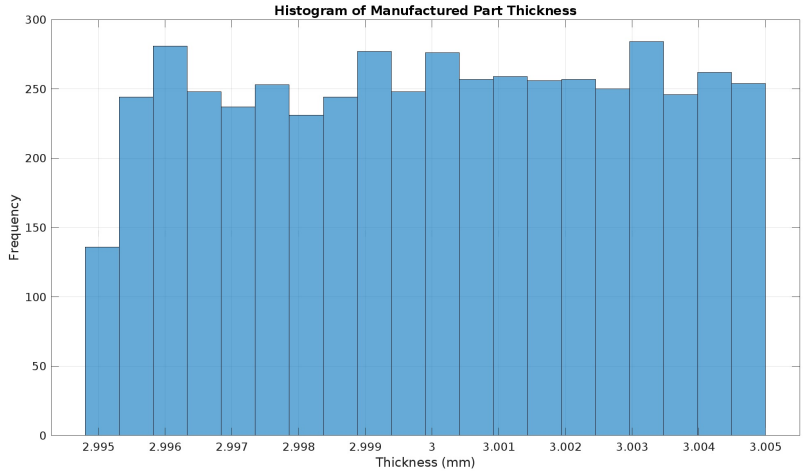
1000개의 random number을 생성했을때, 100개의 random number을 생성했을때보다 더 균일하게 분포되었다.

(c)



5000개의 random number을 생성했을때, 100개와 1000개의 random number을 생성했을때보다 더 균일한 분포를 이루었다.

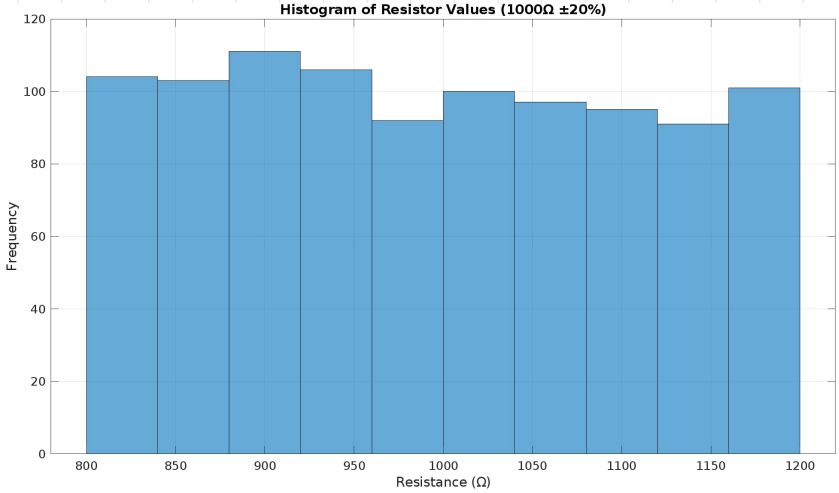
2.



MATLAB Drive > a1_2.m

```
num_samples = 5000;
base_thickness = 3;
tolerance = 0.005;

% Generate 5000 random thickness values
thickness_values = base_thickness + (2 * tolerance * rand(1,
num_samples) - tolerance);

% Plot histogram with 20 bins
histogram(thickness_values, 20);

% Label the plot
xlabel('Thickness (mm)');
ylabel('Frequency');
title('Histogram of Manufactured Part Thickness');

% Display grid
grid on;

```

3.



MATLAB Drive > a1_3.m

```

num_samples = 1000;
nominal_resistance = 1000;
tolerance = 0.20;

% Generate 1000 random resistance values within the tolerance
resistance_values = nominal_resistance * (1 + (2 * tolerance *
rand(1, num_samples) - tolerance));

% Plot histogram with 10 bins
edges=800:40:1200
histogram(resistance_values, edges);

% Label the plot
xlabel('Resistance (Ω)');
ylabel('Frequency');
title('Histogram of Resistor Values (1000Ω ±20%)');

% Display grid
grid on;

```