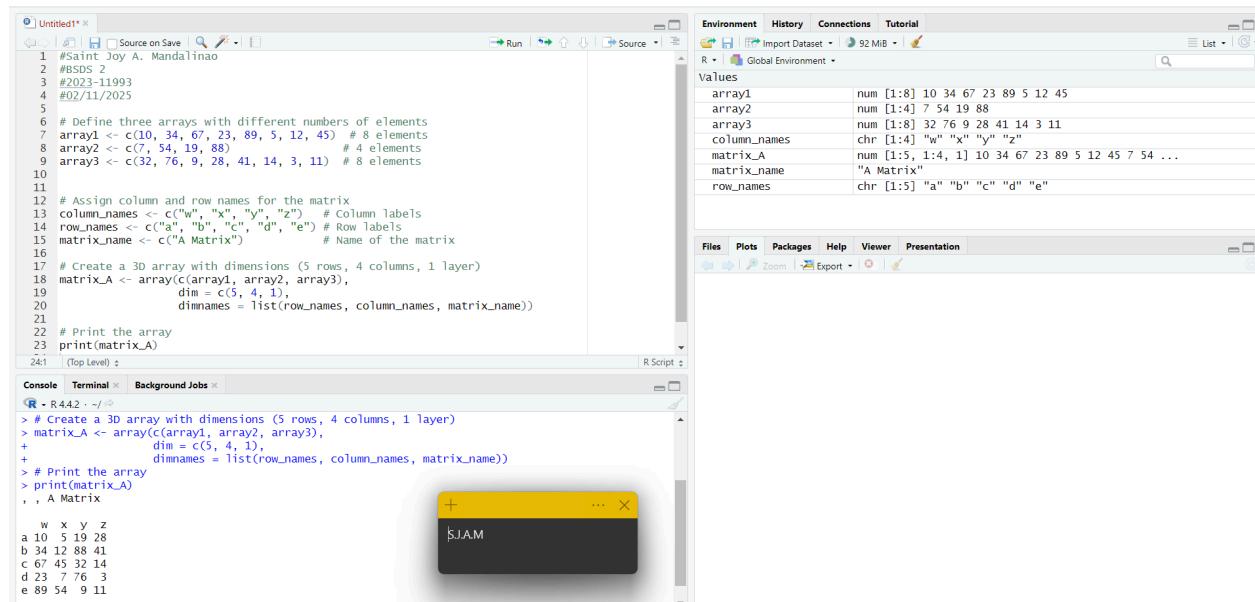


Saint Joy A. Mandalinao BSDS 2  
 2023-11993  
 2/11/2025

## Exercise 1 (Data Organization and Visualizations in R)

**Exercise 1a.** Write a code to create a matrix similar to the one shown below, using three original arrays: array1, array2, and array3. The first array contains 8 elements, and the second contains 4 elements. Ensure the matrix follows the given row and column variables and name it "A Matrix".

### Code



```

1 # Saint Joy A. Mandalinao
2 # 2023-11993
3 # 02/11/2025
4
5 # Define three arrays with different numbers of elements
6 array1 <- c(10, 34, 67, 23, 89, 5, 12, 45) # 8 elements
7 array2 <- c(7, 54, 19, 88) # 4 elements
8 array3 <- c(32, 76, 9, 28, 41, 14, 3, 11) # 8 elements
9
10
11 # Assign column and row names for the matrix
12 column_names <- c("w", "x", "y", "z") # Column labels
13 row_names <- c("a", "b", "c", "d", "e") # Row labels
14 matrix_name <- c("A Matrix") # Name of the matrix
15
16 # Create a 3D array with dimensions (5 rows, 4 columns, 1 layer)
17 matrix_A <- array(c(array1, array2, array3),
18                   dim = c(5, 4, 1),
19                   dimnames = list(row_names, column_names, matrix_name))
20
21
22 # Print the array
23 print(matrix_A)
24

```

(Top Level) : R Script

Console Terminal Background Jobs

```

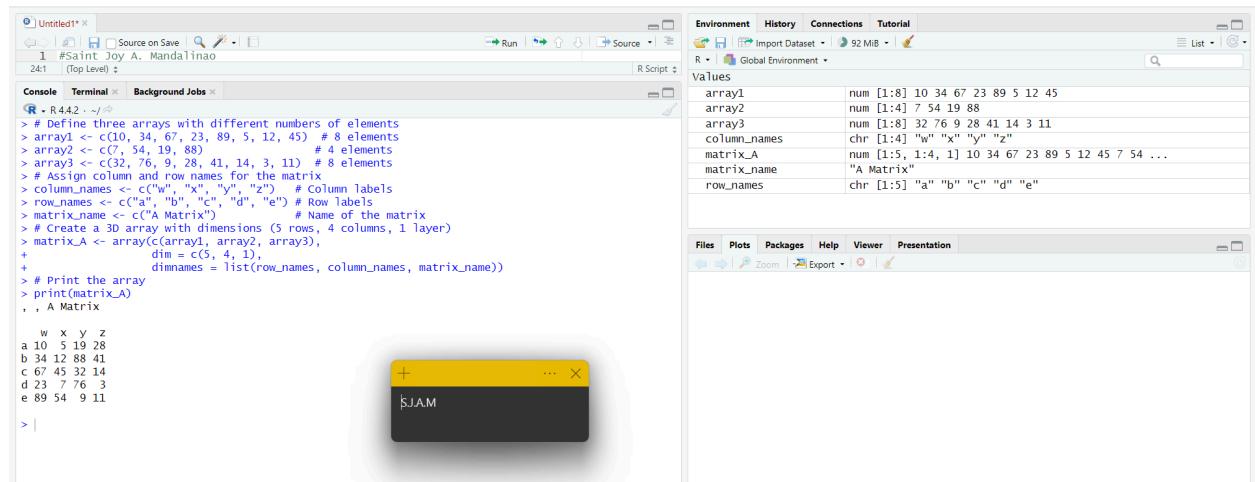
R > R.4.4.2 -- / ...
> # Create a 3D array with dimensions (5 rows, 4 columns, 1 layer)
> matrix_A <- array(c(array1, array2, array3),
>                     dim = c(5, 4, 1),
>                     dimnames = list(row_names, column_names, matrix_name))
> # Print the array
> print(matrix_A)
+ , A Matrix

```

w x y z

a	10	34	67	23	89	5	12	45
b	34	12	88	41				
c	67	45	32	14				
d	23	7	76	3				
e	89	54	9	11				

### Console and Environment



```

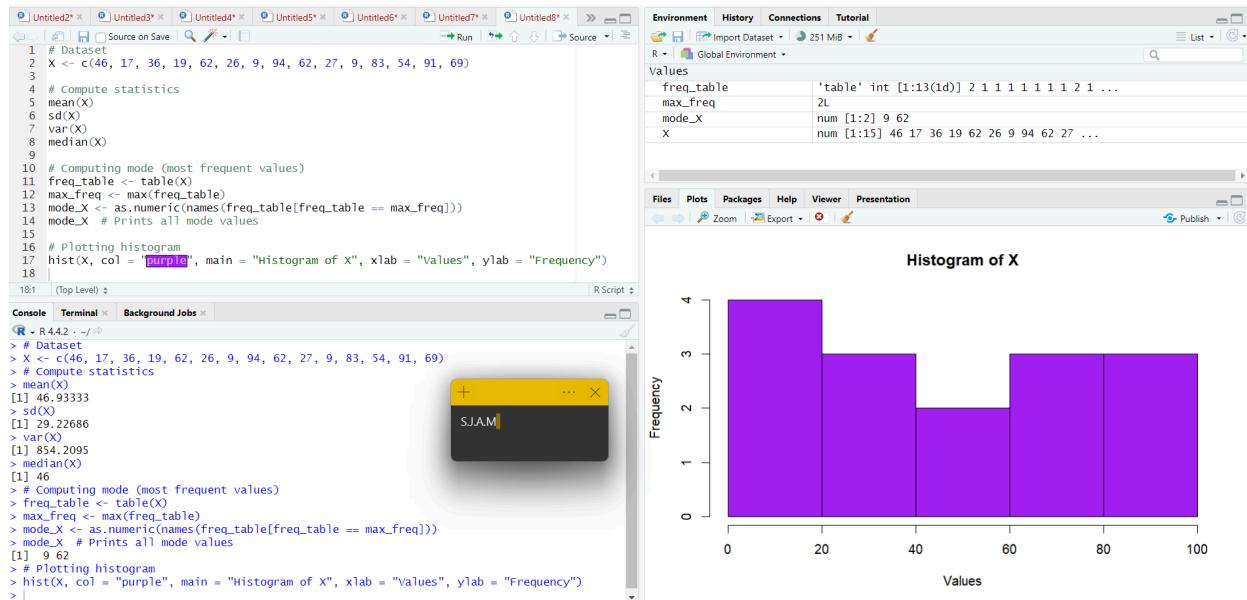
1 # Saint Joy A. Mandalinao
2 # 2023-11993
3 # 02/11/2025
4
5 # Define three arrays with different numbers of elements
6 array1 <- c(10, 34, 67, 23, 89, 5, 12, 45) # 8 elements
7 array2 <- c(7, 54, 19, 88) # 4 elements
8 array3 <- c(32, 76, 9, 28, 41, 14, 3, 11) # 8 elements
9
10 # Assign column and row names for the matrix
11 column_names <- c("w", "x", "y", "z") # Column labels
12 row_names <- c("a", "b", "c", "d", "e") # Row labels
13 matrix_name <- c("A Matrix") # Name of the matrix
14
15 # Create a 3D array with dimensions (5 rows, 4 columns, 1 layer)
16 matrix_A <- array(c(array1, array2, array3),
17                   dim = c(5, 4, 1),
18                   dimnames = list(row_names, column_names, matrix_name))
19
20 # Print the array
21 print(matrix_A)
+ , A Matrix

```

w x y z

a	10	34	67	23	89	5	12	45
b	34	12	88	41				
c	67	45	32	14				
d	23	7	76	3				
e	89	54	9	11				

**Exercise 1b** Write a code to compute the mean, median, mode, variance, and standard deviation of the following dataset.  $X = \{46, 17, 36, 19, 62, 26, 9, 94, 62, 27, 9, 83, 54, 91, 69\}$



The screenshot shows the RStudio interface with the following details:

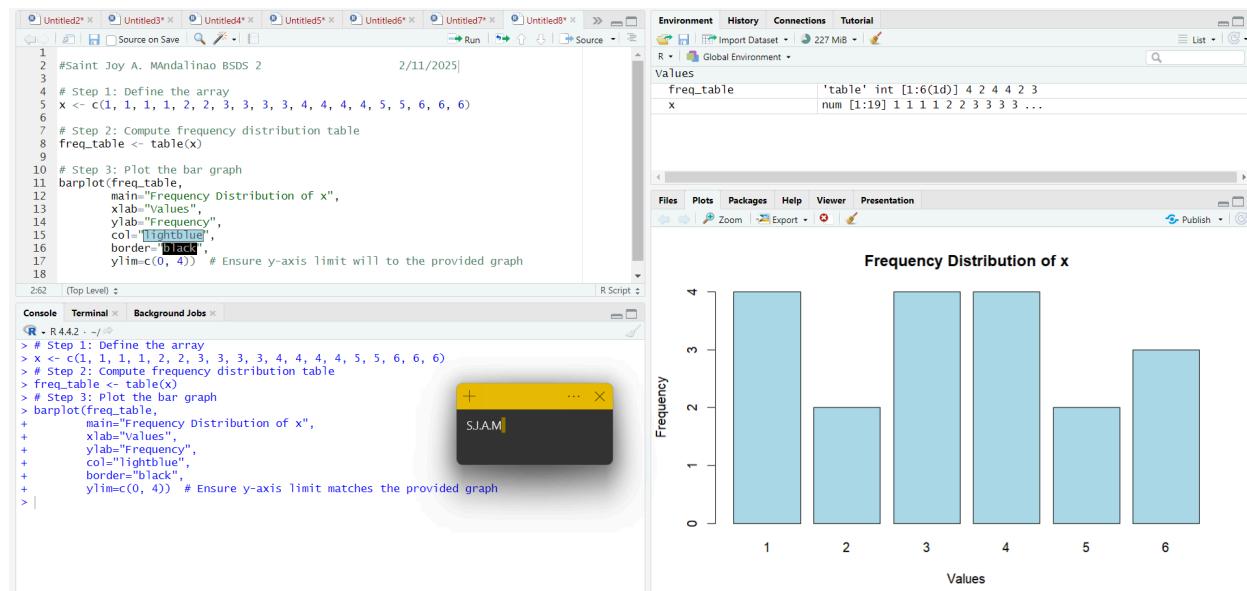
- Code Editor:** Contains R code to calculate statistics and generate a histogram. The code includes:
 

```

1 # Dataset
2 X <- c(46, 17, 36, 19, 62, 26, 9, 94, 62, 27, 9, 83, 54, 91, 69)
3
4 # Compute statistics
5 mean(X)
6 sd(X)
7 var(X)
8 median(X)
9
10 # Computing mode (most frequent values)
11 freq_table <- table(X)
12 max_freq <- max(freq_table)
13 mode_X <- as.numeric(names(freq_table[freq_table == max_freq]))
14 mode_X # Prints all mode values
15
16 # Plotting histogram
17 hist(X, col = "purple", main = "Histogram of X", xlab = "Values", ylab = "Frequency")
18
19 (Top Level) R Script
      
```
- Console:** Shows the output of the R code, including the calculated statistics and the histogram command.
- Environment View:** Displays the global environment with variables:
 

freq_table	'table' int [1:13(1d)] 2 1 1 1 1 1 1 2 1 ...
max_freq	26
mode_X	num [1:2] 9 62
X	num [1:15] 46 17 36 19 62 26 9 94 62 27 9 83 54 91 69
- Plots View:** Shows a histogram titled "Histogram of X" with purple bars. The x-axis is labeled "Values" and ranges from 0 to 100. The y-axis is labeled "Frequency" and ranges from 0 to 4. The histogram has approximately 15 bins.

**Exercise 1c** Write a code to implement the frequency distribution bar graph below.



The screenshot shows the RStudio interface with the following details:

- Code Editor:** Contains R code to define an array, compute a frequency distribution table, and plot a bar graph. The code includes:
 

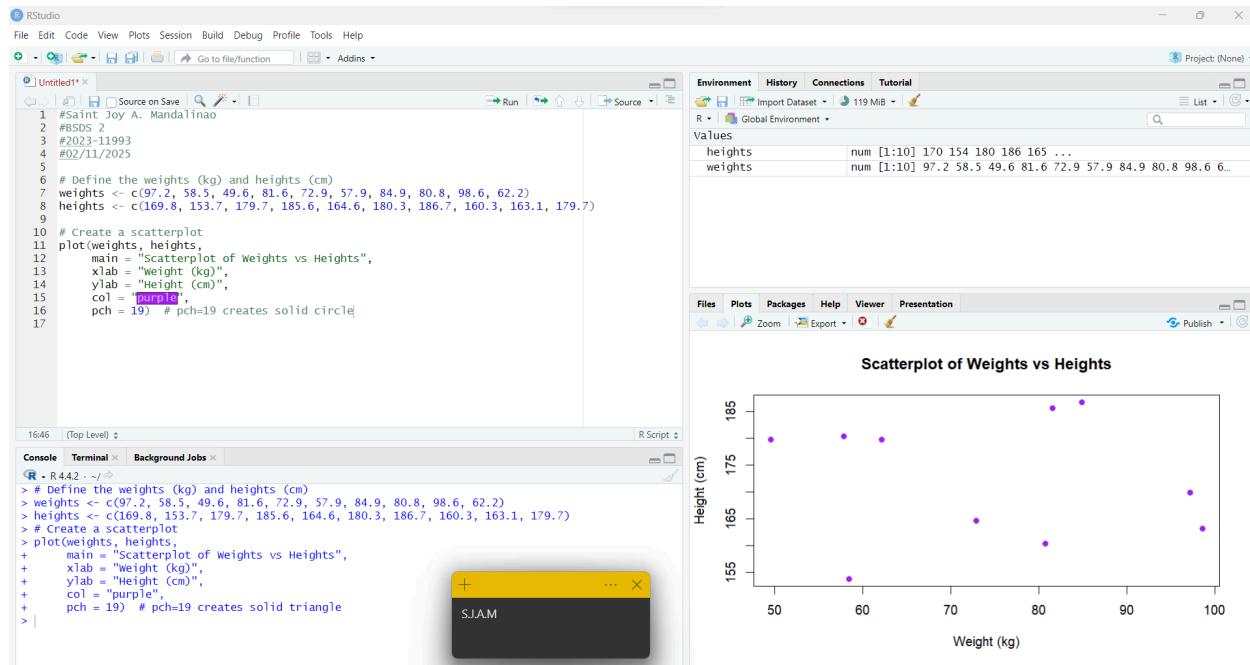
```

1 #Saint Joy A. Mandalinao BSDS 2
2 2/11/2025
3
4 # Step 1: Define the array
5 x <- c(1, 1, 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 6, 6, 6)
6
7 # Step 2: Compute Frequency distribution table
8 freq_table <- table(x)
9
10 # Step 3: Plot the bar graph
11 barplot(freq_table,
12         main="Frequency Distribution of x",
13         xlab="Values",
14         ylab="Frequency",
15         col="lightblue",
16         border="black",
17         ylim=c(0, 4)) # Ensure y-axis limit will to the provided graph
18
19 (Top Level) R Script
      
```
- Console:** Shows the output of the R code, including the frequency distribution table and the bar plot command.
- Environment View:** Displays the global environment with variables:
 

freq_table	'table' int [1:6(1d)] 4 2 4 4 2 3
x	num [1:19] 1 1 1 2 2 3 3 3 3 ...
- Plots View:** Shows a bar graph titled "Frequency Distribution of x" with light blue bars. The x-axis is labeled "Values" and has categories 1, 2, 3, 4, 5, 6. The y-axis is labeled "Frequency" and ranges from 0 to 4. The bar heights are approximately 4, 2, 4, 4, 2, 3 respectively.

**Exercise 1d** Generate a scatterplot using the data provided below:

- Weights (kg): 97.2, 58.5, 49.6, 81.6, 72.9, 57.9, 84.9, 80.8, 98.6, 62.2
- Heights (cm): 169.8, 153.7, 179.7, 185.6, 164.6, 180.3, 186.7, 160.3, 163.1, 179.7



**Exercise 1e.** Write a code to plot a time series for the monthly average sales of a restaurant for the year 2024. Feel free to generate random sales values.

