

Exercises on Vectors:

1. Given a vector of numeric data representing monthly sales for a year, analyze the data to find:
 - The month with the highest sales.
 - The month with the lowest sales.
 - The variance and standard deviation of the sales.
2. Create a vector of integers and write a function that categorizes each number as "low", "medium", or "high" based on its value (e.g., less than 10 as "low", between 10 and 20 as "medium", and greater than 20 as "high"). Apply this function to the vector and display the results.
3. Given a vector of daily temperatures, convert these temperatures from Celsius to Fahrenheit, then find and display:
 - The mean temperature in Fahrenheit
 - The days when the temperature was above the average
4. Create a vector of product sales for each day of a month. Identify the days with sales above the 75th percentile and calculate the total sales for those days.

Exercises on Arrays:

1. Create a 3-dimensional array and perform basic arithmetic operations on it (addition, subtraction, multiplication, division).
2. Create a 3-dimensional array and extract specific elements, rows, and slices.
3. Create a 3-dimensional array and find the mean, median, and standard deviation of the elements in each dimension.
4. Create a 3-dimensional array, transform its elements by applying a custom function, and analyze the transformed data to find the maximum, minimum, and range of values.

Exercises on Lists:

1. Create a list with named elements. Add a new element to the list and modify an existing element. Remove an element from the list.
2. Create a list of numeric vectors. Apply a function to each vector to calculate its sum, and store the results in a new list. Print the new list.
3. Create a list of lists, each containing a numeric vector and a character vector. Write a function to concatenate the character vectors and find the sum of the numeric vectors. Apply this function to the list and print the results.
4. Create a list containing different types of objects (data frames, matrices, vectors). Write a function to calculate the mean of all numeric elements in the list, handling each type appropriately. Apply the function to the list and print the result.

Exercises on Matrices:

1. Create two 4x4 matrices with random numbers. Compute their product and analyze the resulting matrix by finding its determinant and checking if it is singular (i.e., determinant equals zero).
2. Create a 4x4 matrix with random integers between 10 and 50. Write a function that extracts the submatrix consisting of the last two rows and columns.
3. Create two 3x3 matrices with random integers between 1 and 10. Compute their element-wise difference and analyze whether any elements are negative. Write a function to identify and return the positions of negative elements.

Exercises on Factors:

1. Create a factor variable representing different levels of education (e.g., "High School", "Associate", "Bachelor", "Master", "PhD"). Generate a factor vector with 10 random samples from these levels. Write a function to return the frequency count of each level.
2. Analyze a factor variable representing Feedback with levels "Positive", "Neutral", and "Negative". Create a factor vector of 20 feedback entries. Compute the proportion of each feedback level and analyze the distribution.
3. Create a factor variable SurveyResponse with levels "Agree", "Disagree", "Neutral". Generate a vector of 15 survey responses randomly chosen from these levels. Write a function that returns the proportion of each response level and indicates the most common response.
4. Given a factor variable ProductCategory with levels "Electronics", "Clothing", "Furniture", and a numeric vector Sales representing monthly sales, analyze the average sales for each product category and identify the category with the highest average sales.