**JavaScript Arrays Assignment**

**1. Basic Array Manipulation**

* Create an array fruits containing the following elements: "Apple", "Banana", "Mango", "Orange", "Pineapple".
  + a. Add "Grapes" to the end of the array.
  + b. Remove the first element of the array.
  + c. Add "Watermelon" at the beginning of the array.
  + d. Remove the last element of the array.
  + e. Display the updated array after each operation.

**2. Array Iteration**

* Create an array numbers with the elements: [5, 12, 8, 130, 44].
  + a. Use a for loop to find and print all the elements greater than 10.
  + b. Use a forEach() method to multiply each element by 2 and display the updated array.

**3. Array Searching and Filtering**

* Given an array ages = [32, 33, 16, 40, 12], perform the following tasks:
  + a. Find and display the first age greater than 18 using find().
  + b. Create a new array of ages greater than or equal to 18 using filter().

**4. Array Sorting and Reversing**

* Create an array names = ["John", "Alice", "Bob", "David", "Charles"].
  + a. Sort the array alphabetically and display it.
  + b. Reverse the sorted array and display it.

**5. Multi-Dimensional Arrays**

* Create a 2D array matrix representing a 3x3 grid with the values:

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1 2 3

4 5 6

7 8 9

* + a. Write a function to print all elements of the matrix row by row.
  + b. Write a function to calculate and return the sum of all elements in the matrix.

**6. Array Methods Practice**

* Given the array nums = [10, 20, 30, 40, 50], use the following array methods:
  + a. map(): Create a new array where each number is squared.
  + b. reduce(): Calculate the sum of all elements in the array.
  + c. some(): Check if there is at least one element greater than 25.
  + d. every(): Check if all elements are greater than 5.

**7. Array Splicing and Slicing**

* Given the array colors = ["Red", "Green", "Blue", "Yellow", "Purple"]:
  + a. Use slice() to create a new array that contains the first 3 colors.
  + b. Use splice() to remove "Blue" from the array and insert "Cyan" and "Magenta" in its place.
  + c. Display the updated colors array.

**8. Merging and Copying Arrays**

* Given two arrays:
  + arr1 = [1, 2, 3]
  + arr2 = [4, 5, 6]
  + a. Merge both arrays into a single array using concat() and display the result.
  + b. Use the spread operator ... to merge them and display the result.
  + c. Create a shallow copy of the merged array and demonstrate that changes in the copy do not affect the original array.

**9. Array Destructuring**

* Given the array coordinates = [15.5, 20.3]:
  + a. Use array destructuring to assign the values to x and y variables.
  + b. Display the values of x and y.

**10. Challenge: Array Rotation**

* Write a function rotateArray(arr, k) that rotates an array arr by k positions.
  + Example:

makefile

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Input: arr = [1, 2, 3, 4, 5], k = 2

Output: [4, 5, 1, 2, 3]

* + Hint: You can use slice() and concat() to solve this problem.