1. Find Second Largest Number in an Array

Description: Find the second largest number without sorting the array.
Example:
Input: [10, 20, 4, 45, 99]
Output: 45

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2. Merge Two Sorted Arrays

Description: Merge two sorted arrays into a single sorted array.
Example:
Input: [1, 3, 5], [2, 4, 6]
Output: [1, 2, 3, 4, 5, 6]

---

3. Rotate Array K Times to the Right

Description: Rotate elements of an array K times to the right.
Example:
Input: [1, 2, 3, 4, 5], K = 2
Output: [4, 5, 1, 2, 3]

---

4. Intersection of Two Arrays

Description: Return elements present in both arrays.
Example:
Input: [1, 2, 3, 4], [3, 4, 5, 6]
Output: [3, 4]

---

5. Rearrange Array (Even Before Odd)

Description: Move even numbers before odd numbers while maintaining order.
Example:
Input: [1, 2, 3, 4, 5, 6]
Output: [2, 4, 6, 1, 3, 5]

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6. Binary Search Algorithm

Description: Implement binary search in a sorted array.
Example:
Input: [1, 3, 5, 7, 9], Target = 7
Output: Found at index 3

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7. Rock, Paper, Scissors Game

Description: Simulate a game using random computer choices.

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8. Menu-Based ATM System

Description: Handle options for balance, withdraw, deposit, exit.
Example: "100 withdrawn successfully"

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9. String Compression

Description: Compress using counts of consecutive characters.
Example:
"aabcccccaaa" → "a2b1c5a3"

---

10. Check Unique Characters

Description: Return whether a string contains only unique chars.
Example:
"hello" → Not Unique

---

11. String Rotation Check

Description: Check if one string is rotation of another.
Example:
"waterbottle", "erbottlewat" → True

---

12. Character Frequency Counter

Description: Count occurrences of characters.
Input: "banana" → {b:1, a:3, n:2}

---

13. String Pattern Matching ("abba")

Description: Check if sentence follows the pattern.
Example: "dog cat cat dog" → True

---

14. All Permutations of a String

Description: Generate all permutations.
Input: "abc" → abc, acb, bac, ...

---

15. Kadane's Algorithm (Max Subarray Sum)

Example:
[-2,1,-3,4,-1,2,1,-5,4] → 6

---

16. Matrix Multiplication

Description: Multiply matrix A × B manually.
Example:
[[1,2],[3,4]] × [[5,6],[7,8]] → [[19,22],[43,50]]

---

17. Sentence Abbreviation

Description: Convert sentence into first-letter abbreviation.
Example: "I am learning JavaScript" → "I a l J"

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18. Implement a Stack (Array-Based)

Operations: push, pop, peek, isEmpty.

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19. Implement a Queue Using Two Stacks

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20. Check Balanced Parentheses

Input: "{[()]}" → Output: Balanced

21. Longest Palindromic Substring

Input: "babad" → "bab" or "aba"

---

22. Merge Overlapping Intervals

Input: [[1,3],[2,6],[8,10]] → [[1,6],[8,10]]

---

23. Top K Frequent Elements

Input: [1,1,1,2,2,3], k=2 → [1,2]

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24. K-th Largest Element

Given an array of numbers and a value **k**, find the number that would appear in the **k-th position if the array were sorted in descending order**.

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25. Set Matrix Zeroes

If an element is zero, set its entire row and column to zero.
Follow-up: solve in **constant extra space** using the matrix itself as markers.