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| **Single Number in C++** | |
| #include <iostream>  #include <vector>  using namespace std;  int singleNumber(vector<int>& nums) {  int result = 0;  for (int num : nums) {  result ^= num;  }  return result;  }  int main() {  vector<int> arr = {2, 2, 3, 3, 4, 6, 6};  cout << singleNumber(arr) << endl; // Output: 4  return 0;  } | **Input:**  vector<int> arr = {2, 2, 3, 3, 4, 6, 6};  All numbers repeat twice **except 4**, which should be our result.  **💡 Logic Behind XOR:**   * a ^ a = 0 * a ^ 0 = a * XOR is **commutative** and **associative**, so order doesn’t matter.   **🧮 Dry Run Table:**   | **Step** | **num** | **result (before)** | **result ^ num** | **result (after)** | | --- | --- | --- | --- | --- | | 1 | 2 | 0 | 0 ^ 2 = 2 | 2 | | 2 | 2 | 2 | 2 ^ 2 = 0 | 0 | | 3 | 3 | 0 | 0 ^ 3 = 3 | 3 | | 4 | 3 | 3 | 3 ^ 3 = 0 | 0 | | 5 | 4 | 0 | 0 ^ 4 = 4 | 4 | | 6 | 6 | 4 | 4 ^ 6 = 2 | 2 | | 7 | 6 | 2 | 2 ^ 6 = 4 | 4 |   **✅ Final Output:**  4 |
| 4 | |