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DEPARTMENT: COMPUTER SCIENCE

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## Problem 1: Basic Array Declaration and Access

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[3] = {1, 2, 3};  
 cout << a[0] << endl; // Output: 1  
 return 0;  
}

## Problem 2: Array Modification

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[4] = {5, 6, 7, 8};  
 a[1] = 10;  
 cout << a[1] << endl; // Output: 10  
 return 0;  
}

## Problem 3: Loop Through an Array

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[5] = {2, 4, 6, 8, 10};  
 for(int i = 0; i < 5; i++) {  
 cout << a[i] << " "; // Output: 2 4 6 8 10  
 }  
 return 0;  
}

## Problem 4: Array Sum Calculation

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[3] = {1, 3, 5};  
 int sum = 0;  
 for(int i = 0; i < 3; i++) {  
 sum += a[i];  
 }  
 cout << sum << endl; // Output: 9  
 return 0;  
}

## Problem 5: Find Maximum in an Array

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[4] = {1, 9, 3, 7};  
 int max\_val = a[0];  
 for(int i = 1; i < 4; i++) {  
 if(a[i] > max\_val) {  
 max\_val = a[i];  
 }  
 }  
 cout << max\_val << endl; // Output: 9  
 return 0;  
}

## Problem 6: Reverse an Array

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[4] = {1, 2, 3, 4};  
 for(int i = 3; i >= 0; i--) {  
 cout << a[i] << " "; // Output: 4 3 2 1  
 }  
 return 0;  
}

## Problem 7: Basic 2D Array Declaration and Access

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[2][2] = {{1, 2}, {3, 4}};  
 cout << a[0][1] << endl; // Output: 2  
 return 0;  
}

## Problem 8: Modify 2D Array Element

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[2][2] = {{5, 6}, {7, 8}};  
 a[1][0] = 10;  
 cout << a[1][0] << endl; // Output: 10  
 return 0;  
}

## Problem 9: Print 2D Array

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[2][3] = {{1, 2, 3}, {4, 5, 6}};  
 for(int i = 0; i < 2; i++) {  
 for(int j = 0; j < 3; j++) {  
 cout << a[i][j] << " ";  
 }  
 cout << endl;  
 }  
 // Output:  
 // 1 2 3  
 // 4 5 6  
 return 0;  
}

## Problem 10: Sum of 2D Array Elements

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[2][2] = {{1, 2}, {3, 4}};  
 int sum = 0;  
 for(int i = 0; i < 2; i++) {  
 for(int j = 0; j < 2; j++) {  
 sum += a[i][j];  
 }  
 }  
 cout << sum << endl; // Output: 10  
 return 0;  
}

## Problem 11: Find Maximum in 2D Array

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[2][3] = {{1, 9, 2}, {7, 6, 3}};  
 int max\_val = a[0][0];  
 for(int i = 0; i < 2; i++) {  
 for(int j = 0; j < 3; j++) {  
 if(a[i][j] > max\_val) {  
 max\_val = a[i][j];  
 }  
 }  
 }  
 cout << max\_val << endl; // Output: 9  
 return 0;  
}

## Problem 12: Transpose of a 2x2 Matrix

#include <iostream>  
using namespace std;  
  
int main() {  
 int a[2][2] = {{1, 2}, {3, 4}};  
 int t[2][2];  
 for(int i = 0; i < 2; i++) {  
 for(int j = 0; j < 2; j++) {  
 t[j][i] = a[i][j];  
 }  
 }  
 for(int i = 0; i < 2; i++) {  
 for(int j = 0; j < 2; j++) {  
 cout << t[i][j] << " ";  
 }  
 cout << endl;  
 }  
 // Output:  
 // 1 3  
 // 2 4  
 return 0;  
}

## Problem 13: Basic Vector Declaration and Access

#include <iostream>  
#include <vector>  
using namespace std;  
  
int main() {  
 vector<int> v = {1, 2, 3};  
 cout << v[0] << endl; // Output: 1  
 return 0;  
}

## Problem 14: Add Element to Vector

#include <iostream>  
#include <vector>  
using namespace std;  
  
int main() {  
 vector<int> v = {4, 5, 6};  
 v.push\_back(7);  
 cout << v[3] << endl; // Output: 7  
 return 0;  
}

## Problem 15: Remove Element from Vector

#include <iostream>  
#include <vector>  
using namespace std;  
  
int main() {  
 vector<int> v = {8, 9, 10};  
 v.pop\_back(); // Removes the last element  
 cout << v.size() << endl; // Output: 2  
 return 0;  
}

## Problem 16: Vector Iteration Using Loop

#include <iostream>  
#include <vector>  
using namespace std;  
  
int main() {  
 vector<int> v = {1, 3, 5, 7};  
 for(int i = 0; i < v.size(); i++) {  
 cout << v[i] << " "; // Output: 1 3 5 7  
 }  
 return 0;  
}

## Problem 17: Find Maximum in a Vector

#include <iostream>  
#include <vector>  
using namespace std;  
  
int main() {  
 vector<int> v = {3, 8, 1, 6};  
 int max\_val = v[0];  
 for(int i = 1; i < v.size(); i++) {  
 if(v[i] > max\_val) {  
 max\_val = v[i];  
 }  
 }  
 cout << max\_val << endl; // Output: 8  
 return 0;  
}

## Problem 18: Sum of Vector Elements

#include <iostream>  
#include <vector>  
using namespace std;  
  
int main() {  
 vector<int> v = {4, 5, 6};  
 int sum = 0;  
 for(int i = 0; i < v.size(); i++) {  
 sum += v[i];  
 }  
 cout << sum << endl; // Output: 15  
 return 0;  
}