**1. Matrix Addition**

#include <stdio.h>

int main() {

int m, n;

printf("Enter the size of the matrix (rows and columns): ");

scanf("%d %d", &m, &n);

int A[m][n], B[m][n], sum[m][n];

printf("Enter elements of first matrix:\n");

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

scanf("%d", &A[i][j]);

}

}

printf("Enter elements of second matrix:\n");

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

scanf("%d", &B[i][j]);

}

}

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

sum[i][j] = A[i][j] + B[i][j];

}

}

printf("Resultant matrix:\n");

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

printf("%d ", sum[i][j]);

}

printf("\n");

}

return 0;

}

### ****2. Matrix Multiplication****

#include <stdio.h>

int main() {

int r1, c1, r2, c2;

printf("Enter the size of the first matrix (rows and columns): ");

scanf("%d %d", &r1, &c1);

printf("Enter the size of the second matrix (rows and columns): ");

scanf("%d %d", &r2, &c2);

if (c1 != r2) {

printf("Matrix multiplication not possible.\n");

return 1;

}

int A[r1][c1], B[r2][c2], result[r1][c2];

printf("Enter elements of first matrix:\n");

for (int i = 0; i < r1; i++) {

for (int j = 0; j < c1; j++) {

scanf("%d", &A[i][j]);

}

}

printf("Enter elements of second matrix:\n");

for (int i = 0; i < r2; i++) {

for (int j = 0; j < c2; j++) {

scanf("%d", &B[i][j]);

}

}

for (int i = 0; i < r1; i++) {

for (int j = 0; j < c2; j++) {

result[i][j] = 0;

for (int k = 0; k < c1; k++) {

result[i][j] += A[i][k] \* B[k][j];

}

}

}

printf("Resultant matrix:\n");

for (int i = 0; i < r1; i++) {

for (int j = 0; j < c2; j++) {

printf("%d ", result[i][j]);

}

printf("\n");

}

return 0;

}

**3. Transpose of a Matrix**

#include <stdio.h>

int main() {

int m, n;

printf("Enter the size of the matrix (rows and columns): ");

scanf("%d %d", &m, &n);

int matrix[m][n], transpose[n][m];

printf("Enter elements of the matrix:\n");

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

scanf("%d", &matrix[i][j]);

}

}

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

transpose[j][i] = matrix[i][j];

}

}

printf("Transposed matrix:\n");

for (int i = 0; i < n; i++) {

for (int j = 0; j < m; j++) {

printf("%d ", transpose[i][j]);

}

printf("\n");

}

return 0;

}

### ****4. Find the Largest Element****

#include <stdio.h>

int main() {

int m, n;

printf("Enter the size of the matrix (rows and columns): ");

scanf("%d %d", &m, &n);

int matrix[m][n];

printf("Enter elements of the matrix:\n");

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

scanf("%d", &matrix[i][j]);

}

}

int max = matrix[0][0];

for (int i = 0; i < m; i++) {

for (int j = 0; j < n; j++) {

if (matrix[i][j] > max) {

max = matrix[i][j];

}

}

}

printf("Largest element: %d\n", max);

return 0;

}

### ****5. Sum of Diagonal Elements****

#include <stdio.h>

int main() {

int n;

printf("Enter the size of the square matrix (n x n): ");

scanf("%d", &n);

int matrix[n][n];

printf("Enter elements of the matrix:\n");

for (int i = 0; i < n; i++) {

for (int j = 0; j < n; j++) {

scanf("%d", &matrix[i][j]);

}

}

int principalSum = 0, secondarySum = 0;

for (int i = 0; i < n; i++) {

principalSum += matrix[i][i];

secondarySum += matrix[i][n - 1 - i];

}

printf("Sum of principal diagonal: %d\n", principalSum);

printf("Sum of secondary diagonal: %d\n", secondarySum);

return 0;

}

### ****Maximum in Each Row and Column:****

#include <stdio.h>

int main() {

int a, b;

printf("Enter the number of rows and columns: ");

scanf("%d %d", &a, &b);

int mat[a][b];

printf("Enter the elements of the matrix:\n");

for (int i = 0; i < a; i++) {

for (int j = 0; j < b; j++) {

scanf("%d", &mat[i][j]);

}

}

// Find maximum of each row

printf("Maximum of each row:\n");

for (int i = 0; i < a; i++) {

int rowMax = mat[i][0];

for (int j = 1; j < b; j++) {

if (mat[i][j] > rowMax) {

rowMax = mat[i][j];

}

}

printf("Row %d: %d\n", i + 1, rowMax);

}

// Find maximum of each column

printf("Maximum of each column:\n");

for (int j = 0; j < b; j++) {

int colMax = mat[0][j];

for (int i = 1; i < a; i++) {

if (mat[i][j] > colMax) {

colMax = mat[i][j];

}

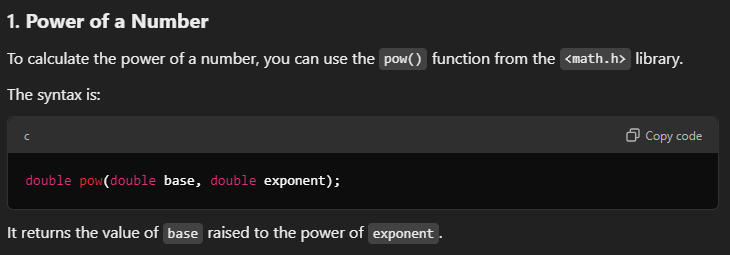
}

printf("Column %d: %d\n", j + 1, colMax);

}

return 0;

}



### Example: Power of a Number

#include <stdio.h>

#include <math.h> // Required for pow()

int main() {

double base, exponent, result;

printf("Enter base and exponent: ");

scanf("%lf %lf", &base, &exponent); // Read base and exponent

result = pow(base, exponent); // Calculate base raised to exponent

printf("%.2f raised to %.2f is: %.2f\n", base, exponent, result);

return 0;

}

### 2. ****Root of a Number****

#include <stdio.h>

#include <math.h> // Required for pow()

int main() {

double number, n, result;

printf("Enter the number and the root (n): ");

scanf("%lf %lf", &number, &n); // Read number and root

result = pow(number, 1.0 / n); // Calculate nth root

printf("The %.2fth root of %.2f is: %.2f\n", n, number, result);

return 0;

}