**Topic 3: Arrays  
Question:  
You are given a 2D matrix of size n x n where each row and each column is sorted in increasing order. Write a C function to determine whether a given key exists in the matrix using the most efficient approach.**

#include <stdio.h>

typedef int bool;

#define true 1

#define false 0

bool search(int matrix[][100], int n, int key) {

int row = 0;

int col = n - 1;

while (row < n && col >= 0) {

if (matrix[row][col] == key) {

return true;

} else if (matrix[row][col] > key) {

col--;

} else {

row++;

}

}

return false;

}

int main() {

int n, key;

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

scanf("%d", &n);

int matrix[100][100];

printf("Enter the elements of the %d x %d matrix row by row (separated by spaces):\n", n, n);

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

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

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

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

}

}

printf("Enter the key to search: ");

scanf("%d", &key);

if (search(matrix, n, key)) {

printf("Key found in the matrix.\n");

} else {

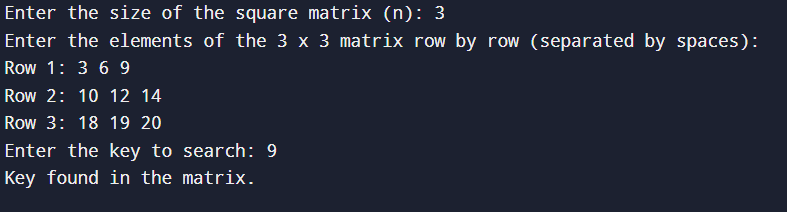
printf("Key not found in the matrix.\n");

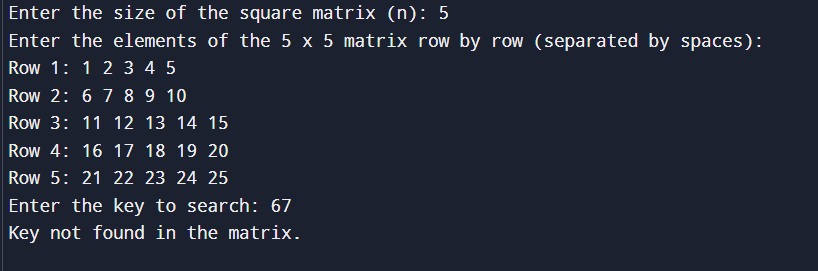
}

return 0;

}

**OUTPUT:**

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