1. **Transpose Matrix**

r = int(input())

a = []

for i in range(r):

row = list(map(int, input().strip().split()))

a.append(row)

for row in a:

print(\*row)

print("Transpose matrix is:")

for i in range(r):

for j in range(r):

print(a[j][i], end=" ")

print()

1. **Upper Triangular Matrix**

n = int(input())

mat = []

check = 1

for i in range(n):

row = list(map(int, input().strip().split()))

mat.append(row)

for i in range(1, n):

for j in range(0, i):

if mat[i][j] != 0:

check = 0

break

if check == 1:

print("Upper triangular matrix")

else:

print("Not an Upper triangular matrix")

1. **Maximum Element in each Column**

m = int(input())

n = int(input())

a = []

for i in range(m):

row = list(map(int, input().strip().split()))

a.append(row)

for i in range(n):

max = 0

for j in range(m):

if a[j][i] > max:

max = a[j][i]

print(max)

1. **Matrix Multiplication**

row, col = map(int, input().split())

mat1 = []

mat2 = []

for i in range(row):

mat1.append([int(x) for x in input().split()])

for i in range(row):

mat2.append([int(x) for x in input().split()])

mult = [[0 for i in range(col)] for j in range(row)]

for i in range(row):

for j in range(col):

for k in range(col):

mult[i][j] += mat1[i][k] \* mat2[k][j]

for i in range(row):

for j in range(col):

print(mult[i][j], end=' ')

print()

1. **Sum of Zig-Zag**

r = int(input().strip())

c = int(input().strip())

a = []

for i in range(r):

row = list(map(int, input().strip().split()))

a.append(row)

sum = 0

for i in range(c):

sum += a[0][i]

sum += a[r - 1][i]

for i in range(1, r - 1):

sum += a[i][c - 1 - i]

print("Sum of Zig-Zag pattern is", sum)

1. **Move all Zeroes**

t = int(input())

while t > 0:

t -= 1

num = int(input())

r = 0

count = 0

ans = 0

while num != 0:

r = num % 10

if r == 0:

count += 1

else:

ans = (ans \* 10) + r

num = num // 10

print(ans, end='')

for i in range(count):

print("0", end='')

print()

1. **Uniformity Matrix**

n = int(input())

a = []

for i in range(n):

a.append([int(x) for x in input().split()])

ecount = 0

ocount = 0

for i in range(n):

for j in range(n):

if a[i][j] % 2 == 0:

ecount += 1

else:

ocount += 1

if ecount == (n \* n) or ocount == (n \* n):

print("Yes")

else:

print("No")

1. **Magic Square**

r = int(input())

a = []

for i in range(r):

a.append([int(x) for x in input().split()])

d1 = 0

d2 = 0

for i in range(r):

for j in range(r):

if i == j:

d1 += a[i][j]

if i == r - j - 1:

d2 += a[i][j]

if d1 == d2:

print("Yes")

else:

print("No")

1. **Sum of Rows and Columns**

r = int(input())

c = int(input())

rw = [0] \* r

cw = [0] \* c

for i in range(r):

row = list(map(int, input().split()))

for j in range(c):

x = row[j]

rw[i] += x

cw[j] += x

print("The Sum of rows is", end = " ")

mi = 0

m1 = 1

for i in range(r):

print(rw[i], end = " ")

if mi < rw[i]:

mi = rw[i]

m1 = i + 1

print("\nRow", m1, "has a maximum sum")

print("The Sum of columns is", end = " ")

mi = 0

m1 = 1

for i in range(c):

if mi < cw[i]:

mi = cw[i]

m1 = i + 1

print(cw[i], end = " ")

print("\nColumn", m1, "has the maximum sum")

1. **Spiral Pattern**

n = int(input().strip())

a = []

for i in range(n):

row = [int(x) for x in input().strip().split()]

a.append(row)

round = int(n/2 + 0.5)

for i in range(round):

for j in range(i, n-i):

print(a[i][j], end=" ")

for j in range(i+1, n-i):

print(a[j][n-i-1], end=" ")

for j in range(n-i-2, i-1, -1):

print(a[n-i-1][j], end=" ")

for j in range(n-i-2, i, -1):

print(a[j][i], end=" ")

1. **Product IDs**

n, m, k = map(int, input().strip().split())

a = []

for i in range(n):

row = [int(x) for x in input().strip().split()]

a.append(row)

max\_val = 0

for i in range(n):

for j in range(m):

max\_val = max(max\_val, a[i][j])

b = [0] \* (max\_val + 1)

for i in range(n):

for j in range(m):

b[a[i][j]] += 1

for i in range(k):

max1 = 0

val = 0

for j in range(max\_val + 1):

if max1 < b[j]:

max1 = b[j]

val = j

print(val, end=" ")

b[val] = 0

1. **Matrix Rotation**

n = int(input().strip())

mat = []

for i in range(n):

mat.append(list(map(int, input().strip().split())))

for i in range(n):

for j in range(i + 1, n):

temp = mat[i][j]

mat[i][j] = mat[j][i]

mat[j][i] = temp

for i in range(n):

for j in range(n // 2):

temp = mat[i][j]

mat[i][j] = mat[i][n - j - 1]

mat[i][n - j - 1] = temp

for i in range(n):

for j in range(n):

print(mat[i][j], end=' ')

print()