In [60]:
```
%run my_functions_library.ipynb                                  # executing my library file
```

# Question 1

In [56]:
```
print("Augmented matrix: ")
A,r,c=read_matrix('matrix_Q1.txt')
print_matrix(A,r,c)                                              #prints the Augmented matrix
matrix_GJ, det_val =gauss_jordan(A,r,c)                          #returns solution matrix and determinant value
if matrix_GJ!=None:
    print("The solutions: ")
    for i in range(r):
        print(Round(matrix_GJ[i][r]),2)
else:
    print("No unique solution")
```

```
Augmented matrix:

1    1    1    1    13

2    3    0    -1    -1

-3    4    1    2    10

1    2    -1    1    1

The solutions:
2.0 2
-0.0 2
6.0 2
5.0 2
```

# Question 2

In [57]:
```
print("Augmented matrix: ")
B,r,c=read_matrix('matrix_Q2.txt')
print_matrix(B,r,c)
matrix_GJ, det_val =gauss_jordan(B,r,c)                                  #returns solution matrix and determinant value
if matrix_GJ!=None:
    print("The solutions: ")
    for i in range(r):
        print(matrix_GJ[i][r])
else:
    print("No unique solution")
```

```
Augmented matrix:

0    2    -3    -1

1    0    1    0

1    -1    0    3


The solutions:
1.0
-2.0
-1.0
```

# Question 3

In [58]:
```
print("Augmented matrix: ")
C,r,c=read_matrix('matrix_Q3.txt')
print_matrix(C,r,c)
matrix_GJ, det_val =gauss_jordan(C,r,c)                          #returns solution matrix and determinant value
C2,r,c=read_matrix('matrix_Q3.txt')
if matrix_GJ!=None:
                                                                 # Finding the inverse; printing in rounded form
                                                 # performing the matrix multiplication for verification and then rounding at the end
    M=get_inv(C,r)
    M_M,k,l=matrix_multiply(M,r,r,C2,r,r)                                # using only the n x n matrix i.e. unaugmented matrix
    M=round_matrix(M)
    print("Inverse matrix: ")
    print_matrix(M,r,r)
    print("The multiplication of the matrix and it's inverse gives (Unit matrix): ")
    M_M=round_matrix(M_M)
    print_matrix(M_M,r,r)
else:
    print("No unique solution")
```

```
Augmented matrix:

0    2    1    1    0    0

4    0    1    0    1    0

-1    2    0    0    0    1

Inverse matrix:

-0.33    0.33    0.33

-0.17    0.17    0.67

1.33    -0.33    -1.33

The multiplication of the matrix and it's inverse gives (Unit matrix):

1.0    0    0

0    1.0    0.0

0    0    1.0
```

# Question 4

In [59]:
```
print("Augmented matrix: ")
D,r,c=read_matrix('matrix_Q4.txt')
print_matrix(D,r,c)
matrix_GJ, det_val =gauss_jordan(D,r,c)                                  #returns solution matrix and determinant value
if matrix_GJ!=None:
    print("Tha determinant value is = "+str(det_val))
else:
    print("No unique solution")
```

```
Augmented matrix:

1    4    2    3    1    0    0    0

0    1    4    4    0    1    0    0

-1    0    1    0    0    0    1    0

2    0    4    1    0    0    0    1


Tha determinant value is = 65.0
```

In [ ]:
```

```