S.No: 30	Exp. Name: ***NumPy and SciPy***	Date:2024-11-27

Aim:

Write a Python program to create a 2-D array with ones on the diagonal and zeros elsewhere. Now convert the NumPy array to a SciPy sparse matrix in CSR format.

Explanation

In this program, we first import the necessary modules: `numpy` and `scipy.sparse.csr_matrix` . We then specify the size of the 2-D array as `size = 5` . Next, we create the 2-D array using `np.eye(size)` , which creates an identity matrix with ones on the diagonal and zeros elsewhere.

To convert the NumPy array to a SciPy sparse matrix in CSR (Compressed Sparse Row) format, we use the `csr_matrix()` function from the `scipy.sparse` module. Finally, we print the original array and the sparse matrix in CSR format.

Source Code:

NumpyScipy.py

```
import numpy as np
from scipy.sparse import csr_matrix

# Create a 2-D array with ones on the diagonal and zeros elsewhere
size = 5
arr = np.eye(size)

# Write code below to convert the NumPy array to a SciPy sparse matrix in CSR
format
import numpy as np
from scipy.sparse import csr_matrix
size = 5
arr = np.eye(size)
print("Original array:", arr)
print("Sparse matrix in CSR format:",csr_matrix(arr))
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Original array: [[1. 0. 0. 0. 0.]
[0. 1. 0. 0. 0.]
[0. 0. 1. 0. 0.]
[0. 0. 0. 1. 0.]
[0. 0. 0. 0. 1.]]
Sparse matrix in CSR format: (0, 0) 1.0
(1, 1) 1.0
(2, 2) 1.0
(3, 3) 1.0
(4, 4) 1.0