CSE220: Data Structures (Lab)
Fall 2024
Lab Quiz - 07
Duration: 35 Minutes

A

Name:	ID:	Section:

Question 1 [15 Points]

Suppose, you are the manager of the central bank of your country. You have access to the database containing information about the transactions between different banks of the country. The information is represented as a matrix M. The value at M[i][j] contains the amount of currency **transferred from Bank i to Bank j** over the last year.

Since this is a new year, you want to know about the financial activities of the banks during the last year. More specifically, for each bank, you want to find out the **net spend.** The definition of net spend for Bank A is as follows:

net spend(A) = funds transferred from Bank A to other banks - funds transferred to Bank A from other banks

Write a function ***calculate_net_spend(M, n)*** that takes a 2D numpy array M, and an integer n as a parameter. M is the matrix containing the information of transactions, as described above, and n is the total number of banks. The function should return a **1D numpy array**, containing the net spend for each of the banks.

- **Hint**: Think of the banks as the nodes of a graph, and the transactions between them as edges.
- You can use additional numpy arrays. You cannot use any other data structures.
- You cannot use negative indexing or any builtin functions except **len()**.

Sample Input:	**Sample Output:**	**Explanation:**

	0	1	2	3
0	0	5	10	7
1	2	0	14	13
2	8	4	0	9
3	3	6	1	0

```
np.array([9,14,-4,-19])
```

```
For Bank 0:
Funds transferred out = 5 + 10 + 7
= 22

Funds transferred in = 2 + 8 + 3
= 13

Net spend = funds transferred out -
            funds transferred in
          = 22 - 13 = 9
```