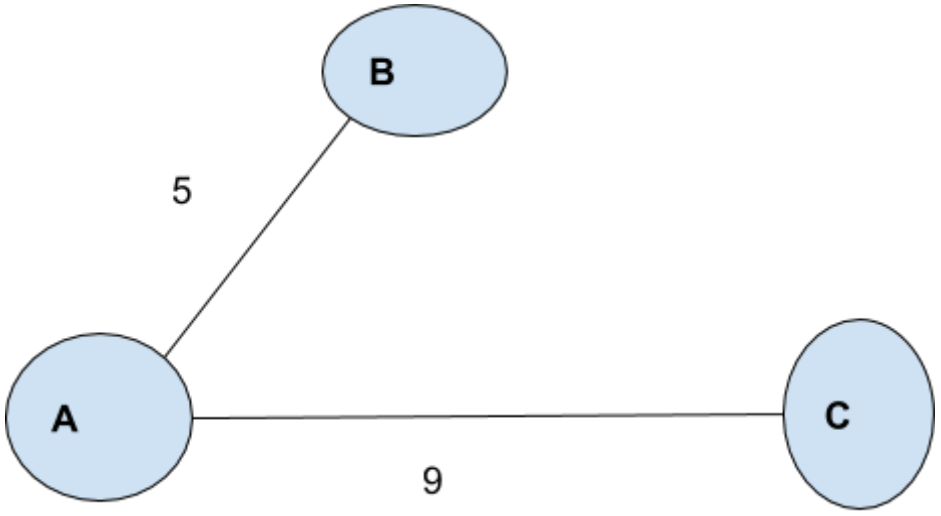
How I approach to solve this:

First of all I wanted to build an array where I can store every connection for a particular user with time and date. As I used to code in c++ or python . But here I had to complete this task using javascript/typescript. I am familiar with javascript as I use it front end side in my personal/academic projects. For that I choose Javascript instead of Typescript.
As the problem was asked to write a csv file , no need to write something in a web-browser.
For that reason I choose node.js . As it is easy and has some built in libraries to work with input files like json and csv.
For those two reasons I choose Node js to implement this program.

My first intention was to implement a 2D dynamic array where I can store connections and at the connection edge I can store information(Date,Shift).

Let's see an example:
Let's have 3 nodes.
And they are connected this way:



I want to make a list of list (2D array) which store this graph this way; (Bold's char are connected nodes).

A	B	C
B (5)	**A(5)**	**A(9)**
C(9)		

And I made an array(“graph rep”) in this way. Here if I go array [A] then you will find that A is connected with node B and C with weights 5 and 9 respectively.

By iterating this array I can easily find connections and weight but one thing I need to keep in mind is that, no need to add a connection which was already visited.
Like if we write A and C connected then no need to write C and A are connected.

Now see what I actually did on the code:

First I read the .csv file as input and convert it in JSON format.Then I took this json file in an array (Entitled: “list”) thinking that it will help me to get information in the right way.
Then I make an array (“alluser”) where I store all users.
After that I make another array (“uwsd”) where I store dates and shifts for every user so that I can find out conflicted shifts and dates compared with other users by using this date and shift.

I compare two dates and shift by joining them(Make them a single string).
Ex: if date: 5/01/2021, shift: 3pm - 6pm
I make this date and shift as “5/01/2021+3pm - 6pm”. So that I can compare it with another date and shift. I put a “+” sign between the date and shift so that I can separate them using the ‘+’ sign in future if we need it.

Then I iterate over this “uwsd” and find out the conflicted date and shift for every user. If we found any matched date and shift for a user we store them in an array (“graph rep”) and also store date and time for every user.

Let’s see “graph rep” for a user named “Bobita ”.

```
[
  Bobita: [
    'Rajjak',
    'Kabori',
    'Kabori',
    Rajjak: [ '5/01/2021+3pm - 6pm' ],
    Kabori: [ '5/01/2021+3pm - 6pm', '6/01/2021+9pm - 12am' ]
  ],
]
```

This means “bobita” is connected with Rajjak once,and kobori twice . Razzak and Kobori hold the edge weighted with date and shift.

Now I have a full graph in the “Graph_rep” array . By iterating this array I find out the final result. As there are duplicate values,we need to check it and we can count weight for every connection. I store two users who have a connection and their weight in another array (“weighted_array_for_csv ”).

Then I convert this array to csv format using the “convertArrayToCSV” function and save it as “Output.csv”.

Challenges I have faced:

My First challenge was to take an input from .csv and write output as a .csv file. First I tried to implement it without using Nodejs. Then I realize that it’ll be easier for me to work with those files if I use Nodejs .

Another challenge was to choose appropriate data structure to store graph representation. I choose Array instead of Object as it is dynamic and easy to handle.

Limitation of My solution:

I use inner loops in some cases. Now it is not taking time. But if there was big data then it may take some extra times to find out the solution. But I hope it will work no matter what the data size is.

END