

Assignment 1
CE 787A: Computational Tools for Transportation Engineering
Total Marks: 30

Instructions: Use Jupyter notebook to work on this assignment using Python language. All cell outputs and visualizations (if any) should be visible and necessary comments should be put to make the code readable. Once the code is ready, convert it to HTML (File > Download as HTML), save the html as pdf, and submit the pdf.

Also, submit the *.ipynb* file of the jupyter notebook separately.

1. The file 'ques1_data.txt' contains monthly traffic volume data (in vehicles) of a few sites in a given city. The columns in the data file are comma separated and there are total 12 columns in the data. The 12 columns show volume data for each month i.e., the 1st column is for January, 2nd column for February, and so on. Each row provides volume data for a particular site i.e., 1st row is for Site 1, 2nd row is for Site 2, and so on. With this required information, perform the following tasks:

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| a) Read the dataset using numpy package | 2 |
| b) Find out the number of sites for each traffic volume data is present (Hint: number of rows) | 2 |
| c) Find out the monthly average traffic (MAT) volume for each site (Hint: add traffic volume of 12 months for each site and divide by 12). Store it as an array and show the output of MAT for the first 5 sites (Site 1, Site 2, ..., Site 5) | 3 |
| d) Which site has maximum total yearly volume and which site has minimum yearly volume? | 2 |
| e) What is the maximum and minimum yearly volume (in vehicles)? | 2 |
| f) Which month experienced maximum traffic volume across all sites and which month experienced minimum traffic volume across all sites? (Hint: Sum up traffic volume for all sites for given month) | 2 |
| g) Which sites has total yearly volume > 9700 vehicles? | 4 |
| h) Determine the months where the total monthly volume for the entire city (sum of monthly volume for all sites) is greater than 38,000 vehicles. | 3 |

2. Suppose, Person X posted the following tweet: *"Neeraj Chopra brings home the much awaited Gold First place medal for Flag of India in his debut Olympic Games. The gigantic effort made sure India has best ever medal haul in the olympics. Congratulations champ Neeraj Chopra, the whole nation is proud of you"*

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|--|---|
| a) Store this tweet as a single string in python. | 1 |
| b) Split the string into a list with each element of the list being each word of the tweet. Output the list. | 2 |
| c) How many words are present in the tweet? | 1 |
| d) How many unique words are present in the tweet? (Hint: use appropriate data structure) | 3 |

Additional 3 marks reserved for creating code readable (appropriate comments as and when necessary, using variable names which can be easily understood, etc.)