

# SD 1 Coursework – Task A, B, C Test Results

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## Task A: Input Validation

The “validate\_date\_input ()” function collects and validates a date input in the format DD MM YYYY. The function ensures the input adheres to the following rules:

- Day must be an integer between 1 and 31.

```
Python 3.12.7 (tags/v3.12.7:0b05ead, Oct 1 2024, 03:06:41) [MSC v.1941 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: p
Integer required.
Please enter the day of the survey in the format DD:
Integer required.
Please enter the day of the survey in the format DD: @!$
Integer required.
Please enter the day of the survey in the format DD: 32
Out of range - values must be in the range 1 and 31.
Please enter the day of the survey in the format DD: 15
Please enter the month of the survey in the format MM:
```

- Month must be an integer between 1 and 12.

```
Python 3.12.7 (tags/v3.12.7:0b05ead, Oct 1 2024, 03:06:41) [MSC v.1941 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 15
Please enter the month of the survey in the format MM: March
Integer required.
Please enter the month of the survey in the format MM: 13
Out of range - values must be in the range 1 to 12.
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY:
```

- Year must be an integer between 2000 and 2024.

```
Python 3.12.7 (tags/v3.12.7:0b05ead, Oct 1 2024, 03:06:41) [MSC v.1941 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 15
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 1997
Out of range - values must range from 2000 and 2024.
Please enter the year of the survey in the format YYYY: 2024
```

- The day must be valid for the specified month and year (including leap years).

```
Python 3.12.7 (tags/v3.12.7:0b05ead, Oct 1 2024, 03:06:41) [MSC v.1941 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 29
Please enter the month of the survey in the format MM: 02
Please enter the year of the survey in the format YYYY: 2021
Invalid day for the given month/year. The month 02 in year 2021 has 28 days.
Restarting input for day, month, and year...
Please enter the day of the survey in the format DD: 31
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
Invalid day for the given month/year. The month 06 in year 2024 has 30 days.
Restarting input for day, month, and year...
Please enter the day of the survey in the format DD: |
```

If invalid inputs are provided, the function notifies the user with error messages and re-prompts for valid input. It handles invalid types, out-of-range values, and ensures proper formatting.

The `validate_continue_input()` function asks the user whether they want to load another dataset by entering "Y"(yes) or "N"(no).

How it works:

- Prompts the user for input.
- Accepts both lowercase and uppercase inputs (e.g., "y" is treated as "Y").
- Repeats the prompt until a valid response is entered.

```
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 15
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
*****
data file selected is traffic_data15062024.csv
*****
The total number of vehicles recorded for this date is 1037
The total number of trucks recorded for this date is 109
The total number of electric vehicles for this date is 368
The total number of two-wheeled vehicles for this date is 401
The total number of Buses leaving Elm Avenue/Rabbit Road heading North is 15
The total number of Vehicles through both junctions not turning left or right is 363
The percentage of total vehicles recorded that are trucks for this date is 11%
The average number of Bikes per hour for this date is 7

The total number of Vehicles recorded as over the speed limit for this date is 205
The total number of vehicles recorded through Elm Avenue/Rabbit Road junction is 494
The total number of vehicles recorded through Hanley Highway/Westway junction is 543
10% of vehicles recorded through Elm Avenue/Rabbit Road are scooters.

The highest number of vehicles in an hour on Hanley Highway/Westway is 39
The most vehicles through Hanley Highway/Westway were recorded Between 18:00 and 19:00
The number of hours of rain for this date is 0

Data successfully saved to results.txt
Do you want to select another data file for a different date? Y/N:y
Please enter the day of the survey in the format DD: |
```

```

== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 15
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
*****
data file selected is traffic_data15062024.csv
*****
The total number of vehicles recorded for this date is 1037
The total number of trucks recorded for this date is 109
The total number of electric vehicles for this date is 368
The total number of two-wheeled vehicles for this date is 401
The total number of Buses leaving Elm Avenue/Rabbit Road heading North is 15
The total number of Vehicles through both junctions not turning left or right is 363
The percentage of total vehicles recorded that are trucks for this date is 11%
The average number of Bikes per hour for this date is 7

The total number of Vehicles recorded as over the speed limit for this date is 205
The total number of vehicles recorded through Elm Avenue/Rabbit Road junction is 494
The total number of vehicles recorded through Hanley Highway/Westway junction is 543
10% of vehicles recorded through Elm Avenue/Rabbit Road are scooters.

The highest number of vehicles in an hour on Hanley Highway/Westway is 39
The most vehicles through Hanley Highway/Westway were recorded Between 18:00 and 19:00
The number of hours of rain for this date is 0

Data successfully saved to results.txt
Do you want to select another data file for a different date? Y/N:n
End of run
>>> |

```

## Task B: Processed Outcomes

The ``process_csv_data(file_path)`` function reads data from a specified CSV file and computes the

following outcomes:

- Total vehicles recorded.
- Counts of specific vehicle types (e.g., trucks, bicycles, electric vehicles).
- Percentage and averages of vehicle data.
- Peak hour of traffic at a specified junction.

The outcomes are stored in a dictionary and include metrics

Validation:

- Ensures the file exists and handles errors gracefully (e.g., `FileNotFoundError`).
- Handles missing or invalid data within the CSV file without crashing.

```

Python 3.12.7 (tags/v3.12.7:0b05ead, Oct 1 2024, 03:06:41) [MSC v.1941 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 14
Please enter the month of the survey in the format MM: 07
Please enter the year of the survey in the format YYYY: 2024
Error: The file 'traffic_data14072024.csv' was not found.
Error: The file 'traffic_data14072024.csv' could not be processed or does not contain valid data.
Do you want to select another data file for a different date? Y/N:

```

The `display_outcomes(outcomes)` function displays the processed outcomes from the traffic data in a user-friendly format.

How it works:

- Accepts the outcomes dictionary as input.
- Format and prints the results using a structured string.
- Prints the result to the console.

## Output

```

Python 3.12.7 (tags/v3.12.7:0b05ead, Oct 1 2024, 03:06:41) [MSC v.1941 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
== RESTART: C:\Users\user\AppData\Local\Programs\Python\Python312\w2120071.py ==
Please enter the day of the survey in the format DD: 15
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
*****
data file selected is traffic_data15062024.csv
*****
The total number of vehicles recorded for this date is 1037
The total number of trucks recorded for this date is 109
The total number of electric vehicles for this date is 368
The total number of two-wheeled vehicles for this date is 401
The total number of Buses leaving Elm Avenue/Rabbit Road heading North is 15
The total number of Vehicles through both junctions not turning left or right is 363
The percentage of total vehicles recorded that are trucks for this date is 11%
The average number of Bikes per hour for this date is 7

The total number of Vehicles recorded as over the speed limit for this date is 205
The total number of vehicles recorded through Elm Avenue/Rabbit Road junction is 494
The total number of vehicles recorded through Hanley Highway/Westway junction is 543
10% of vehicles recorded through Elm Avenue/Rabbit Road are scooters.

The highest number of vehicles in an hour on Hanley Highway/Westway is 39
The most vehicles through Hanley Highway/Westway were recorded Between 18:00 and 19:00
The number of hours of rain for this date is 0

Data successfully saved to results.txt
Do you want to select another data file for a different date? Y/N:

```

## Task C: Save Results to File

The ``save_results_to_file(outcomes, file_name)`` function saves the processed outcomes to a text

file. The results include all metrics computed in Task B, formatted for readability. It ensures:

- Data is appended to the file without overwriting existing content.
- Proper error handling to notify the user in case of issues while saving the file.

```

results.txt - C:\Users\user\AppData\Local\Programs\Python\Python312\results.txt (3.12.7)
File Edit Format Run Options Window Help

*****
data file selected is traffic_data15062024.csv
*****
The total number of vehicles recorded for this date is 1037
The total number of trucks recorded for this date is 109
The total number of electric vehicles for this date is 368
The total number of two-wheeled vehicles for this date is 401
The total number of Buses leaving Elm Avenue/Rabbit Road heading North is 15
The total number of Vehicles through both junctions not turning left or right is 363
The percentage of total vehicles recorded that are trucks for this date is 11%
The average number of Bikes per hour for this date is 7

The total number of Vehicles recorded as over the speed limit for this date is 205
The total number of vehicles recorded through Elm Avenue/Rabbit Road junction is 494
The total number of vehicles recorded through Hanley Highway/Westway junction is 543
10% of vehicles recorded through Elm Avenue/Rabbit Road are scooters.

The highest number of vehicles in an hour on Hanley Highway/Westway is 39
The most vehicles through Hanley Highway/Westway were recorded Between 18:00 and 19:00
The number of hours of rain for this date is 0

*****
data file selected is traffic_data16062024.csv
*****
The total number of vehicles recorded for this date is 101
The total number of trucks recorded for this date is 11
The total number of electric vehicles for this date is 29
The total number of two-wheeled vehicles for this date is 29
The total number of Buses leaving Elm Avenue/Rabbit Road heading North is 0
The total number of Vehicles through both junctions not turning left or right is 38
The percentage of total vehicles recorded that are trucks for this date is 11%
The average number of Bikes per hour for this date is 0

The total number of Vehicles recorded as over the speed limit for this date is 20
The total number of vehicles recorded through Elm Avenue/Rabbit Road junction is 52
The total number of vehicles recorded through Hanley Highway/Westway junction is 49
5% of vehicles recorded through Elm Avenue/Rabbit Road are scooters.

The highest number of vehicles in an hour on Hanley Highway/Westway is 5
The most vehicles through Hanley Highway/Westway were recorded Between 01:00 and 02:00
The number of hours of rain for this date is 0

```

## Conclusion

This script demonstrates robust input validation, data processing, and file management techniques.

Each task ensures user-friendly interaction and handles edge cases effectively, providing clear insights into traffic data.