UNIVERSITY OF WESTMINSTER

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Software Development I

4COSC006C

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Pseudo code

```
// Input Validation Functions
FUNCTION validate_date_input:
    WHILE true:
        PRINT "Enter survey date (DD/MM/YYYY):"
        TRY:
            GET date from user
            IF date not between 1-31:
                PRINT "Invalid date range"
                CONTINUE

            GET month from user
            IF month not between 1-12:
                PRINT "Invalid month range"
                CONTINUE

            GET year from user
            IF year not between 2000-2024:
                PRINT "Invalid year range"
                CONTINUE

            RETURN date, month, year
        CATCH error:
            PRINT "Invalid input - enter integers"
```

```
FUNCTION validate_continue_input:
    WHILE true:
        GET choice from user "Analyze another file? (Y/N)"
        SET choice to uppercase
        IF choice is "Y" OR "N":
            RETURN choice
        PRINT "Invalid input"

// Data Processing Functions
FUNCTION process_csv_data(filename):
    INITIALIZE outcomes dictionary with all counters set to 0

    TRY:
        OPEN filename as csv
        CREATE hourly_count dictionary
        CREATE rain_hours list
        SET bicycle_count to 0

        FOR each row in csv:
            INCREMENT total_vehicles

            IF vehicle is truck:
                INCREMENT truck_count

            IF vehicle is electric:
                INCREMENT electric_count

            IF vehicle is two-wheeled:
```

```
            INCREMENT two_wheeled_count

        // Continue counting other vehicle types...

        // Calculate hourly statistics
        GET hour from timeOfDay
        IF location is Hanley Highway:
            ADD to hourly_count

        IF weather is rainy:
            ADD hour to rain_hours

    // Calculate final statistics
    CALCULATE percentages
    CALCULATE averages
    FIND peak hours

    RETURN outcomes
  CATCH file error:
    PRINT "File not found"
  CATCH other error:
    PRINT error message

FUNCTION display_outcomes(outcomes):
  PRINT report header
  FOR each statistic in outcomes:
    PRINT formatted statistic
  PRINT newline
```

```
FUNCTION save_results_to_file(outcomes):
    OPEN results.txt in append mode
    WRITE section header
    FOR each outcome:
        WRITE formatted outcome
    WRITE newline

// Histogram Class
CLASS HistogramApp:
    FUNCTION initialize(traffic_data, date):
        SET window properties
        SET canvas dimensions
        LOAD traffic data

    FUNCTION load_traffic_data:
        READ csv file
        STORE data in list

    FUNCTION setup_window:
        CREATE tkinter window
        SET title
        CREATE canvas

    FUNCTION draw_histogram:
        COUNT vehicles per hour for each junction
        CALCULATE scales
        DRAW axes
        DRAW hour labels
        FOR each hour:
```

```
            DRAW bars for each junction
            ADD count labels

    FUNCTION add_legend:
        DRAW title with formatted date
        DRAW color boxes
        ADD junction labels
        ADD time range footer

    FUNCTION run:
        SETUP window
        DRAW histogram
        ADD legend
        START main loop

// Main Processor Class
CLASS MultiCSVProcessor:
    FUNCTION initialize:
        SET data fields to null

    FUNCTION load_csv_file(filepath):
        TRY:
            PROCESS file
            RETURN outcomes
        CATCH:
            HANDLE errors

    FUNCTION clear_previous_data:
        RESET all data fields
```

```
    FUNCTION process_files:
        GET initial date
        CREATE filename

        WHILE true:
            PROCESS current file
            IF successful:
                DISPLAY results
                SAVE results
                SHOW histogram

            GET user choice
            IF continue:
                CLEAR data
                GET new date
            ELSE IF quit:
                END program
            ELSE:
                SHOW error

// Main Program
FUNCTION main:
    CREATE processor
    RUN process_files
```

Test Cases

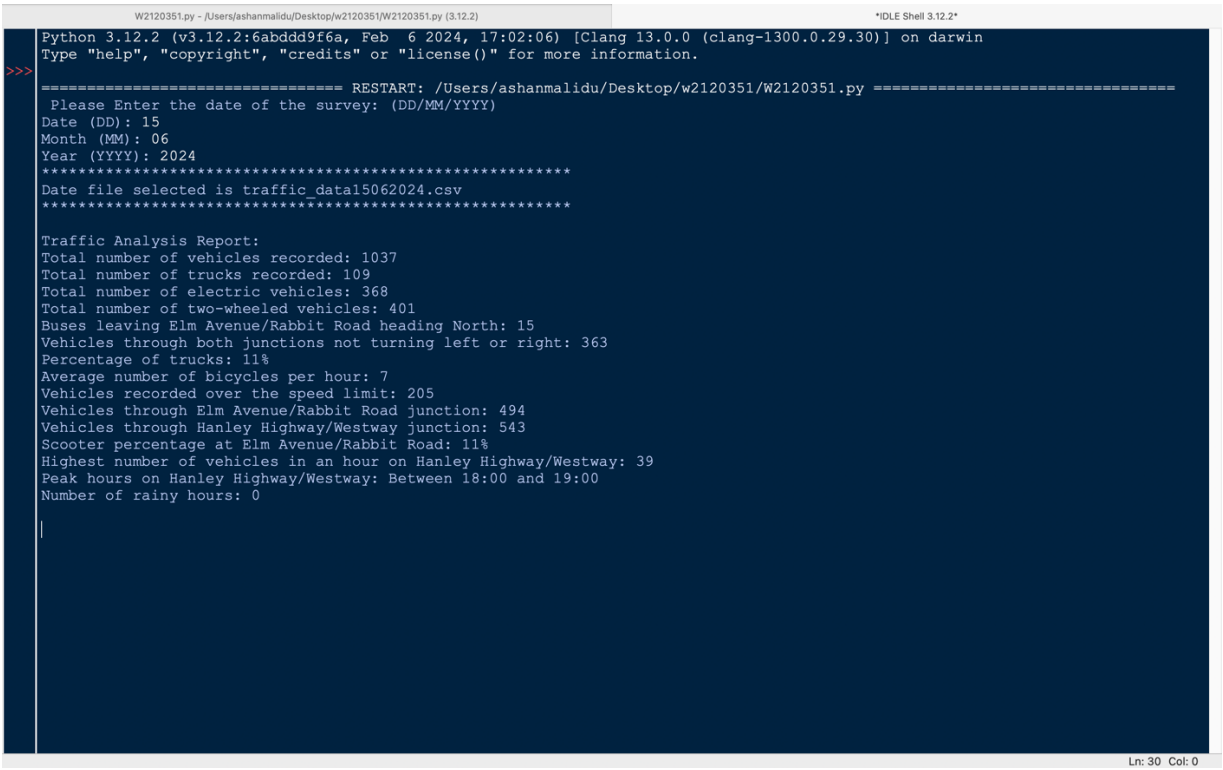


Figure 1 input o1

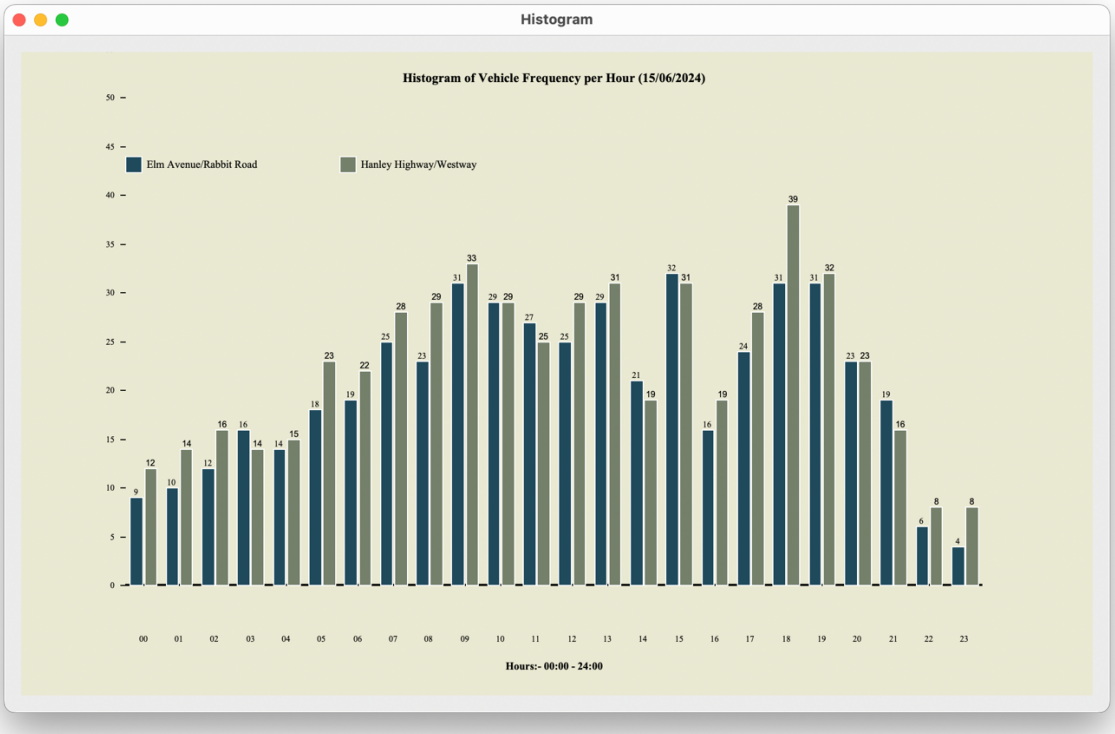


Figure 2 Histogram- 15/06/2024

```
Do you want to select a data file for a different date? (Y/N): y
 Please Enter the date of the survey: (DD/MM/YYYY)
Date (DD): 16
Month (MM): 06
Year (YYYY): 2024
**********************************************************
Date file selected is traffic_data16062024.csv
**********************************************************

Traffic Analysis Report:
Total number of vehicles recorded: 101
Total number of trucks recorded: 11
Total number of electric vehicles: 29
Total number of two-wheeled vehicles: 29
Buses leaving Elm Avenue/Rabbit Road heading North: 0
Vehicles through both junctions not turning left or right: 38
Percentage of trucks: 11%
Average number of bicycles per hour: 0
Vehicles recorded over the speed limit: 20
Vehicles through Elm Avenue/Rabbit Road junction: 52
Vehicles through Hanley Highway/Westway junction: 49
Scooter percentage at Elm Avenue/Rabbit Road: 6%
Highest number of vehicles in an hour on Hanley Highway/Westway: 5
Peak hours on Hanley Highway/Westway: Between 01:00 and 2:00
Number of rainy hours: 3
```

Figure 3 input 02

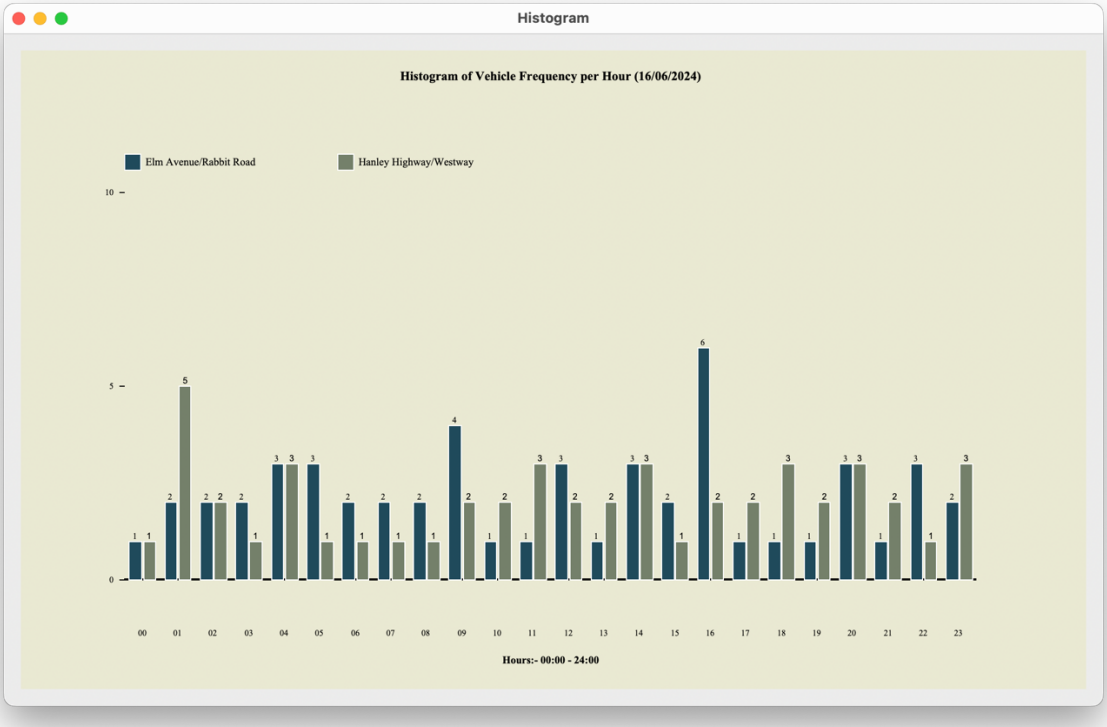


Figure 4 Histogram- 16/06/2024

```
Do you want to select a data file for a different date? (Y/N): y
 Please Enter the date of the survey: (DD/MM/YYYY)
Date (DD): 21
Month (MM): 06
Year (YYYY): 2024
**********************************************************
Date file selected is traffic_data21062024.csv
**********************************************************

Traffic Analysis Report:
Total number of vehicles recorded: 1334
Total number of trucks recorded: 138
Total number of electric vehicles: 442
Total number of two-wheeled vehicles: 503
Buses leaving Elm Avenue/Rabbit Road heading North: 19
Vehicles through both junctions not turning left or right: 494
Percentage of trucks: 10%
Average number of bicycles per hour: 10
Vehicles recorded over the speed limit: 250
Vehicles through Elm Avenue/Rabbit Road junction: 651
Vehicles through Hanley Highway/Westway junction: 683
Scooter percentage at Elm Avenue/Rabbit Road: 10%
Highest number of vehicles in an hour on Hanley Highway/Westway: 71
Peak hours on Hanley Highway/Westway: Between 18:00 and 19:00
Number of rainy hours: 6
```

Figure 5 input 03

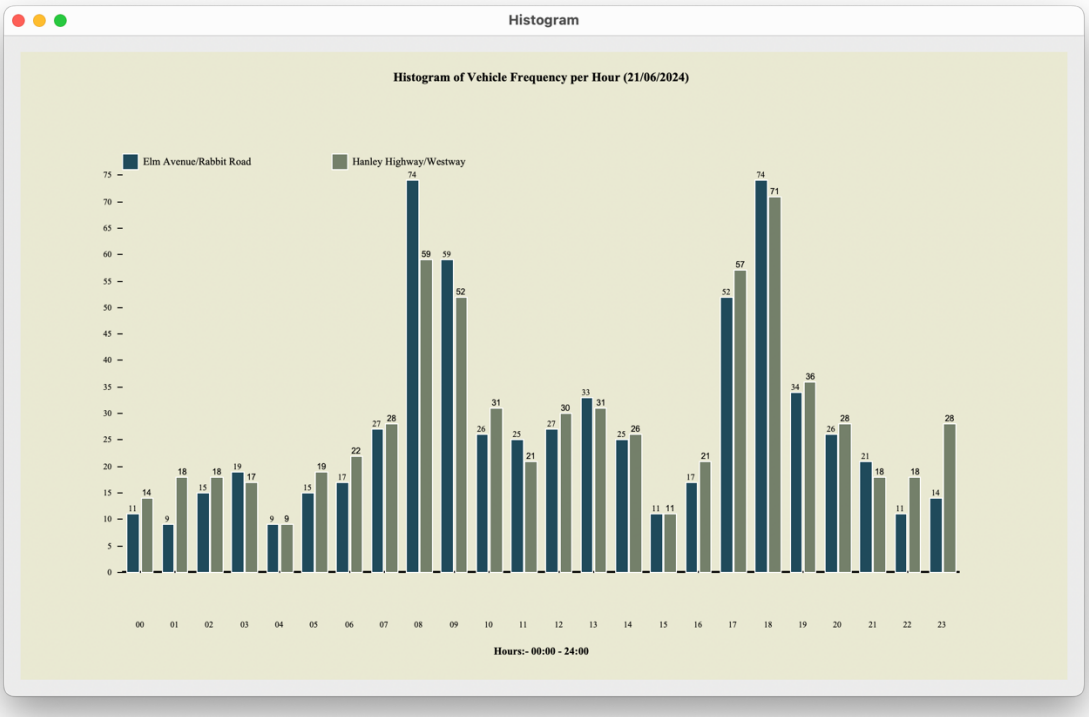
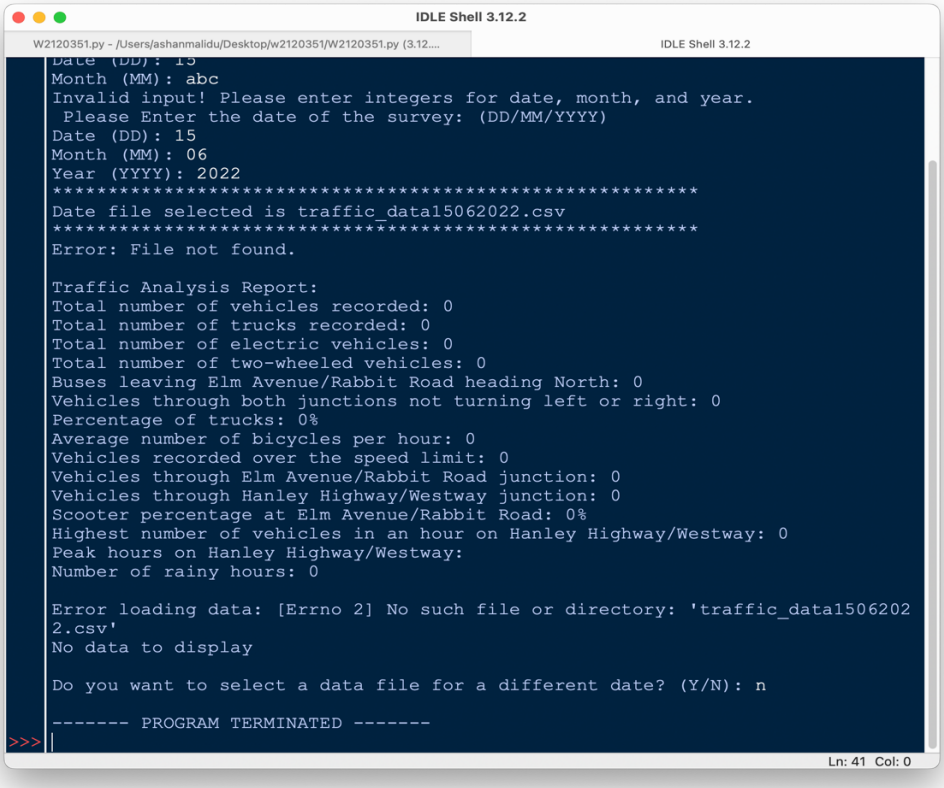
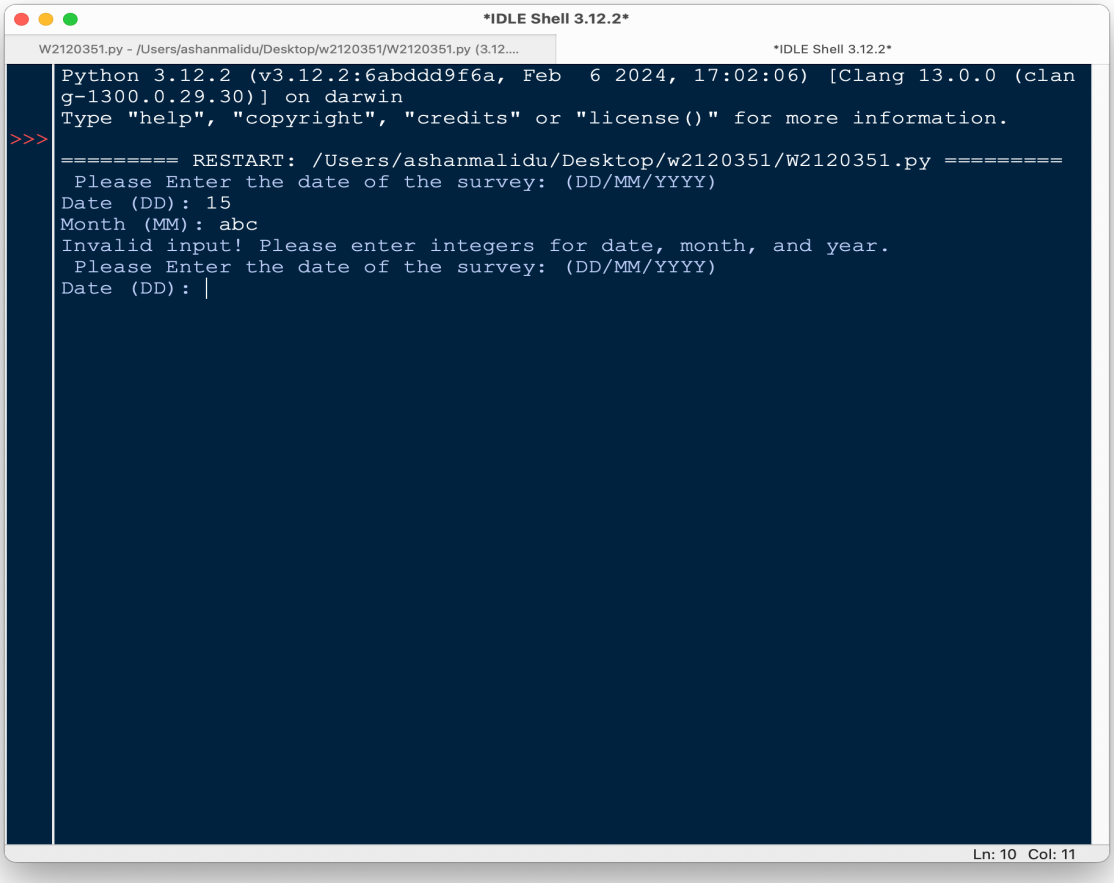


Figure 6 Histogram- 12/06/2024


IDLE Shell 3.12.2
W2120351.py - /Users/ashanmalidu/Desktop/w2120351/W2120351.py (3.12....
IDLE Shell 3.12.2
Date (DD): 15
Month (MM): abc
Invalid input! Please enter integers for date, month, and year.
Please Enter the date of the survey: (DD/MM/YYYY)
Date (DD): 15
Month (MM): 06
Year (YYYY): 2022
****
Date file selected is traffic_data15062022.csv
****
Error: File not found.
Traffic Analysis Report:
Total number of vehicles recorded: 0
Total number of trucks recorded: 0
Total number of electric vehicles: 0
Total number of two-wheeled vehicles: 0
Buses leaving Elm Avenue/Rabbit Road heading North: 0
Vehicles through both junctions not turning left or right: 0
Percentage of trucks: 0%
Average number of bicycles per hour: 0
Vehicles recorded over the speed limit: 0
Vehicles through Elm Avenue/Rabbit Road junction: 0
Vehicles through Hanley Highway/Westway junction: 0
Scooter percentage at Elm Avenue/Rabbit Road: 0%
Highest number of vehicles in an hour on Hanley Highway/Westway: 0
Peak hours on Hanley Highway/Westway:
Number of rainy hours: 0
Error loading data: [Errno 2] No such file or directory: 'traffic_data1506202
2.csv'
No data to display
Do you want to select a data file for a different date? (Y/N): n
------- PROGRAM TERMINATED -------
>>>
Ln: 41 Col: 0


IDLE Shell 3.12.2
W2120351.py - /Users/ashanmalidu/Desktop/w2120351/W2120351.py (3.12....
IDLE Shell 3.12.2
Python 3.12.2 (v3.12.2:6abddd9f6a, Feb 6 2024, 17:02:06) [Clang 13.0.0 (clan
g-1300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========= RESTART: /Users/ashanmalidu/Desktop/w2120351/W2120351.py =========
Please Enter the date of the survey: (DD/MM/YYYY)
Date (DD): 15
Month (MM): abc
Invalid input! Please enter integers for date, month, and year.
Please Enter the date of the survey: (DD/MM/YYYY)
Date (DD):
Ln: 10 Col: 11

```
Date (DD): 15
Month (MM): 06
Year (YYYY): 2022
**********************************************************
Date file selected is traffic_data15062022.csv
**********************************************************
Error: File not found.

Traffic Analysis Report:
Total number of vehicles recorded: 0
Total number of trucks recorded: 0
Total number of electric vehicles: 0
Total number of two-wheeled vehicles: 0
Buses leaving Elm Avenue/Rabbit Road heading North: 0
Vehicles through both junctions not turning left or right: 0
Percentage of trucks: 0%
Average number of bicycles per hour: 0
Vehicles recorded over the speed limit: 0
Vehicles through Elm Avenue/Rabbit Road junction: 0
Vehicles through Hanley Highway/Westway junction: 0
Scooter percentage at Elm Avenue/Rabbit Road: 0%
Highest number of vehicles in an hour on Hanley Highway/Westway: 0
Peak hours on Hanley Highway/Westway:
Number of rainy hours: 0

Error loading data: [Errno 2] No such file or directory: 'traffic_data1506202
2.csv'
No data to display
```

Screenshot of the Text file