INFORMATICS INSTITUTE OF TECHNOLOGY

BEng(Hons) Software Engineering (Level 4)

Module: 4COSC006C.1 Software Development I

Module leader: Mr. Guganathan Poravi

Assessment Type: Individual work

Group ID: 11

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Name: Delaksan Sritharan

Pseudocode

```
1. PROGRAM TrafficDataAnalysis
2. MAIN FUNCTION
3.     INITIALIZE MultiCSVProcessor
4.     WHILE true
5.         date = GET validated date input from user
6.         filename = GENERATE filename from date
7.         data = PREPARE histogram data from file
8.         IF data exists THEN
9.             CREATE GUI window
10.            DISPLAY histogram with data and date
11.            WAIT for window close
12.        END IF
13.        IF user doesn't want to continue THEN
14.            PRINT goodbye message
15.            BREAK
16.        END IF
17.    END WHILE
18.    RUN optional MultiCSVProcessor main function
19. END MAIN

20. FUNCTION validate_date_input()
21.     FUNCTION is_leap_year(year)
22.         RETURN (year divisible by 4) AND (year not divisible by 100 OR year
divisible by 400)
23.     END FUNCTION
24.     WHILE true
25.         // Day validation
26.         REPEAT
27.             TRY
28.                 GET day from user input
29.                 IF day is between 1 and 31 THEN
30.                     BREAK
31.                 ELSE
32.                     DISPLAY "Out of range" message
33.                 END IF
34.             CATCH ValueError
35.                 DISPLAY "Integer required" message
36.             END TRY
37.         UNTIL valid day entered

38.         // Month validation
39.         REPEAT
40.             TRY
```

```
41.             GET month from user input
42.             IF month is between 1 and 12 THEN
43.                 BREAK
44.             ELSE
45.                 DISPLAY "Out of range" message
46.             END IF
47.         CATCH ValueError
48.             DISPLAY "Integer required" message
49.         END TRY
50.     UNTIL valid month entered

51.     // Year validation
52.     REPEAT
53.         TRY
54.             GET year from user input
55.             IF year is between 2000 and 2024 THEN
56.                 BREAK
57.             ELSE
58.                 DISPLAY "Out of range" message
59.             END IF
60.         CATCH ValueError
61.             DISPLAY "Integer required" message
62.         END TRY
63.     UNTIL valid year entered

64.     // Validate date combination
65.     SET max_days to 31
66.     IF month is February THEN
67.         IF is_leap_year(year) THEN
68.             SET max_days to 29
69.         ELSE
70.             SET max_days to 28
71.         END IF
72.     ELSE IF month is April, June, September, or November THEN
73.         SET max_days to 30
74.     END IF

75.     IF day is not between 1 and max_days THEN
76.         DISPLAY invalid day message
77.         CONTINUE
78.     END IF

79.     RETURN formatted date string "DD/MM/YYYY"
80.   END WHILE
81. END FUNCTION

82. FUNCTION prepare_histogram_data(filename)
```

```
    INITIALIZE empty hourly counts for Elm and Hanley (24 hours each)
    TRY
        OPEN CSV file
        FOR each line in CSV file
            EXTRACT hour from timeOfDay
            IF junction is Elm Avenue THEN
                INCREMENT Elm count for that hour
            ELSE IF junction is Hanley Highway THEN
                INCREMENT Hanley count for that hour
            END IF
        END FOR
    CATCH FileNotFoundError
        DISPLAY error message
    END TRY
    RETURN hourly counts
END FUNCTION

CLASS HistogramApp
    CONSTRUCTOR(master, data, date)
        SET window title to "Histogram"
        INITIALIZE canvas dimensions and margins
        CREATE canvas
        CALL draw_histogram()
    END CONSTRUCTOR

    FUNCTION draw_histogram()
        DRAW title with date
        CALCULATE maximum value from both datasets
        CALCULATE bar dimensions and spacing

        IF no data available THEN
            DISPLAY "No Data Available" message
            RETURN
        END IF

        DRAW x-axis and labels
        FOR each hour from 0 to 23
            CALCULATE bar heights for Elm and Hanley
            DRAW Elm bar with value
            DRAW Hanley bar with value
            DRAW hour label
        END FOR

        DRAW legend for both locations
    END FUNCTION
END CLASS
```

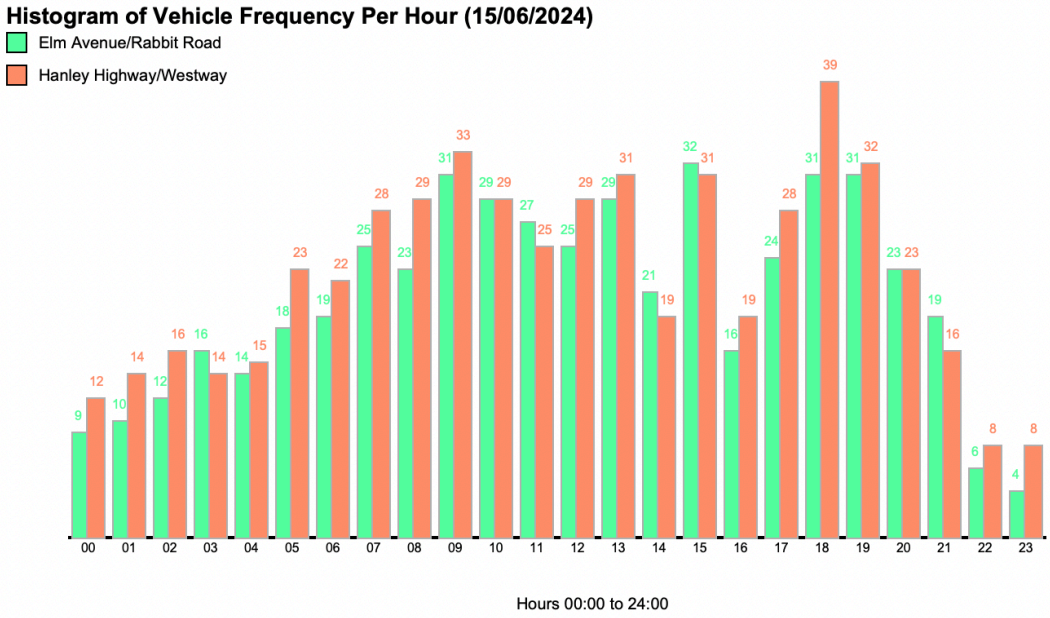
```
CLASS MultiCSVProcessor
    CONSTRUCTOR()
        INITIALIZE current_data as null
    END CONSTRUCTOR

    FUNCTION load_csv_file(file_path)
        INITIALIZE empty data structure
        READ CSV file
        EXTRACT date from headers
        FOR each row in CSV
            UPDATE data counts for both locations
        END FOR
        RETURN data and date
    END FUNCTION

    FUNCTION handle_user_interaction()
        WHILE true
            PROMPT user to select CSV file
            IF no file selected THEN
                BREAK
            END IF

            LOAD data from selected file
            CREATE new histogram window
            WAIT for window close
            CLEAR previous data
        END WHILE
    END FUNCTION
END CLASS

FUNCTION validate_continue_input()
    WHILE true
        GET user input
        IF input is 'Y' or 'N' THEN
            RETURN input
        ELSE
            DISPLAY error message
        END IF
    END WHILE
END FUNCTION

END PROGRAM
```

Test cases which are used to test the program and the results.

Date (15/06/2024)

```
Python 3.12.2 (v3.12.2:6abddd9f6a, Feb  6 2024, 17:02:06) [Clang 13.0.0 (clang-1300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========= RESTART: /Users/delaksan/Documents/ICW-Python/D&E/w2120777.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
```

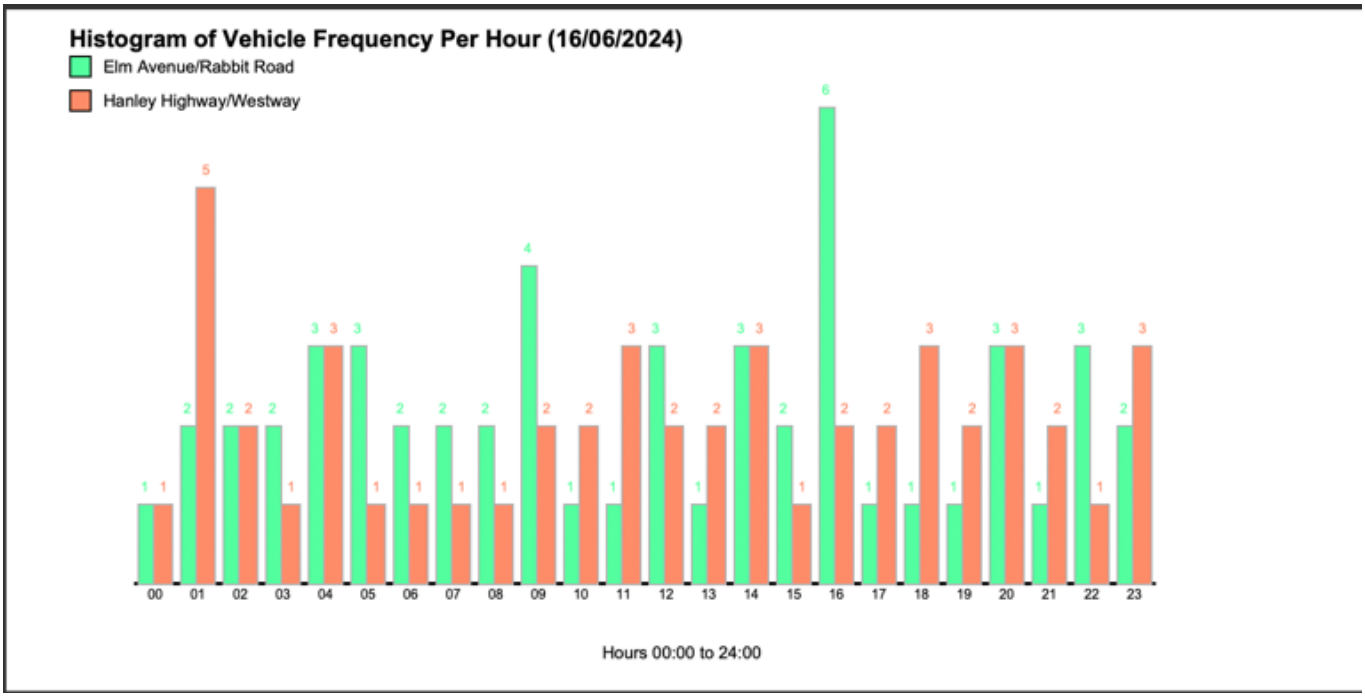
Ln: 8 Col: 0



Date (16/06/2024)

```
Python 3.12.2 (v3.12.2:6abddd9f6a, Feb  6 2024, 17:02:06) [Clang 13.0.0 (clang-1300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
======== RESTART: /Users/delaksan/Documents/ICW-Python/D&E/w2120777.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
Do you want to run the program again with a new date? (Y/N): Y
Please enter the day of the survey in the format dd: 16
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
```

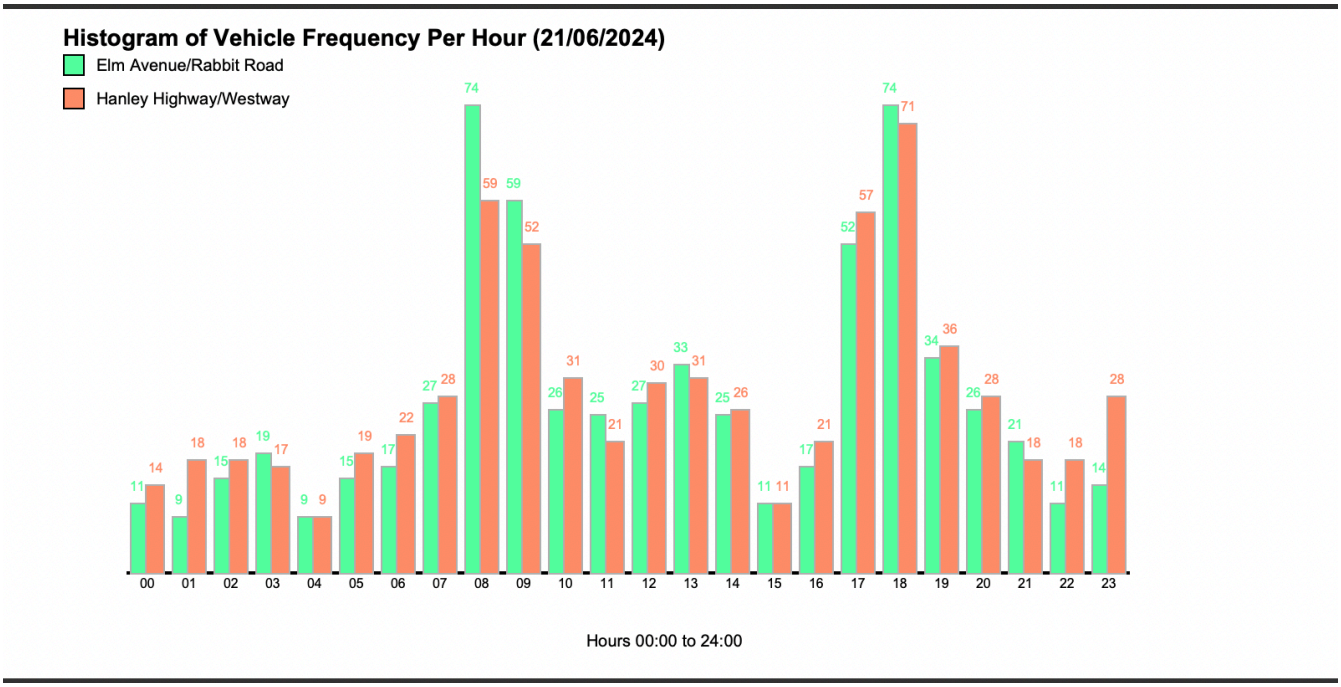
Ln: 12 Col: 0



Date (21/06/2024)

```
Python 3.12.2 (v3.12.2:6abddd9f6a, Feb  6 2024, 17:02:06) [Clang 13.0.0 (clang-1300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========= RESTART: /Users/delaksan/Documents/ICW-Python/D&E/w2120777.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
Do you want to run the program again with a new date? (Y/N): Y
Please enter the day of the survey in the format dd: 16
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
Do you want to run the program again with a new date? (Y/N): Y
Please enter the day of the survey in the format dd: 21
Please enter the month of the survey in the format MM: 06
Please enter the year of the survey in the format YYYY: 2024
```

Ln: 16 Col: 0



References

1. W3Schools. (2024, November 19). Python Tutorial. W3Schools. https://www.w3schools.com/python/

2. Informatics Institute of Technology. (May 2024). *Professional Certificate in Python Programming*. Credential ID: 6991.

3. LinkedIn. (December 2024). *Critical Thinking and Problem Solving*. Credential ID: 3e8d43abbf0e621e88830f049d00aedb9e8445447a6983d04a40c259eaf2f23a.

4. Great Learning. (February 2024). *Programming Basics*. Completed during the "Get Started with Python" event, hosted by Microsoft Learn Student Ambassadors Shalitha Madhuwantha.