Speed Limit Monitoring

Research :

Road safety is a critical issue, and monitoring vehicle speed plays a vital role in reducing accidents. This research focuses on developing a simple C program that checks whether a vehicle's speed is within legal limits. The program compares the entered speed with a predefined speed limit and outputs whether the driver is safe, overspeeding, or driving too slow. Such applications are useful in embedded systems for automobiles, traffic management, and driver assistance technologies.

With the increasing number of vehicles on roads, speed regulation has become a necessity. Over-speeding is one of the major causes of accidents worldwide. A computational solution that evaluates vehicle speed can assist in educating drivers and can be integrated into speed monitoring devices. C programming language is widely used in embedded systems due to its simplicity, efficiency, and hardware-level control.

This research proposes a C program that acts as a speed checker. It takes speed input from the user (or a sensor in real-world applications) and then compares it with a defined maximum and minimum speed limit. Based on this evaluation, it gives the result to the user.

Objectives :

To implement a C program that monitors vehicle speed.

To check if the speed is within permissible limits.

To generate warnings if the vehicle is overspeeding or moving below safe speed.

To demonstrate the use of decision-making constructs in C.

Applications :

Traffic Monitoring Systems

Automobile Embedded Systems (speed alarms)

Educational Tools for road safety awareness

Driver Assistance Systems

Future Scope :

Integration with GPS for dynamic speed limits.

Storing driver history for repeated violations.

IoT-based traffic monitoring.

Smart dashboards that give voice alerts.

Source :
1. https://www.wikipedia.org/
2. https://www.sciencedirect.com/science/article/pii/S1369847823002735
3.https://www.researchgate.net/publication/305445882_Speed_Limits_-_A_review_of_evidence

Analyse :

1. To implement a C program that monitors vehicle speed.

2. To check if the speed is within permissible limits.

3. To generate warnings if the vehicle is overspeeding or moving below safe speed.

4.To demonstrate the use of decision-making constructs in C.

The program uses the following steps:

1. Define speed limits (e.g., minimum = 30 km/h, maximum = 100 km/h).

2. Take input speed from the user.

3. Compare input speed with the defined limits using `if-else` conditions.

4. Display the result as:

   * **"Overspeeding"** if speed > maximum limit.

   * **"Too Slow"** if speed < minimum limit.

        * **"Safe Driving"** if within range.

Algorithm :

Step 1: Start
Step 2: Declare integer speed
Step 3: Print "Enter the speed of the vehicle (km/h):"
Step 4: Read value of speed
Step 5: Check conditions
    if (speed >= 0 && speed <= 20)
        Print "Too Slow! Unsafe for highways."
    else if (speed >= 21 & speed <= 40)
        Print "Below Normal Speed."
    else if (speed >= 41 & speed <= 80)
        Print "Safe Driving. Keep it up!"
    else if (speed >= 81 & speed <= 100)
        Print "High Speed! Drive with caution."
    else if (speed > 100)
        Print "Overspeeding! Danger ahead."
    else
        Print "Invalid input."
Step 6: Stop.

Build :

Speed Ranges :

0 – 20 km/h → Too Slow (unsafe for highways)

21 – 40 km/h → Below Normal Speed

41 – 80 km/h → Safe Driving Range

81 – 100 km/h → High Speed (Caution)

101+ km/h → Overspeeding (Danger)

Code :

```c
#include <stdio.h>

int main() {
    int speed;

    printf("Enter the speed of vehicle in (km/h): ");
    scanf("%d", &speed);

    if (speed >= 0 && speed <= 20) {
        printf("Too slow, unsafe for highways.\n");
    }
    else if (speed >= 21 && speed <= 40) {
        printf("Below Normal Speed.\n");
    }
    else if (speed >= 41 && speed <= 80) {
        printf("Safe Driving, keep it up.\n");
    }
    else if (speed >= 81 && speed <= 100) {
        printf("High speed, drive safe.\n");
    }
    else if (speed >= 101 && speed <= 120) {
        printf("Overspeeding, can be dangerous.\n");
    }
    else {
        printf("Invalid input.\n");
    }

    return 0;
}
```

Output

```
Enter the speed of vehicle in (km/h): 17
Too slow, unsafe for highways.


=== Code Execution Successful ===
```

1. When speed is between 0 and 20 , output = too slow , unsafe for highway.

Output

```
Enter the speed of vehicle in (km/h): 30
Below Normal Speed.


=== Code Execution Successful ===
```

2. When speed is between 21 and 40, output = Below normal speed

```
Output

Enter the speed of vehicle in (km/h): 51
Safe Driving, keep it up.



=== Code Execution Successful ===
```

3. When speed is between 41 to 80, output = Safe driving, keep it up .

```
Output

Enter the speed of vehicle in (km/h): 92
High speed, drive safe.



=== Code Execution Successful ===
```

4. When speed is between 81 to 100, Output = High speed, drive safe.

```
Output

Enter the speed of vehicle in (km/h): 111
Overspeeding, can be dangerous.



=== Code Execution Successful ===
```

5. When speed is between 101 to 120, Output = Overspeeding, can be dangerous .

```
Output
Enter the speed of vehicle in (km/h): 500
Invalid input.


=== Code Execution Successful ===
```

6. When speed is so much that it is not possible for a bike or a car, Output = invalid input.

Publishing :

https://github.com/vedmuley536/Ved-Muley