TRAFFIC LIGHT CONTROL SYSTEM

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Traffic Light Control System – Report

Introduction

The **Traffic Light Control System** is a simple program that simulates the functioning of a real-world traffic light using a Python console. It follows a cyclic sequence of **Green, Yellow, and Red** lights, each having a specific duration. This program can be used for traffic simulations, educational purposes, or as a foundation for more advanced traffic management systems.

Methodology

The system follows a step-by-step approach to ensure smooth execution:

Step 1: Problem Definition

- The goal is to mimic a traffic light system using Python.

- The system should cycle through Green, Yellow, and Red lights continuously.

- Each light should be displayed for a fixed duration.

Step 2: Design & Planning

- Sequence of lights: Green → Yellow → Red → Repeat.

- Time duration for each light:

- Green Light: 5 seconds (Vehicles can move).

- Yellow Light: 2 seconds (Warning to slow down).

- Red Light: 5 seconds (Vehicles must stop).

Step 3: Implementation Using Python

- Use time.sleep() to introduce delays and control light duration.

- Use an infinite loop (while True) to keep the system running continuously.

Step 4: Testing & Debugging

- Verify that the output correctly follows the Green → Yellow → Red sequence.

- Ensure timing is accurate for each signal.

Step 5: Future Enhancements

- **Graphical Interface (GUI) using Tkinter/ Pygame.**

- **AI-based smart traffic control to adjust light duration based on traffic density.**

- **IoT-based real-world implementation using Raspberry Pi and sensors.**

Code Implementation

The following Python code executes the **Traffic Light Control System**:

python
CopyEdit
import time

```python
def traffic_light():
    while True:
        # Green Light
        print("\n🟢 GREEN LIGHT - GO 🚗💨")
        time.sleep(5)  # Wait for 5 seconds
```

```python
    # Yellow Light
    print("\n YELLOW LIGHT - SLOW DOWN ⚠")
    time.sleep(2)  # Wait for 2 seconds

    # Red Light
    print("\n RED LIGHT - STOP ⊖")
    time.sleep(5)  # Wait for 5 seconds

if __name__ == "__main__":
    print("Starting Traffic Light Control System...\n")
    traffic_light()  # Run the traffic light function
```

```
Starting Traffic Light Control System...

🟢 GREEN LIGHT - GO 🚗💨
(wait 5 seconds)


🟡 YELLOW LIGHT - SLOW DOWN ⚠️
(wait 2 seconds)


🔴 RED LIGHT - STOP ⛔
(wait 5 seconds)


(repeats infinitely)
```