

C PROGRAM MINI PROJECT

TRAFFIC SIGNAL MANAGEMENT SYSTEM

PROJECT TITLE: TRAFFIC SIGNAL MANAGEMENT SYSTEM

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ABSTRACT:

This project presents a Traffic Signal Management System developed using the C programming language to simulate and manage traffic flow at road intersections. Traffic congestion is a major issue in urban areas, leading to delays and accidents. This system helps in controlling vehicle movement efficiently by managing traffic lights using programmed time intervals.

The system provides a menu-driven interface where users can simulate traffic signals for different directions such as North, South, East, and West. Each signal operates based on a fixed timing mechanism (Red, Yellow, Green). The program ensures smooth traffic control by allowing only one direction to move at a time while others remain stopped. This project demonstrates the practical implementation of control structures, loops, and functions in solving real-world traffic management problems.

INTRODUCTION:

In modern cities, traffic management plays a vital role in maintaining road safety and reducing congestion. Improper signal timing can lead to accidents and traffic jams.

This project provides a simple Traffic Signal Management System that simulates signal control at a four-way intersection. It helps understand how traffic lights operate in sequence and ensures organized vehicle movement. The project serves as a practical example of applying programming concepts to real-life traffic control systems.

OBJECTIVES:

- To design and develop a Traffic Signal Management System using C programming.
- To understand the use of loops for continuous traffic signal operation.
- To apply conditional statements (if-else, switch) for signal control and direction management.
- To implement functions for modular and structured programming.
- To simulate real-time signal changes using time delay functions.
- To develop a menu-driven console application.
- To enhance logical thinking and problem-solving skills.
- To understand the working principle of automated traffic systems.

TOOLS AND TECHNOLOGY:

- **PROGRAMMING LANGUAGE:** C
- **COMPILER:** TURBO C, VS CODE, ONLINE COMPILER
- **PLATFORM:** WINDOWS/LINUX

SYSTEM REQUIREMENTS:

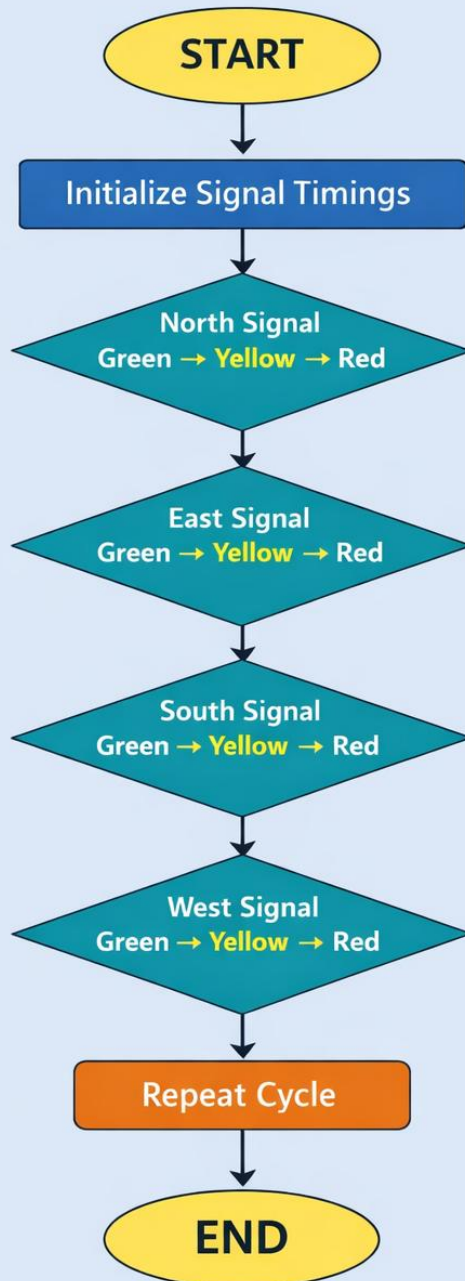
- HARDWARE : BASIC COMPUTER WITH MINIMUM 4GB RAM
- SOFTWARE: C COMILER AND ANY IDE/TEXT EDITOR\

ALGORITHM:

- Start the program.
- Display the traffic signal menu.
- Initialize signal timings (Green, Yellow, Red).
- Allow traffic movement for one direction (Green signal ON).
- Display Yellow signal for warning.
- Change the signal to Red.
- Repeat the process for the next direction (North → East → South → West).
- Continue the cycle until the user chooses to exit.
- End the program.

FLOW CHART:

TRAFFIC SIGNAL MANAGEMENT SYSTEM



SOURCE CODE:

```
#include <stdio.h>
#include <stdlib.h>
#ifdef _WIN32
#include <windows.h>
#else
#include <unistd.h>
#endif

void delay(int seconds) {
#ifdef _WIN32
    Sleep(seconds * 1000);
#else
    sleep(seconds);
#endif
}

void signal(char direction[]) {
    printf("\nDirection: %s\n", direction);

    printf("GREEN Light ON\n");
    delay(3);

    printf("YELLOW Light ON\n");
    delay(2);

    printf("RED Light ON\n");
    delay(1);
}

int main() {
    int choice;

    while (1) {
        printf("\n===== TRAFFIC SIGNAL MANAGEMENT =====\n");
        printf("1. Start Traffic Signal\n");
        printf("2. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);

        switch (choice) {

        case 1:
            signal("NORTH");
            signal("EAST");
```

```
        signal("SOUTH");
        signal("WEST");
        break;

    case 2:
        printf("\nExiting Traffic Signal System...\n");
        return 0;

    default:
        printf("\nInvalid Choice! Try Again.\n");
    }
}
```

OUTPUT:

===== TRAFFIC SIGNAL MANAGEMENT =====

1. Start Traffic Signal
2. Exit

Direction: NORTH
GREEN Light ON
YELLOW Light ON
RED Light ON

Direction: EAST
GREEN Light ON
YELLOW Light ON
RED Light ON

RESULT:

THE PROGRAM EXECUTED SUCCESSFULLY AND PRODUCED THE EXPECTED OUTPUT.

APPLICATIONS:

- Used in road intersections to control vehicle movement.
- Helps reduce traffic congestion.
- Improves road safety by preventing collisions.
- Can be extended for smart traffic systems.
- Useful for educational purposes to understand embedded and automation systems.
- Can be integrated with sensor-based traffic control systems.

CONCLUSION:

This project demonstrates a basic simulation of a Traffic Signal Management System using C programming. It effectively shows how programming concepts like loops, functions, and conditional statements can be applied to real-world traffic control systems. The system ensures organized vehicle movement and improves understanding of automated signal operations.

FUTURE ENHANCEMENTS:

- Add vehicle density-based signal control using sensors.
- Implement emergency vehicle priority system.
- Develop a graphical user interface (GUI).
- Connect with real-time traffic data.
- Implement smart traffic optimization algorithms.

REFERENCE:

Balagurusamy, E., *Programming in ANSI C*, McGraw Hill Edu