#include <reg51.h>

This line includes the header file **reg51.h**, which contains definitions specific to the 8051 microcontroller family. It is necessary to include this file to use the register and port definitions for the microcontroller.

cCopy code

sbit LED1 = P1^0; // Define LED1 pin sbit LED2 = P1^1; // Define LED2 pin sbit LED3 = P1^2; // Define LED3 pin sbit LED4 = P1^3; // Define LED4 pin sbit LED5 = P1^4; // Define LED5 pin sbit LED6 = P1^5; // Define LED6 pin sbit LED7 = P1^6; // Define LED7 pin sbit LED8 = P1^7; // Define LED8 pin

These lines define the LEDs as single bit variables (**sbit**) and assign them to the corresponding pins on Port 1 (**P1**) of the 8051 microcontroller. For example, **LED1** is defined as bit 0 of Port 1.

cCopy code

void delay(unsigned int count) { unsigned int i, j; for (i = 0; i < count; i++) for (j = 0; j < 1000; j++); }

This function **delay** is defined to introduce a delay in the program execution. It takes an argument **count** which specifies the duration of the delay. The function contains nested loops that essentially waste CPU cycles, resulting in a delay. The actual delay duration depends on the processor speed and the number of iterations in the loops.

cCopy code

void main() { unsigned int i; while (1) { for (i = 1; i <= 8; i++) { if (i % 2 == 0) // Check if the number is even { LED1 = LED3 = LED5 = LED7 = 0; // Turn off odd LEDs LED2 = LED4 = LED6 = LED8 = 1; // Turn on even LEDs } else { LED1 = LED3 = LED5 = LED7 = 1; // Turn on odd LEDs LED2 = LED4 = LED6 = LED8 = 0; // Turn off even LEDs } delay(500); // Delay for 500 milliseconds } } }

This is the **main** function where the program execution starts. It contains an infinite loop (**while (1)**) that repeats indefinitely.

Inside the loop, there is another loop that iterates from **i = 1** to **i = 8**. This loop is responsible for controlling the LEDs.

For each value of **i**, it checks if **i** is even (**i % 2 == 0**). If it is, it turns off the odd-numbered LEDs (**LED1**, **LED3**, **LED5**, and **LED7**) by setting them to 0, and turns on the even-numbered LEDs (**LED2**, **LED4**, **LED6**, and **LED8**) by setting them to 1.

If **i** is odd, it does the opposite. It turns on the odd-numbered LEDs and turns off the even-numbered LEDs.

After setting the LEDs accordingly, it calls the **delay** function with a delay of 500 milliseconds.

This sequence of turning on/off LEDs with a delay repeats indefinitely, creating a pattern where the even-numbered LEDs alternate with the odd-numbered LEDs.