MULTISTOREYED CAR PARKING SYSTEM

CONTENTS

1. INTRODUCTION

2. BASIC IDEA

3. HARDWARE DESCRIPTION
   - Display section
   - Lift & motor section
   - LCD section
1. **Introduction:**

Automatic multistoried car parking system helps to minimize the car parking area. In the modern world, where parking-space has become a very big problem, it has become very important to avoid the wastage of space in modern big companies and apartments etc. In places where more than 100 cars need to be parked, this system proves to be useful in reducing wastage of space. This Automatic Car Parking System enables the parking of vehicles, floor after floor and thus reducing the space used. Here any number of cars can be parked according to the requirement. These makes the systems modernized and even a space-saving one. This idea is developed using 8051 Microcontroller.

2. **Basic idea:**

A display is provided at the ground floor which is basically a counter that displays number of cars in each floor. It informs whether the floors are fully filled with the cars or is it having place in a particular floor or not. There is facility of lift to carry the car to up and down. Movement of Lift is controlled by stepper motor. An indicator with a green and red LED is kept in all the floors to indicate whether the lift is busy or is it ready to take the car up or down. If the red LED glows that means the lift is already engaged and the person has to wait for the green LED to glow. In this project we have provided three floors of a building for car parking. Maximum storage capacity of each floor is given as 4. Storage capacity can be changed according to the requirement.

When the lift reaches the first floor, the processor compares the filled amount to that of the already fed capacity of that floor, and if it finds that the first floor is fully filled, it goes to the second floor and thus the procedure stops here. As soon as a car is placed in a particular floor, the display counter at the ground floor increments as to indicate the floor capacity has decreased by one. After the lift places the car in a particular floor, it comes back to its normal position and that time, the motor that drives it, also stops. Now processor sends signal to glow GREEN LED indicating that lift is free.

When a person needs to come down from a particular floor to ground floor, he is expected to press the switch placed in that floor. Now switch sends signal to motor that the lift has to be send back to that particular floor and sends a signal to glow RED LED indicating that the lift is busy. As soon as the lift reaches that particular floor car should come inside the lift, the display counter at the ground floor decrements by one as to indicate the floor capacity has increased by one. Lift comes back to its normal position and that time, the motor that drives it, also stops. Now processor sends signal to glow GREEN LED indicating that lift is free.

If there no parking taking place, the processor carries out the job according to the following priority:-
1. It checks whether any car is entered to lift.

2. It checks whether any switch is pressed placed in each floor.

Program is written using 8051 microcontroller. Two 8255 IC's are connected to 8051. All circuits are interfaced with 8255. Block diagram of this project is shown below.

3. **Hardware description:**

Following are the main sections in this model.

3.1. Display section
3.2. Keyboard, indicator & Beeper section

3.3. Lift & motor section

3.4. Sensor section

3.5. LCD section

* * *

A brief Introduction to 8051 Microcontroller:

When we have to learn about a new computer we have to familiarize about the machine capability we are using, and we can do it by studying the internal hardware design (devices architecture), and also to know about the size, number and the size of the registers.

The hardware is driven by a set of program instructions, or software. One familiar with hardware and software, the user can then apply the microcontroller to the problems easily. In this project we are making use of microcontroller.

The block diagram of the 8051 shows all of the features unique to microcontrollers:

- Internal ROM and RAM
- I/O ports with programmable pins
- Timers and counters
- Serial data communication

The block diagram also shows the usual CPU components, program counter, ALU, working registers, and the clock circuits.

The 8051 architecture consists of these specific features:

- 8 bit CPU with registers A and B (accumulators)
- 16 bit PC & data pointer (DPTT)
- 8 bit program status word (PSW)
- 8 bit stack pointer (SP)
· Internal ROM 4k
· Internal RAM of 128 bytes.
· 4 register banks, each containing 8 registers
· 80 bits of general purpose data memory
· 32 input/output pins arranged as four 8 bit ports: P0-P3
· Two 16 bit timer/counters: T0-T1
· Two external and three internal interrupt sources
· Oscillator and clock circuits

A pin out of the 8051 microcontroller having 40 pins is shown below.
Lift and motor section

In lift section, there will be a guard at each floor in order to press the switch when a car has entered the lift or not. When the GREEN LED of indicator section glows, that means the lift is ready for the car to enter. When the car enters the lift, the switch will give a signal that a car has entered the lift. Then program decides which floor lift has to go and gives a signal to motor section.

The motor section is a mechanical part of the model which is used for taking the lift up/down. When the lift has to go up, program gives the signal and the motor rotates clockwise and if it has to go down, it rotates anticlockwise. First 4 pins port A is connected to motor. Power transistors must be connected to drive the motor.

LCD Section:

In this project LCD is used to display some messages which is useful to car owners. Here 2X16 LCD (Liquid Crystal Display) is used. This is used to display messages like

a) WELCOME TO CAR PARKING SYSTEM
b) LIFT IS BUSY PLEASE WAIT
Use of sensor in place of switches:

We can use the LDR sensor in place of switches. Their working principal is based on the potential difference of voltage due to which (change in voltage when any object comes in its way) it generates a signal to the microcontroller.

Circuit Diagrams: